NNIDR Australian Dementia Forum

QIMR Berghofer Medical Research Institute

1-3 May 2016

Abstracts

Australian Government

NHMRC National Institute for Dementia Research

Contents

Sunday 1 May 2016

3.00pm - 5.00pm	Registration
5.00pm – 6.30pm	**Welcome to the 2016 NNIDR Symposium** *Professor John McCallum* *Director, NHMRC – National Institute for Dementia Research and Symposium Chair* **Introduction to the Forum** *Graeme Samuel AC* *President, Alzheimer's Australia National Board and NNIDR Board* **Welcome to Country** **Welcome to QIMR** *Professor Michael Breakspear* **Keynote address from the Breakthrough Prize Winner 2015** **Whole genome analysis of neurodegeneration** *Professor John Hardy* *Head, Department of Molecular Neuroscience and Chair of Molecular Biology of Neurological Disease, UCL Institute of Neurology, United Kingdom*
6.30pm - 7.30pm	Networking Drinks – Level 6 outdoor terrace

Monday 2 May 2016

8.00am - 5.00pm	Registration
8.00am – 8.30am	Arrival tea and coffee

Session 1 Diagnosis/Assessment

Chairperson	**Carol Bennet, CEO, Alzheimer's Australia National Office**
8.30am – 9.20am	**Keynote address - Catching dementia – does the evidence stack up?** *Professor Glenda Halliday* *Director, Sydney Brain Bank, UNSW and NeuRA Neuroscience Research Australia* *(NeuRA), Australia*
9.20am – 9.30am	**Consumer discussion** *John Doull*
9.30am – 9.50am	**Prospective Imaging Study of Ageing: Genes, Brain and Behaviour (PISA)** *Professor Michael Breakspear & Dr Christine Guo*
9.50am – 10.10am	**Vascular determinants of dementia** *Associate Professor Amy Brodtmann*
10.10am – 10.30am	**Developing insight into the molecular origins of familial and sporadic frontotemporal dementia and amyotrophic lateral sclerosis** *Associate Professor Ian Blair*
10.30am – 11.00am	Morning Tea
11.00am – 12.30pm	**Rapid fire Talks – NHMRC – ARC Dementia Research Development Fellows** *Chair: Professor Colin Masters*
12.30pm – 2.00pm	Lunch & Poster Session

Session 2 Care/Living with Dementia

Chairperson	**Dr Jane Thompson**
2.00pm – 2.10pm	**Consumer discussion** *Christine & Paul Bryden*
2.10pm – 2.30pm	**What is the 'Australian Community of Practice in Research in Dementia'?** *Professor Rob Sanson-Fisher*

2.30pm – 2.50pm	**Moving Forward in the NNIDR Unitary DCRC Model: The Lens of DCRC: CC** *Professor Elizabeth Beattie*
2.50pm – 3.10pm	**NHMRC Partnership Centre Dealing with Cognitive and Related Functional Decline in Older People: improving the quality of care for people with dementia and their carers.** *Professor Susan Kurrle*
3.10pm – 3.30pm	**Dementia Collaborative Research Centre - Assessment and Better Care** *Professor Brian Draper*
3.30pm – 4.00pm	Afternoon Tea
4.00pm – 5.00pm	**Panel Discussion: Innovations in care research** *Chair: Dr Jane Thompson* *Panel members: Professor Rob Sanson-Fisher* *Professor Elizabeth Beattie* *Professor Brian Draper* *Professor Susan Kurrle*

Tuesday 3 May 2016

8.00am - 5.00pm	Registration
8.00am – 8.30am	Arrival tea and coffee

Session 3 Intervention/Treatment

Chairperson	**Professor Peter Schofield**
8.30am – 8.50am	**Alzheimer's disease: Aβ amyloid is the critical target for primary (pre-AD) and secondary (preclinical) disease-modifying strategies** *Professor Colin Masters*
8.50am – 9.10am	**Clem Jones Centre for Ageing Dementia Research - From basic mechanisms to therapeutic interventions** *Professor Jürgen Götz*
9.10am – 9.30am	**Structural imaging in dementia with Lewy bodies** *Dr Rosie Watson*
9.30am – 10.10am	**Dementia in Indigenous Communities** *Professor Leon Flicker* *Commentator: Dr Tammy Kimpton* This session will provide opportunity for discussion and perspectives from Indigenous people on dementia in their communities.
10.10am – 11.00am	**Keynote Address from the Head of Leading German Dementia Research Institute** *Professor Pierluigi Nicotera* *Scientific Director and Chairman of the Board, German Center for Neurodegenerative Diseases (DZNE), Germany*
11.00am – 11.30am	Morning Tea
11.30am – 1.00pm	**Rapid fire Talks – NHMRC – ARC Dementia Research Development Fellows** *Chair: Professor John McCallum*
1.00pm – 2.40pm	Lunch & Poster Session

Session 4 Prevention

Chairperson	**Professor John McCallum**
2.40pm – 3.00pm	**Dementia Collaborative Research Centre: Early Diagnosis and Prevention – overview and update** *Professor Kaarin Anstey*

3.00pm – 3.20pm	**Maintain Your Brain (MYB): A large scale multi-modal online randomised placebo-controlled intervention to reduce cognitive decline** *Professor Perminder Sachdev*
3.20pm – 3.40pm	**Next Generation Brain Training in the Maintain Your Brain Trial** *Professor Michael Valenzuela*
3.40pm – 4.00pm	**Evaluating dementia risk reduction eHealth tools for the Australian community** *Dr Maree Farrow*
4.00pm – 4.15pm	Afternoon Tea
4.15pm – 5.00pm	**Panel Discussion: Innovations in intervention/treatment and prevention research** *Chair: Professor Peter Schofield* *Panel members: Professor John Hardy* *Professor Pierluigi Nicotera* *Professor Glenda Halliday* *Christine Bryden*

Keynote speakers

Professor John Hardy

Head, Department of Molecular Neuroscience and Chair of Molecular Biology of Neurological Disease
UCL Institute of Neurology United Kingdom

Professor John Hardy is the Head of the Department of Molecular Neuroscience and Chair of Molecular Biology of Neurological Disease at the UCL Institute of Neurology. In 2015, John was awarded the $3 million Breakthrough Prize in Life Sciences for his pioneering research into the genetic causes of Alzheimer's disease, other forms of dementia and Parkinson's disease. In recognition of his exceptional contributions to science, he was also elected a Fellow of the Royal Society in 2009.

Professor Glenda Halliday

Director, Sydney Brain Bank, UNSW and NeuRA
Neuroscience Research Australia (NeuRA), Australia

Professor Glenda Halliday is an Australian Professor of Neuroscience leading a research program of 70 researchers tackling non-Alzheimer's neurodegeneration that stems from her work on frontotemporal and motor neurodegenerative syndromes, and Parkinson's disease. She is also Director of the Sydney Brain Bank. She received her degrees at University of New South Wales, and postdoctoral training at Flinders University prior to an ARC Queen Elizabeth II Fellow and NHMRC research fellowships since 1988, joining NeuRA in 1993. She has published more than 300 research papers and 2 books, and attracted $30m in grant funding. Prof Halliday is on the editorial boards of 5 international journals, on Scientific Advisory Boards for 3 research institutes (one international), and is a committee member for a number of international organizations, including the International Brain Research Organization (a member organization of UNESCO). She was elected president of the Australian Neuroscience Society (ANS 2006-2007), awarded the 2011 ANS Nina Kondelos Prize, and named a high achiever in Australian Health and Medical Research by NHMRC.

Professor Pierluigi Nicotera

Scientific Director and Chairman of the Board
German Center for Neurodegenerative Diseases (DZNE), Germany

Prof Pierluigi Nicotera, a renowned scientist and leading international expert in the field of neuronal cell death, was appointed Scientific Director of DZNE in April 2009. Prof Nicotera was trained in General Medicine and Cardiology at the University of Pavia, Italy. He obtained his Ph.D. at the Karolinska Institute in Stockholm, where he worked subsequently as associate professor. His research has been centred on the molecular mechanisms that lead to neuronal demise following chronic and acute insults. He was awarded the International Prize Gerolamo Cardano by the Rotary Club of Pavia (Italy) for scientific credits in the research of mechanisms determining neuronal death.

Invited speakers

Professor Michael Breakspear

Group Leader, QIMR Berghofer Medical Research Institute & Coordinator program of Mental Health research

Michael Breakspear is Group Leader at QIMR Berghofer and coordinator of the Program of Mental Health Research. He trained in Medicine and Physics at the University of Sydney and completed his psychiatry training at the BlackDog Institute, Sydney. He combines computational modelling with advanced neuroimaging techniques to study neurodevelopmental and neurodegenerative disorders. He is a psychiatrist in the Brisbane Prison Mental Health Service.

Dr Christine Guo

Team Head, QIMR Berghofer Medical Research Institute

Christine Guo is a Team Head at QIMR Berghofer. She came to Australia in 2013, after finishing her PhD at Stanford University and postdoctoral training at UCSF. Dr Guo's research experience extends from molecular biology and genetics to systems neuroscience, and the diversity of her techniques ranges from electrophysiology in animal models to clinical neuropsychology and functional neuroimaging. Dr Guo has led several studies using a multidisciplinary approach, combining functional MRI imaging analysis, clinical anatomy and clinical neuropsychology.

Associate Professor Amy Brodtmann

Co-Division Head, Behavioural Neuroscience, NHMRC Clinical Career Development Fellow at the Florey Institute for Neuroscience and Mental Health in Melbourne, Australia; Stroke Neurologist, Austin Health; Cognitive Neurologist and Clinic Director, Eastern Cognitive Disorders Clinic, Box Hill Hospital

Associate Professor Amy Brodtmann is a stroke and cognitive neurologist at Austin Health and director of the Eastern Cognitive Disorders Clinic. She is the recipient of many awards and grants for her work in stroke and dementia, including NHMRC project grants, post-Graduate, post-Doctorate, and clinical Career Development Fellowships, and is CIA on a Dementia Research Team Grant. She sits on the editorial boards of *Neurology* and the *International Journal of Stroke*, the board and committee of Alzheimer's Australia Victoria Dementia Research Grants, is an inaugural member of the Wicking Strategic Review Panel, and is a founding member of the Australian Frontotemporal Dementia Association. Her research focuses on the imaging of brain network degenerations following stroke, post-stroke behavioural syndromes, and the diagnosis and management of focal onset dementias.

Associate Professor Ian Blair

Faculty of Medicine and Health Science, Macquarie University

A/Prof Ian Blair's research career has focussed on determining the molecular basis of a variety of neurological disorders including ALS/MND, FTD, hereditary sensory neuropathy (HSN), Charcot Marie Tooth disorder (CMT), the spinal cerebellar ataxias (SCA), Joubert syndrome, and bipolar disorder. At Macquarie University, his team works to unravel the molecular and cellular basis of ALS and FTD. His group has played a key role in several ALS/FTD gene discoveries including identification of mutations in the TDP-43 and FUS genes. These discoveries have opened new chapters in ALS/FTD research and led to effective diagnostic tests for ALS, CMT1A and HSN1.

Professor Rob Sanson-Fisher

Director, Health Behaviour Research Group, School of Medicine and Public Health, University of Newcastle

Laureate Professor Rob Sanson-Fisher is Director of the Health Behaviour Research Group, School of Medicine and Public Health, University of Newcastle. An internationally recognised leader in health behaviour research, his work successfully combines behavioural approaches to knowledge translation, health promotion, health service evaluation and chronic disease control. He has published over 470 peer-reviewed journal articles and obtained some 100 competitive research grants, with a total value over $36 million. His research interests include exploring health care provider behaviour and adoption of best evidence practice, and the development, implementation and evaluation of interventions to improve health outcomes for vulnerable population groups.

Professor Elizabeth Beattie

Professor of Aged and Dementia Care, School of Nursing, Queensland University of Technology

Elizabeth Beattie, Professor of Aged and Dementia Care, School of Nursing, Queensland University of Technology, is a psychgeriatric nurse educated in Australia, the UK and the US who has been involved in dementia-focused clinical practice, education and research for 30 years. She directs the Dementia Collaborative Research Centre Carers and Consumers and the Queensland Dementia Training Study Centre. Elizabeth has an international nursing leadership profile and a sustained record of competitive research funding and publication. Her research is focused on improving the quality of care and quality of life of people living with dementia and those who support them.

Professor Susan Kurrle

Geriatrician, Kur-ring-gai Hospital, Sydney

Susan Kurrle is a geriatrician practising at Hornsby Ku-ring-gai Hospital in northern Sydney, and Batemans Bay Hospital in southern NSW, and she holds the Curran Chair in Health Care of Older People in the Faculty of Medicine at the University of Sydney. Since 2012 she has led the NHMRC Partnership Centre on Dealing with Cognitive and Related Functional Decline in Older People. This Centre focusses on research and implementation projects dealing particularly with the care aspect of dementia.

Professor Brian Draper

Professor (Conjoint), School of Psychiatry, University of NSW, and Clinical Director, Academic Department for Old Age Psychiatry, Prince of Wales Hospital

Brian Draper is an old age psychiatrist and Conjoint Professor, School of Psychiatry, UNSW, Sydney Australia. He is Clinical Director, Academic Department for Old Age Psychiatry, Prince of Wales Hospital, Randwick & Deputy Director of the Dementia CRC-ABC at UNSW. He is Board Member, International Psychogeriatric Association. He has published over 300 scientific articles on clinical aspects of dementia and cognitive disorders in the community, hospitals and residential aged care. Other areas of research include late life suicidal behavior, substance use, depression and carer stress.

Professor Colin Masters

Division Head, the Florey Institute

Colin Masters has focused his career on research in Alzheimer's disease and other neurodegenerative diseases. His work over the last 35 years is widely acknowledged as having had a major influence on Alzheimer's disease research world-wide, particularly the

collaborative studies conducted with Konrad Beyreuther in which they discovered the proteolytic neuronal origin of the Aβ amyloid protein which causes Alzheimer's disease. This work has led to the continued development of diagnostics and therapeutic strategies. More recently, his focus has been on describing the natural history of Alzheimer's disease as a necessary preparatory step for therapeutic disease modification.

Professor Jürgen Götz

Inaugural Director, Clem Jones Centre for Aging Dementia Research, Queensland Brain Institute, Brisbane

Professor Jürgen Götz is the inaugural Director of the Clem Jones Centre for Ageing Dementia Research at the Queensland Brain Institute in Brisbane. Götz studied biochemistry in Switzerland and earned his PhD in immunology with Nobel Laureate Köhler in Germany. After postdoctoral work at UCSF and at Novartis, he became a group leader in Zürich, before moving to Sydney in 2005, and Brisbane in 200x. A major focus of his laboratory is the generation and analysis of transgenic animal models to gain a better mechanistic understanding of Alzheimer's disease and to develop therapeutic interventions targeting two key molecules in disease, tau and amyloid-beta.

Professor Leon Flicker

Professor of Geriatric Medicine, University of Western Australia

Leon Flicker is the inaugural Professor of Geriatric Medicine at the University of Western Australia since 1998. He helped establish a research unit aimed at translational issues focusing on the health needs of older people, the Western Australian Centre for Health and Ageing. He has been interested in the risk factors, assessment and management of the common problems of older people. He also pursues studies on why some older people achieve healthy ageing. He has published over 300 peer-reviewed articles on a wide variety of health issues affecting older people.

Dr Rosie Watson

Consultant Geriatrician, Royal Melbourne Hospital, Cognitive, Dementia and Memory Service and the Florey Institute, University of Melbourne

Rosie Watson is a Consultant Geriatrician with current appointments at the Royal Melbourne Hospital, including the Cognitive, Dementia and Memory Service and the Florey Institute of Neurosciences – The University of Melbourne. After completing her clinical training in geriatric medicine in Melbourne, she undertook her PhD studies at the Institute of Ageing and Health, Newcastle upon Tyne, UK investigating the use of MRI techniques in dementia with Lewy bodies and Alzheimer's disease. Her current research interests include how the use of neuroimaging can help better understand dementia, disease trajectories and improve the clinical diagnosis.

Professor Kaarin J Anstry

Professor of Psychology and Population Health, Australian National University

Kaarin J. Anstey is a Professor of Psychology and Population Health at the Australian National University and Director of the Dementia Collaborative Research Centre - Early Diagnosis and Prevention. Her research interests focus on the prevention of dementia, and the impact of cognitive impairment on activities such as driving. Anstey led the first online dementia risk reduction intervention called Body Brain Life that is soon to be trialled in Primary Care. Anstey is a Director of the Alzheimer's Australia Dementia Research Foundation and the Global Council on Brain Health, an initiative of the US AARP and UK HelpAge organisations.

Professor Perminder Sachev

Scientia Professor of Neuropsychiatry, Co-Director, Centre for Healthy Brain Ageing (CHeBA), School of Psychiatry, UNSW, Australia

Perminder Sachdev AM MBBS MD FRANZCP PhD MFPOA is Scientia Professor of Neuropsychiatry, Co-Director of the Centre for Healthy Brain Ageing (CHeBA), School of Psychiatry, UNSW Australia. He is Director of the Neuropsychiatric Institute (NPI), Prince of Wales Hospital, Sydney. He is a past President of the International Neuropsychiatric Association and the International College of Geriatric Psychoneuropharmacology. He has broad research interests, with a major focus on dementia and cognitive ageing, drug-induced movement disorders, neuroimaging and brain stimulation. He has over 700 peer-reviewed journal papers and 5 books, including one for lay readers (*The Yipping Tiger and other tales from the neuropsychiatric clinic*). He was awarded a Member of the Order of Australia (AM) for service to medical research in the field of neuropsychiatry, and to professional associations at a national and international level, an International Distinguished Fellowship from the APA (USA) and a Deans Award for Outstanding Achievement (Academic) for his outstanding contribution to research and teaching in the Faculty of Medicine.

Associate Professor Michael Valenzuela

Leader, Regenerative Neuroscience Group, NHMRC Clinical Career Development Fellow, Brain & Mind Research Centre, University of Sydney

Michael trained in psychology, medicine and neuroscience and for his PhD work was awarded the Australian Museum's Eureka Prize for Medical Research. In 2010, he received a NHMRC Excellence Award as the top-ranked Career Development Fellow and in 2012 moved to the University of Sydney to establish the Regenerative Neuroscience Group at the Brain and Mind Centre. Michael's research focuses on lifestyle-based interventions to help prevent dementia and his team is developing an all-new stem cell therapy. He is the author of the popular science title '*Maintain Your Brain'* and was part of the team that developed BrainyApp.

Dr Maree Farrow

Cognitive Neuroscientist & Lecturer, Wicking Dementia Research and Education Centre, University of Tasmania

Dr Maree Farrow is a cognitive neuroscientist. She is a Lecturer with the Wicking Dementia Research and Education Centre at the University of Tasmania, and a Visiting Fellow with the Centre for Research on Ageing, Health and Wellbeing at The Australian National University. Her current research interests include dementia risk reduction, timely diagnosis and early intervention for cognitive impairment, and translating evidence into programs for the community and primary care**.** She has developed and evaluated a range of resources and eHealth tools for community education about dementia and risk reduction.

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Keynote Speaker Abstracts

Professor Glenda Halliday
Neuroscience Research Australia AUSTRALIA
Email: g.halliday@neura.edu.au
Keynote Presentation
Theme: 1. Diagnosis/Assessment
Monday 2 May 2016
8.30am – 9.20am

Catching dementia – does the evidence stack up?

Glenda Halliday*[1]

1 UNSW Medicine & Neuroscience Research Australia, Sydney, Australia

Prions are proteins that can take on an infectious form and spread through the brain of anyone infected, and also can infect others if ingested. After infection, there is a long incubation period and the infectious form of the protein builds up in the brain, the neurons swell and burst, and the brain becomes inflamed. It is now apparent that the spread of pathological forms of normal brain proteins in association with inflammation occurs in many neurodegenerative diseases, and recent publications have suggested that pathological proteins can be transmitted through contact with already infected brain material. This has now been suggested for Alzheimer's disease, but the data is strongest for multiple system atrophy (MSA), which has some similarities to prion disease. There include considerable inflammation, considerable neuronal death, and transmission along white matter tracts. Compared to Parkinson's disease, MSA is usually rapidly progressive, similar to prion disease. Unlike Parkinson's disease, extracts from the brains of patients with MSA appear to be able to transmit MSA pathology to particular genetic mice, and then the aggregates from these mice can also be transmitted in similar mice [1]. However, unlike prions, not all mice can be infected [1], indicating that a predisposition is important for the phenomenon. What is it that could predispose people to MSA? Genetic polymorphisms in the prion protein predispose people to prion diseases, although recent data suggests that common genetic variations predisposing to MSA are unlikely [2]. There is some evidence that compared with Parkinson's disease, patients with MSA are more likely to have similar polymorphisms in the prion protein gene [3]. They also have polymorphisms in genes involved in oxidative stress, mitochondrial dysfunction, inflammatory processes, as well as parkinsonism- and ataxia-related genes [4]. It will be important to determine what may predispose people to the more rapidly progressive alpha-synucleinopathy of MSA, or other forms of neurodegeneration.

[1] Prusiner *et al.* Proc Natl Acad Sci U S A. 2015;112(38):E5308-17.
[2] Federoff *et al.* Parkinsonism Relat Disord. 2016;22:35-41
[3] Shibao *et al.* Clin Auton Res. 2008;18(1):13-9
[4] Stemberger *et al.* Neurobiol Aging. 2011;32(10):1924.e5-14

Professor John Hardy

Email: r.williamson@unimelb.edu.au
Keynote Presentation
Theme: No Theme Allocated
Sunday 1 May 2016
5.40pm – 6.30pm

Abstract to come

Professor Pierluigi Nicotera

Email: pierluigi.nicotera@dzne.de
Keynote Presentation
Theme: 3. Intervention/Treatment
Tuesday 3 May 2016
10.10am – 11.00am

Abstract to come

Invited Speaker Abstracts

Professor Kaarin Anstey
Centre For Research On Ageing, Health & Wellbeing, ANU
Email: kaarin.anstey@anu.edu.au
Oral Presentation
Theme: 4. Prevention
Tuesday 3 May 2016
2.40pm – 3.00pm

Dementia Collaborative Research Centre: Early Diagnosis and Prevention – overview and update

Professor Kaarin Anstey*[1]

1 Centre for research on ageing, health and wellbeing, ANU, Australia

The Dementia Collaborative Research Centre: Early Diagnosis and Prevention (DCRC-EDP) focuses on translating basic research related to early detection of dementia and risk reduction, into practical tools, interventions and policy. Compared with other areas of population health, dementia prevention is relatively new and methodologies and effective interventions are still being developed. The DCRC-EDP has contributed to global advances in early diagnosis and prevention at several levels. The groundbreaking AiBL study has been at the forefront of biomarker development in Alzheimer's disease. Systematic reviews of cohort studies funded by DCRC have led to knowledge that has informed government policies internationally as well as intervention design. Risk assessment tools have been developed that are now widely in use online and as apps. The DCRC has supported the development of interventions to reduce risk of dementia. Recently completed interventions have been conducted in nutrition, lifestyle modification, and dementia literacy. Interventions are in progress in cognitive training, sitting reduction and physical activity. The presentation provides an overview of the program and discusses the challenge and opportunity of knowledge translation in this field.

Professor Elizabeth Beattie
QUT
Email: elizabeth.beattie@qut.edu.au
Oral Presentation
Theme: 2. Care/Living With Dementia
Monday 2 May 2016
2.30pm – 2.50pm

Moving Forward in the NNIDR Unitary DCRC Model: The Lens of DCRC:CC

Elizabeth Beattie*[1]

1 Queensland University of Technology, Brisbane, Australia

The research agenda of the Dementia Collaborative Research Centre: Carers and Consumers has historically focused on basic and applied studies and knowledge translation designed to meet gaps in understanding of, or provide strong evidence for interventions designed to improve, the issues affecting the care, support and quality of life of people living with dementia and carers. Pressing issues include: systematic reviews of meaningful activities and carer resilience, supporting carer wellness, respite care options, home care support, decision making about care choices, palliative care, responsive interventions for behavioural

and psychological symptoms and the use of technologies such as companion robots to connect and enrich lives. Projects undertaken by DCRC: CC partners span all contexts of care (community, RACF, acute care) and have been determined in increasingly close consultation with the Consumer Dementia Research Network. In the absence of a cure for dementia, and with limited effective treatments, improving care, carer support and QoL across the dementia trajectory is critical. A highlight of our achievements is the completion of the first nationally representative study of Quality of Life for people living with dementia in residential aged care (N =53 facilities across 5 states and 1 territory, including 430 people with dementia, over 400 family carers and over 900 staff members). Australia now has world class benchmarking on a set of outcome variables essential to improving daily QoL: depression, behavioural symptoms, activities, staff factors, person centred care uptake and environmental characteristics, in addition to perceived QoL from three perspectives (person with dementia, family and staff). We are currently disseminating study outcomes in local, national and international fora and hope to use study findings to develop targeted research and KT projects consistent with NNIDR priorities. We look forward to uniting, extending and energising the pool of investigators skilled and committed to care focused applied research and KT around these NNIDR priorities and growing the next generation of world class care researchers. Challenges for care-focused researchers from any original DCRC within the unitary DCRC model will include creating and sustaining new collaborations and synergies across the dementia initiative to best respond to and meet priorities.

A/Professor Ian Blair
Macquarie University
Email: ian.blair@mq.edu.au
Oral Presentation
Theme: 1. Diagnosis/Assessment
Monday 2 May 2016
10.1 0am – 10.30am

Developing insight into the molecular origins of familial and sporadic frontotemporal dementia and amyotrophic lateral sclerosis

Julie Atkin[1], Roger Chung[1], Gilles Guillemin[1], Lezanne Ooi[2], William Wilson[3], Mark Molloy[1], Justin Yerbury[2], Nicholas Cole[1], Tim Karl[4], Carol Dobson-Stone[5], Denis Bauer[3], Dominic Rowe[1], Gaetan Burgio[6], John Kwok[5], Kelly Williams[1], Roger Pamphlett[7], Ian Blair[1]

1 Macquarie University
2 The University of Wollongong
3 CSIRO
4 Western Sydney University
5 Neuroscience Research Australia
6 Australian National University
7 University of Sydney

There is strong evidence that frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) represent a spectrum of neurodegenerative disease with common origins. A combined study of FTD/ALS patient cohorts will provide greater power to identify these shared molecular origins. We aim to discover gene variants that cause, predispose, or modify onset and progression of inherited and sporadic FTD/ALS, and validate and study our discoveries in new cell and animal models of these disorders. In addition to familial genetic studies in FTD/ALS, we are performing large-scale whole-genome sequencing in sporadic cases to identify risk alleles. Epigenetic studies are also underway, which coupled with WGS data, aim to identify modifiers of disease including the age-of-onset and rate of disease progression. In vitro studies will assess the pathogenicity of these candidate sequence variants and transgenic studies in zebrafish will inform the development of mouse models.

Using our comprehensive patient biobank, we are generating and investigating a bank of fibroblast-derived iPSC lines from patients with candidate gene variants. Coupling cellular and proteomic analysis with genetic, epigenetic and clinical data provides a powerful approach to unravel the molecular origins of these disorders.

Professor Michael Breakspear
QIMR Berghofer
Email: mjbreaks@gmail.com
Oral Presentation
Theme: 1. Diagnosis/Assessment
Monday 2 May 2016
9.30am – 9.50am

Prospective Imaging Study of Ageing: Genes, Brain and Behaviour (PISA)

Professor Michael Breakspear*[1], Dr Christine Guo*[1]

1 QIMR Berghofer Medical Research Institute, Brisbane, Australia

While the burden of dementia occurs late in life, neuropathology accumulates for decades prior to dementia onset. Disease modifying interventions have the greatest potential to avert neuronal death and later disease burden if introduced during this crucial window, well before the onset of clear cognitive decline. To reduce Australia's future dementia burden, the PISA study aims to develop methods to identify those Australians at the very early stage of dementia. I will introduce our strategies in establishing a younger healthy cohort enriched for high risk of dementia. Risk prediction is enabled by recent advances in genome wide association study (GWAS) studies on Alzheimer's study and the computation of polygenetic risk scores. To elucidate the neurobiology of prodromal Alzheimer's disease, we will use cutting-edge bioinformatics, brain imaging, cognitive testing and lifestyle monitoring to follow up this cohort longitudinally. Overall, PISA aims to (1) Discover biological markers of early neuropathology; (2) Identify modifiable risk factors, and (3) Establish the very early phenotypic and neuronal signs of disease conversion.

A/Professor Amy Brodtmann
The Florey Institute of Neuroscience and Mental Health
Email: amy.brodtmann@florey.edu.au
Oral Presentation
Theme: 1. Diagnosis/Assessment
Monday 2 May 2016
9.50am – 10.10am

Vascular determinants of Dementia

Associate Professor Amy Brodtmann*[1]

1 The Florey Institute of Neuroscience and Mental Health Australia

The evidence is compelling: vascular burden is the greatest determinant of late life cognition. This risk is not just for vascular dementia. In 2013, the American Alzheimer's Association conceded that the volume of evidence linking vascular risk and dementia was conclusive, announcing that vascular contributions to cognitive decline were a priority area of research focus for their international grant program. All late-onset dementia syndromes, especially Alzheimer's disease (AD), are driven or exacerbated by vascular brain burden. We

aim to examine how vascular burden causes dementia. Understanding the mechanisms means that we can prevent and treat the global epidemic of dementia.

Professor Brian Draper
University of NSW
Email: b.draper@unsw.edu.au
Oral Presentation
Theme: 2. Care/Living With Dementia
Monday 2 May 2016
3.10pm – 3.30pm

Dementia Collaborative Research Centre – Assessment and Better Care

Professor Brian Draper*[1]

1 University of New South Wales, Australia

The Dementia Collaborative Research Centre – Assessment and Better Care (DCRC-ABC) was established in 2006 under the National Dementia Initiative. The pillars of our centre continue to be research, collaboration, capacity building, consumer involvement and knowledge translation. The foci of our collaborating research partners across Australia have been assessment, treatment, primary care, nursing, community care, acute care, behavioural and psychological symptoms of dementia (BPSD), transitions in care, environment and technology, special groups (e.g. Aboriginal & Torres Strait Islanders, CALD, Intellectual disability, Young Onset Dementia) and physical comorbidity. DCRC-ABC has received $11.8 million in funding over last 9.5 years with approximately half going to internal research and knowledge translation projects within UNSW and half to research partners. We have a local consumer advisory committee and have collaborated with Alzheimer's Australia's Consumer Dementia Research Network and its National Quality Dementia Care Network. Other important collaborations have been with the Dementia Training Study Centres, the Dementia Behaviour Management and Advisory Services, the Australian Institute of Health and Welfare, the Australian Department of Health, 10 University partners and various service providers. There have been 89 Centre based (61 completed, 28 in progress) and 59 Partner based (45 completed, 14 in progress) projects. Our model has been to fund smaller/ pilot projects that can be the basis for larger grants usually from NHMRC and Dept. of Health. Three examples follow. DCRC funding for a review of non-pharmacological funding of management of BPSD resulted in an NHMRC project grant which was successfully completed. Collaboration between Centre researchers and AIHW led to the NHMRC funded Hospital Dementia Services Project. A pilot of humour therapy in nursing homes led to the NHMRC-funded SMILE study which was the basis for the Arts Health Institute establishment and adoption of humour therapy across ≈100 nursing homes in Australia. Capacity building has included part or full-time funding for 14 PhD and 5 Masters Students, top-up scholarships for PhDs, travel scholarships for early career researchers and training for service providers to evaluate their innovative programs. Recent short-term arrangements for funding have limited DCRCs' ability to fund projects and capacity building over last three years. The process of combining the three DCRCs into a unitary DCRC is underway

Dr Maree Farrow
Wicking Dementia Research & Education Centre, University of Tasmania
Email: maree.farrow@utas.edu.au
Oral Presentation
Theme: 4. Prevention
Tuesday 3 May 2016
3.40pm – 4.00pm

Evaluating dementia risk reduction eHealth tools for the Australian community

Maree Farrow[1,2]

1 *Wicking Dementia Research and Education Centre, University of Tasmania*
2 *Centre for Research on Ageing, Health and Wellbeing, The Australian National University*

Several modifiable health and lifestyle factors are consistently associated with the risk of developing dementia. It has been estimated that millions fewer cases worldwide would result from reducing the population incidence of dementia risk factors. However, knowledge in the general population is low, especially about the link between cardiovascular risk factors and brain health. In conjunction with Alzheimer's Australia's dementia risk reduction campaigns, we have undertaken a program of research to gain an understanding of Australians' perceptions, knowledge and health behaviours related to dementia risk reduction, and to determine whether the advice provided by eHealth resources (websites and smart device apps) can improve knowledge, increase motivation to adopt healthier lifestyles, and change behaviour. Surveys of consumers' perceptions of a dementia risk reduction website and community presentation revealed many were already concerned about cognitive decline and their immediate risk of dementia and would like personalised risk assessments and risk reduction programs. Brief dementia risk reduction eHealth interventions were found to achieve improved knowledge and increased motivation, as well as improvements in self-rating of health behaviours for mental, social and physical activity and diet. An evaluation of user experiences and perceptions of the online Australian National University Alzheimer's Disease Risk Index found two thirds of respondents were likely to change their behaviour based on their results. Strong community interest in access to dementia risk assessment and risk reduction information was confirmed by large responses to recruitment advertisements for these studies. Findings suggest those who already have healthy lifestyles are more likely to be attracted to dementia risk reduction resources and more work is needed to reach those most at risk. Findings also suggest eHealth resources can make a difference, raising awareness and also improving behaviour, but that interactive elements may need to be individually targeted and provide structured guidance.

Professor Leon Flicker
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Email: leon.flicker@uwa.edu.au
Oral Presentation
Theme: 3. Intervention/Treatment
Tuesday 3 May 2016
9.30am – 10.10am

Dementia in Indigenous Communities

Leon Flicker*[1]

1 Western Australia Centre for Health and Ageing, University of Western Australia, Australia

Indigenous peoples represent up to 5%of the world's population (almost 400 million people), representing thousands of individual cultures and language groups. In Australia the Indigenous population is undergoing rapid ageing despite life expectancy being considerably lower than the non-Indigenous population. In 2008, we reported that the prevalence of dementia in older Indigenous people in the Kimberley area of Western Australia was 12.4%, some five times greater than the overall Australian population rate of

2.4% (age standardized). Since then, another study has demonstrated a similarly high prevalence of dementia in rural and urban dwelling Aboriginal people in NSW. In both studies the most common specific form of dementia was Alzheimer's type dementia. Five year follow-up of the original study performed in the Kimberley has confirmed the stability of diagnosis and risk factors associated with dementia and cognitive impairment that include, age, head injury, hypertension and stroke. Of the original participants with dementia 77% had died by the 5 year follow-up. Overall, the major predictors of mortality included age (Hazard ratio (95% CI)), 1.03 (1.01, 1.05), male sex, 2.17 (1.39, 3.39), poor mobility, 2.11 (1.34, 3.30) and cognitive impairment 2.19 (1.31, 3.65). Dementia and cognitive impairment are major problems for Australian Indigenous people. Provision of care of Indigenous people with dementia needs to be culturally sensitive, taking into consideration the whole community and not only individuals and carers.

Professor Jürgen Götz
The University of Queensland, Queensland Brain Institute, Clem Jones Centre for Ageing Dementia Research
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Oral Presentation
Theme: 3. Intervention/Treatment
Tuesday 3 May 2016
8.50am – 9.10am

Clem Jones Centre for Ageing Dementia Research – From basic mechanisms to therapeutic interventions

Professor Jürgen Götz*[1]

1 The University Of Queensland, Queensland Brain Institute, Clem Jones Centre For Ageing Dementia Research

In an ageing society, we are in a race against time to find new, effective treatments for Alzheimer's disease, the most prevalent of all dementias. At the Clem Jones Centre for Ageing Dementia Research (Queensland Brain Institute), we have the depth of talent to research the disease at its molecular, cellular and systems level and translate these discoveries into health outcomes. In my presentation I will highlight selected research activities, driven by a mix of curiosity and innovation, including the vital work underway into a novel ultrasound-based technology that can be employed for the clearing of toxic protein aggregates and the delivery of biologics past the blood-brain barrier.

Dr Christine Guo
QIMR Berghofer
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Oral Presentation
Theme: 1. Diagnosis/Assessment
Monday 2 May 2016
9.30am – 9.50am

Prospective Imaging Study of Ageing: Genes, Brain and Behaviour (PISA)

Professor Michael Breakspear*[1], Dr Christine Guo*[1]

1 QIMR Berghofer Medical Research Institute, Brisbane, Australia

While the burden of dementia occurs late in life, neuropathology accumulates for decades prior to dementia onset. Disease modifying interventions have the greatest potential to avert neuronal death and later disease burden if introduced during this crucial window, well before the onset of clear cognitive decline. To reduce Australia's future dementia burden, the PISA study aims to develop methods to identify those Australians at the very early stage of dementia. I will introduce our strategies in establishing a younger healthy cohort enriched for high risk of dementia. Risk prediction is enabled by recent advances in genome wide association study (GWAS) studies on Alzheimer's study and the computation of polygenetic risk scores. To elucidate the neurobiology of prodromal Alzheimer's disease, we will use cutting-edge bioinformatics, brain imaging, cognitive testing and lifestyle monitoring to follow up this cohort longitudinally. Overall, PISA aims to (1) Discover biological markers of early neuropathology; (2) Identify modifiable risk factors, and (3) Establish the very early phenotypic and neuronal signs of disease conversion.

Professor Susan Kurrle
NHMRC Cognitive Decline Partnership Centre
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Oral Presentation
Theme: 2. Care/Living With Dementia
Monday 2 May 2016
2.50pm – 3.10pm

NHMRC Partnership Centre Dealing with Cognitive and Related Functional Decline in Older People: improving the quality of care for people with dementia and their carers

Professor Susan Kurrle*[1], Jennifer F Thompson[1]

1 NHMRC cognitive decline partnership centre, Australia

The NHMRC Partnership Centre Dealing with Cognitive and Related Functional Decline in Older People (known as the Cognitive Decline Partnership Centre – CDPC) is the first of the NHMRC Partnership Centres for Better Health. In 2013, $25M in funding was made available by the National Health and Medical Research Commission (NHMRC), Department of Health (DOH), Brightwater Care Group, HammondCare, Helping Hand Aged Care, and Alzheimer's Australia (the Funding Partners) for creation of this Centre, which was envisaged to utilise initial funding within 5 years, with a second 5 years of funding potentially available. NHMRC mandated objectives for NHMRC Partnership Centres are: implementation of research informed change; synthesis and dissemination of existing research; undertaking collaborative new research; and capacity building. Capacity building, it should be noted is inherent across most activities. CDPC Investigator teams bring together government, researchers, consumers, aged care providers, and practitioners. The fields of medicine, nursing, allied health, pharmacy, social work, law, sociology, health economics, and change management are represented within the CDPC membership. Institutional and individual involvement spans 5 States (NSW, WA, SA, VIC, QLD), the ACT, 10 Universities, numerous other research institutions, aged care facilities, and multiple professions. CDPC Consumer representatives include people with dementia and their carers, drawn from the Alzheimer's Australia Consumer Dementia Research Network (CDRN). The reach and influence of CDPC research spans urban, rural and regional areas and examples from 28 CDPC Activities funded to date are: **Implementation** - the Confused Hospitalised Older Persons) (CHOPs) program enabling acute hospital staff in identifying, treating, and caring for older people presenting with confusion; and the implementation of Vitamin D supplements for residents of aged care facilities. **Synthesis and dissemination** - development and launch of the Clinical Guidelines for Management of Dementia in Australia; and development and dissemination of a national approach to advance care planning in dementia. **Collaborative new research** - the effect of regulations on care provided in residential care; understanding long-term care

configurations for older people with cognitive decline; and optimizing the quality use of medicines for people with cognitive and related functional decline. **Capacity building** - activities include workshops on health economics, policy development, and technology and telehealth. CDPC research funding has also enabled support through employment for numerous early career researchers since its inception.

Professor Colin Masters
The Florey Institute
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Oral Presentation
Theme: 3. Intervention/Treatment
Tuesday 3 May 2016
8.30am – 8.50am

Alzheimer's disease: Aβ amyloid is the critical target for primary (pre-AD) and secondary (preclinical) disease-modifying strategies

Professor Colin Masters*[1]

1 The Florey Institute, Australia

There are two basic forms of Alzheimer's disease (AD). The common (>95%) form is sporadic, and is caused by the failure to clear the Aβ peptide (mean age at onset 80 years). The rare (< 5%) autosomal dominant familial form is caused by the over-production of this peptide (mean age at onset 45 years). In both forms, the kinetics of Aβ accumulation are similar, taking about 30 years to accumulate approximately 10mg of Aβ. Thus we estimate that sporadic AD starts about the age of 50 years and the autosomal dominant form starts about 15 years of age. A disease modifying strategy will be needed to keep the total brain Aβ burden close to normal levels (<2.5 mg) and prevent/delay onset of both forms. Such a strategy may encompass lowering production, stabilizing / neutralizing the toxic Aβ species, and promoting it's clearance from the brain. Interventions targeting Aβ in the earliest / mildest stages of the natural history of AD are beginning to show efficacies.

Professor Perminder Sachdev
UNSW
Email: p.sachdev@unsw.edu.au;angie.russell@unsw.edu.au
Oral Presentation
Theme: 4. Prevention
Tuesday 3 May 2016
3.00pm – 3.20pm

Maintain Your Brain (MYB): A large scale multi-modal online randomised placebo-controlled intervention to reduce cognitive decline

Professor Perminder Sachdev*[1]

1 UNSW, Australia

Background: A number of health and lifestyle-related modifiable risk factors for dementia have been identified. It is not known whether addressing these risk factors at the population level will lead to a reduced incidence of dementia as indicated by a slowed rate of cognitive decline in a middle-aged to older population. **Methods:** MYB is a randomised controlled trial of multiple online interventions designed to target modifiable risk factors (physical inactivity, cognitive inactivity, depression, overweight and obesity, and poor diet)

for Alzheimer's disease and dementia. Four intervention modules (physical activity, diet and nutrition, cognitive training and depression, each of 3 months' duration) will be customised to individual risk profiles and delivered over 12 months online through the newly developed MYB eHealth platform. Booster sessions and monitoring will continue for four years. Follow-up assessments measuring these risk factors and cognition will be completed annually for 4 years. The comparison control group will receive basic psychoeducation with up-to-date information on risk factors and care as usual. The sample will be drawn from the NSW 45-and-Up study, with target N=18,000 and will include individuals aged 55-75 years, with at least 1 risk factor on the ANU Dementia Risk Index, without history of dementia or other neurological or major psychiatric disorder, access to computer and home internet, and reasonable proficiency in English. **Co-primary outcomes:** change in cognition as measured by Cogstate Plus, and incident dementia. Multiple secondary outcomes and linkage to electronic health records and databases. **Results and Conclusions:** The pilot study will begin in mid-2016 and the trial launched in early 2017. MYB is the largest dementia prevention trial internationally and introduces novel elements and state-of-the-art concepts in mode of delivery and behavioural change theory that make it unique among existing strategies. It has the potential to be scalable at the population level and make a significant impact on the burden of dementia internationally.

Professor Rob Sanson-Fisher
University of Newcastle
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Oral Presentation
Theme: 2. Care/Living With Dementia
Monday 2 May 2016
2.10pm – 2.30pm

What is the 'Australian Community of Practice in Research in Dementia'?

Professor Rob Sanson-Fisher*[1]

1 University of Newcastle, Australia

The Australian Community Of practice in Research in Dementia (ACcORD) program will conduct research aimed at improving the wellbeing and health outcomes of people with dementia and those who support and care for them. The ACcORD program is made up of a national group of researchers, consumers, legal and clinical experts, who will work together to undertake this research. This program is one of 6 funded by the National Health and Medical Research Council for the period 2016-2020 under the Dementia Research Team Grants scheme. L/Prof Sanson-Fisher will provide an overview of the research and highlight ways people can get involved in this work.

A/Professor Michael Valenzuela
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Oral Presentation
Theme: 4. Prevention
Tuesday 3 May 2016
3.20pm – 3.40pm

Next Generation Brain Training in the Maintain Your Brain Trial

Associate Professor Michael Valenzuela*[1]

1 Regenerative Neuroscience Group, Brain and Mind Centre, University of Sydney

Brain training is an effective method for improving cognitive outcomes in older adults with and without cognitive impairment. However, efficacy wanes quickly after training offset and current technology is only effective when supervised in a group environment. Therefore, the main obstacles for establishing a genuine role for brain training in dementia prevention are scalability and sustained long-term engagement. We are tackling these challenges in the Maintain Your Brain Trial through co-development of next generation brain training technology together with our industry partner, NeuroNation. This includes innovation in training regimen, exercise content and context of online delivery. Based on our research, we will employ distinct loading, peak-finding and maintenance doses in order to target long-term cognitive gains without over-burdening participants. Cognitive exercises are to be designed on "gaming for training" principles that prioritize affective immersion and customized learning architecture. Our aim is for participants to experience their assigned tasks as fun, challenging and inherently rewarding. The new "Training with Friends" eHealth platform is intended to solve the main implementation challenge, the inefficacy of unsupervised home-alone training. From the consumer's perspective, the platform will allow training "alongside" other participants using Skype-like audiovideo streaming, post-training debriefs, self-identified opt-in groups and competitive leader boards. From the clinician's side, the platform will flag participants who are struggling on exercises or protocol adherence, such that an online trainer can be "called up" during training sessions to instruct, mentor and motivate. Further, we will engage the participant's wider circle of friends and family, inviting them to upload motivational messages (text, photos, video) delivered to participants at key progress milestones. Overall, the Maintain Your Brain strategy is to socialize the online brain training experience, connecting participants with like-minded peers, expert trainers and their own social network for long term engagement and hence sustained cognitive benefit.

Dr Rosie Watson
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Oral Presentation
Theme: 3. Intervention/Treatment
Tuesday 3 May 2016
9.10am – 9.30am

Structural imaging in dementia with Lewy bodies

Rosie Watson*[1]

1 Florey Institute of Neurosciences and the Department of Medicine – The Royal Melbourne Hospital

Dementia with Lewy bodies is a common form of dementia in older age, but it can be difficult to distinguish from other dementias. Due to overlapping clinical features, people with DLB are often misdiagnosed as having Alzheimer's disease (AD) during life, and therefore investigating the neurobiological changes *in vivo* using MRI can assist our understanding of the common characteristics of the disease and could help improve the clinical diagnosis.
One hundred and six older participants (35 DLB, 36 AD and 35 healthy controls) underwent 3 Tesla MR scanning along with clinical and neuropsychological assessments. The FreeSurfer analysis package was used investigate patterns of cortical thinning and subcortical volume differences across groups. Compared to controls, AD was associated with significant cortical thinning in the bilateral temporal and parietal regions extending into the frontal lobes, while in DLB; cortical thinning was less diffuse with focal areas of change mainly affecting bilateral

posterior structures. Analysis of subcortical structures indicated that whilst not significantly different from AD, volumetric loss relative to healthy subjects in basal ganglia and brainstem were more pronounced in DLB. For similar levels of dementia severity, DLB was associated with less cortical thinning, relative preservation of the medial temporal lobe and more subtle subcortical volume changes. Future work needs to concentrate on longitudinal imaging studies with pathological correlates to evaluate the influence and interaction of differing pathologies on the DLB clinical syndrome, disease trajectories and patient outcomes. This may assist with treatment development and appropriate stratification for clinical trials.

Poster Abstracts

Dr Scott Ayton
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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P001

Cerebrospinal ferritin determines the risk of cognitive decline in pre-clinical APOE-Îµ4 carriers

Scott Ayton*[1,2], Noel Faux[1,2], Ashley Bush[1,2]

1 Florey Institute on Neuroscience and Mental Health, Victoria, Australia
2 CRC for Mental Health, Victoria, Australia

Introduction: The Îµ4 allele of APOE confers the greatest risk for Alzheimer's disease (AD), however the pathologic mechanisms for this are uncertain, as are the reasons for variable disease penetrance. We recently that CSF ferritin, a reporter of brain iron load, predicted longitudinal outcomes of AD comparable to that of the combined performance of CSF tau and AÎ² (an established biomarker for AD). Here, we explored whether CSF ferritin levels could be use in combination with other AD risk factors such as APOE Îµ4 to predict early cogntive changes. **Methods:** Subjects classified as Cognitively Normal (CN; n=91), Mild Cognitive Impaired (MCI; n=144) and AD (n=67) were recruited to the Alzheimer's Disease Neuroimaging Initiative (ADNI) study, which collected demographic, genetic (e.g. APOE isoform), clinical (e.g. cognition) and biochemical (e.g. CSF) information at baseline, and clinical appraisal was performed annually for up to seven years. **Results & Discussion:** Baseline CSF ferritin was associated with a marked acceleration of cognitive deterioration over 7 years in CN subjects carrying the APOE Îµ4 risk allele (RAVLT: P=0.0008, r2=0.21), but there was no association in Îµ4-ve subjects. In contrast, the ratio of tau and AÎ² levels in CSF was more modestly assocaited with cogntive change (RAVLT: P=0.039, r2=0.005), and did not vary according to Îµ4 genotype. A threshold value of 6.6 ng/ml CSF ferritin predicated stable and cognitively declining Îµ4+ve CN subjects with an accuracy (area under receiver-operator characteristic) of 0.96. **Conclusions:** CN Îµ4+ve subjects with comparatively low ferritin may not deteriorate in the foreseeable future, which could explain why ~30% of Îµ4+ve subjects do not develop AD. The effect of CSF ferritin on cognitive deterioration was remarkably different between APOE Îµ4 carriers and non-carriers, which provides insight into the pathomechanisms of this major risk factor, and supports lowering brain iron levels as a therapeutic strategy.

Dr Amee Baird
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Poster Presentation

Theme: 2. Care/Living With Dementia
Poster number: P032

Music, memory and me: An investigation of the beneficial effects of music on autobiographical memory and self identity in persons with dementia

Amee Baird*[1,2], William Thompson[1,2]

1 Department of Psychology, Macquarie University
2 ARC Centre for Excellence in Cognition and its Disorders (CCD)

Introduction: Music is highly effective at evoking personal (autobiographical) memories. Autobiographical memory is closely linked to our self identity. Our objective is to explore music evoked autobiographical memories (MEAMs) and the impact of music on self identity in persons with mild cognitive impairment (MCI), dementia of any type, and healthy elderly. We aim to characterise MEAMs compared with memories evoked by photos and to explore the impact of favourite music on self-identity. **Methods:** 25 persons with MCI or dementia (any type) and 25 aged matched healthy persons will recall personal memories during music listening or photo viewing. Stimuli will be 15 famous songs (rated number 1 in Australia) and 15 photos of famous world events from 3 time periods, when participants were aged (a) 10-30 years (reminiscence bump), (b) 31-50 years, and (c) 51-70+ years. A measure of self-identity that involves generating 'I am' statements (e.g. I am a grandfather) and associated memories while listening to their favourite music (or an auditory control), in addition to measures of cognition and music engagement will also be completed. **Anticipated results:** We predict that compared with participants with MCI or dementia, healthy participants will produce more specific and frequent MEAMs, particularly for the recent lifetime period (50+ years), but frequency or type of MEAMs from aged 10-30 years (reminiscence bump) will not differ between the groups. Furthermore, compared with photo evoked memories, MEAMs will be more specific and contain higher emotional content, and favourite music should facilitate production of self identity statements and associated memories in all participants. **Discussion:** This study will be the first systematic characterisation of MEAMs and the relationship between favourite music and self-identity in persons with dementia. The findings will have implications for how MEAMs can be used to enhance well-being and maintain self-identity in this population.

Ms Pippy Barnett
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Poster Presentation
Theme: 4. Prevention
Poster number: P058

Vitamin D to Reduce Falls: Planning to Implement Evidence into Australian Residential Aged Care Facilities

Pippy Barnett*[1], Amanda Miller Amberber[1], Sue Kurrle[2], Ian Cameron[1]

1 John Walsh Centre for Rehabilitation Research, University of Sydney
2 Division of Rehabilitation and Aged Care, Hornsby Ku-ring-gai Health Service

Introduction: There is strong evidence of the effectiveness of vitamin D supplements in preventing falls in residential aged care facilities. This project aims to understand the barriers and enablers to knowledge translation in aged care homes for the implementation of vitamin D supplements for falls prevention. **Methods:** A literature review on interventions focused on the implementation of vitamin D supplements in aged care homes was

conducted. Factors influencing implementation were also considered by an expert advisory group, who were consulted over an 18 month planning period. **Results:** Ten studies were identified that have focused on the implementation of vitamin D supplements. Evidence for the effectiveness of implementation strategies is inconclusive, with a general consensus for the use of multifaceted interventions that include strategies such as education, audit and feedback and appointing a champion. It is clear that the attitudes and beliefs of relevant stakeholders, and organisational readiness and capacity for change are pivotal for the success of implementation. The experience with the expert advisory group and with partner organisations was instructive in that there is resistance to implementation of vitamin D supplements despite clear guideline evidence supporting this. **Conclusions:** Whilst there is limited evidence for effective knowledge translation in this setting, it is clear that there will be no 'one size fits all' answer. Although the evidence for vitamin D supplement use in this population is strong, the individual contexts of aged care homes must be understood to develop and implement a multifaceted knowledge translation intervention specific to their needs.

Dr Prashant Bharadwaj
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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P047

Using yeast to understand intracellular pathways that promote the removal of Alzheimer beta amyloid

Prashant Bharadwaj*[1, 2], Giuseppe Verdile[1, 2, 3], Ralph Martins[1, 2, 3]

1 Edith Cowan University, Western Australia, Australia
2 Curtin University, Western Australia, Australia
3 University of Western Australia, Western Australia, Australia

Introduction: The aggregation and accumulation of the beta amyloid (Abeta) protein in the brain is one of the major contributors to neurodegeneration in AD. Enhancing the removal of Abeta aggregates is one approach to prevent neuronal cell death. Intracellular clearance pathways such as autophagy play a vital role in cell survival by removing damaged organelles and aggregated proteins, including Abeta. However, the cellular mechanisms underlying autophagy mediated Abeta clearance and protection against toxicity is poorly understood. **Methods:** We originally developed a yeast cell model expressing Abeta tagged with green fluorescent protein (GFP-Abeta) to investigate aggregation, toxicity and intracellular clearance pathways that regulate Abeta accumulation in cells. In yeast, aggregated Abeta is selectively targeted for degradation in the cell and stimulating the autophagy-lysosomal pathway reduces Abeta accumulation and toxicity. To identify protective autophagy genes against Abeta, a genetic screening of Abeta expression and toxicity was undertaken in a knock-out yeast autophagy mutant library. To further validate the protective effects of the autophagy genes identified in yeast, GFP-Abeta accumulation and clearance was assessed in cells lacking and overexpression the desired genes. **Results & Discussion:** Autophagy regulators encoding regulatory subunits of AMPK, PP2A and heat shock protein complexes were identified as the lead candidate genes that altered Aî² accumulation and toxicity in the yeast screening. In addition, overexpression of these autophagy regulators showed reduced aggregation and accumulation of Abeta in yeast. **Conclusion:** Understanding mechanisms for effective removal of Abeta will be paramount for developing novel therapies for Alzheimer's. This study has identified novel genes that protect against the accumulation of Abeta aggregates. Further investigation is underway to determine whether these genes are altered in the Alzheimer's brain and if they have

neuroprotective functions. In addition to identifying protective genes, this yeast model is suited for high-throughput screening techniques for drug discovery in AD.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P048

Role of Apolipoprotein D in Alzheimer's disease and Frontotemporal dementia

Surabhi Bhatia*[1], Glenda Halliday[1], Scott Kim[1]

1 Neuroscience Research Australia, NSW, Australia

Dementia is an umbrella term that describes a wide range of symptoms associated with cognitive dysfunction due to gradual brain atrophy. The loss of cognitive ability results in impairment of memory, planning, reasoning and behaviour, profoundly affecting the lives of the patients. Alzheimers disease (AD) and Frontotemporal Dementia (FTD) are the two major forms of dementia. These are characterised by extracellular deposition of amyloid Î² (AÎ²) and TDP43, tau and FUS deposits respectively. Oxidative stress manifested in the form of lipidperoxidation and neuroinflammation are considered to play an important role in dementia. Apolipoprotein D (apoD) is a highly conserved protein known for its antioxidant function. Recent studies have demonstrated that apoD inhibits lipidperoxidation and plays a role in regulating inflammatory pathways. The exact role of apoD in regulating inflammatory pathways is unknown. The main aim of this project is to study the role of apoD in AD and FTD brain. The project will investigate the association of apoD to inflammatory markers, TNFÎ±, IL1Î², LTB4 and PLA2 in AD and FTD post-mortem brain tissues and lipid peroxidation markers, malondialdehyde and 4-hydroxynonenal in post-mortem tissues of FTD patients in a case controlled study. This data will provide information about the role of apoD in these biochemical processes in AD and FTD brain. We will also study the impact of apoD on generation and processing of AÎ² and examine the effect of apoD on TDP43 expression and its effect on TDP43 shuttling between the nucleus and cytoplasm using neuronal cells. Hence this study will advance the knowledge of role of apoD in dementia related neuroinflammation and its effect on pathological markers of dementia. We believe that apoD may help prevent neuronal damage in dementia using its antioxidant nature by inhibiting oxidative stress and/or effecting AÎ² and TDP43 pathology.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P079

The role of mobile DNA in Parkinson's disease

Gabriela O. Bodea*[1], Geoffrey J. Faulkner[1]

1 Mater Research Institute - University of Queensland, Brisbane, Australia

Parkinson's disease (PD) is a complex neurodegenerative condition, which affects more than 7 million people worldwide and often occurs after the age of 65. About one-quarter of the

affected individuals, experience PD associated dementia and the prevalence of dementia increases with the severity of PD. The main hallmark of PD is the selective loss of dopamine (DA) neurons which control voluntary movement. Despite recent advances, current PD treatments only ameliorate symptoms but cannot cure the disease. PD aetiology is multifactorial, with genetic and environmental factors interacting via a yet unclear mechanism to induce PD pathology. Recent studies have proposed that environmental and genetic factors may trigger hyper activation of DNA mobile elements which can alter the genome by insertional mutagenesis, recombination and deletions, contributing to the susceptibility and pathophysiology of neurological disorders. Long interspersed element-1 (L1) is the only active and autonomous mobile element in the human genome, and accounts for about 17% of human DNA. L1 is active in somatic cells and can 'jump' from one place in the genome to another by first copying itself into RNA and then reversing the process, thus altering the activity of genes were it relocates. This study proposes to investigate the role of L1 activity at the intersection of environmental and genetic factors known to contribute to PD aetiology and, as such, presents an opportunity to transform and deepen our understanding of how PD develops. The study will go far beyond establishing the core parameters of L1 mobilisation in PD, by also testing whether L1 insertions are likely to alter DA neuronal phenotype, and whether chemical modulation of L1 activity could ameliorate PD phenotype. To achieve these aims, the project will employ imaging techniques in a mouse model combined with cutting edge single-cells genomics in mouse and human samples.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P076

A deprescribing intervention to reduce the inappopriate use of antipsychotics to manage BPSD in residential aged care: The Halt Project

Fleur Harrison[1], Tiffany Jessop[1], Monica Cations[1], Allan Shell[1], Henry Brodaty*[1]

1 Dementia Collaborative Research Centre UNSW

Background/Objectives: Inappropriate use of antipsychotic medications to manage Behavioural and Psychological Symptoms of Dementia (BPSD) continues despite evidence for the associated risks and side-effects including apathy, stroke and death. The aim of the HALT project was to identify residents of aged care facilities on antipsychotic medications, and undertake an intervention to deprescribe antipsychotic medications and improve non-pharmacological behaviour management. Training was provided to nursing staff using a train-the-trainer model, and to pharmacists and GPs. **Method:** Twenty-four Residential Aged Care Facilities (RACFs) were recruited across metropolitan and regional areas. Potential participants were aged over 60 years, on regular antipsychotic medication, and without a primary psychotic illness or too severe neuropsychiatric symptoms, defined as total Neuropsychiatric Inventory (NPI) score above 50, with individual symptom scores score of 12 and occupational disruptiveness scores of at least 4 in at least two of the domains delusions, hallucinations, agitation/aggression, anxiety and disinhibition. Consenting participants were assessed one month and one week prior to commencement of deprescribing. Training was provided for nurses on how to manage neuropsychiatric symptoms and a dose reduction schedule was sent to and approved by GPs before deprescribing commenced. Participants were re-assessed 3, 6 and 12 months later. The primary outcome measure was reduction of regular antipsychotic medication without use of substitute psychotropic medications. The secondary outcome measures were NPI total and domain scores and Cohen-Mansfield Agitation Inventory score. **Results To date:** of 137 residents recruited, 126 had commenced

deprescribing of antipsychotic medication. Of these, 109 had achieved cessation; 22.2% had not or later recommenced an antipsychotic medication. Preliminary analyses of 71 participants assessed 6 months after deprescribing showed NPI and CMAI scores remained stable from baseline to follow-up, including those for whom an antipsychotic was recommenced. **Conclusion:** Deprescribing of antipsychotics in nursing home residents with previous BPSD is feasible; however one quarter of those whom commence deprescribing either do not reach cessation, or are later recommenced on an antipsychotic medication. Preliminary results show BPSD do not significantly change in the 6 months after deprescribing.

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Poster Presentation
Theme: 4. Prevention
Poster number: P059

The role of intensity physical activity in protecting the ageing brain

Belinda Brown*[1], Jeremiah Peiffer[2], Hamid Sohrabi[1], Stephanie Rainey-Smith[1], Michael Weinborn[3], Olivier Salvado[4], KirkErickson[5], Ralph Martins[1]

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Introduction: With no available cure for Alzheimer's disease (AD, the most common form of dementia), interest has turned to preventative measures, such as changes in lifestyle that may delay or prevent the onset of cognitive decline leading to AD. A vast literature supports a link between higher levels of physical activity and cognitive function and reduced risk of AD. Furthermore, previous research findings indicate that there may be a physical activity intensity threshold beyond which cognitive benefits become more pronounced. The hypothesis that the level of physical activity intensity moderates the level of cognitive response is quite logical; however, this has yet to be thoroughly investigated in an intervention in which physical activity intensity is systematically manipulated. My proposed project will address this hypothesis by evaluating the effect of a 6 month high- and low-intensity cycle-based exercise intervention on measures of cognitive health, including neuropsychological assessment and MRI-derived brain volume, connectivity and activation. **Method and Result:** One hundred and five community dwelling individuals aged 65-80 years will be recruited and randomised into one of three groups: high-intensity, low-intensity and control (n=35 in each group). Participants allocated to an exercise intervention will complete 6 months of either low-intensity or high-intensity cycling program consisting of two sessions per week. Neuropsychological assessment, volumetric and functional MRI will be conducted pre-intervention, post-intervention and 12 months post-intervention. **Discussion and Conclusion:** At an individual level, findings from this study should result in an increased awareness of the benefits of exercise beyond the highly publicised benefits to cardiovascular health. At a national and international level, findings from this research, combined with other research corroborating these results, will provide important information which could be used to develop evidence based physical activity programs specifically aimed at enhancing cognitive health and decreasing the incidence of AD in Australia.

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Poster Presentation
Theme: No Theme Allocated
Poster number: P072

The role of the neuronal epigenome in natural brain ageing and Alzheimer's disease

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Introduction: Although the prevalence of Alzheimer's disease (AD) is increasing, the origins and mechanisms that underlie the characteristic cognitive decline remain elusive. The emerging field of neuroepigenomics is offering new insights into the role of the epigenome in neurodegenerative disorders, and several recent studies have revealed an incredibly complex neuronal epigenetic landscape. Levels of DNA methylation in the brain are correlated with age, and affect genes involved in nervous system development, neurogenesis and AD. Furthermore, limited profiling of DNA methylation in AD brains identified aberrant DNA methylation near genes with neurological and cognitive functions. These compelling data indicate a role of the epigenome in age-related cognitive decline. Given the complexity of the neuronal epigenome, and the profound insights already gained through genome-wide DNA methylation profiling, there is a immediate need to determine the role of the neuronal epigenome in ageing and AD. **Method:** In this study, we will determine the extent of neuronal epigenomic reconfiguration during ageing and in AD. Epigenomic profiling of neurons isolated from non-pathological human brains spanning 45-95 years and AD-affected brains will be analysed using whole-genome DNA bisulfite sequencing (methylC-seq), accessible chromatin profiling (ATAC-seq) and gene expression profiling (RNA-seq) to enable the first comprehensive investigation of epigenomic changes in AD. **Discussion:** These comprehensive epigenome profiles of AD and normal human brain ageing will provide unprecedented insights into the role of the epigenome in neuronal genome regulation throughout the natural ageing process and in AD. This project has the potential to identify many new candidate genes involved in cognitive decline, which could aid in the generation of new animal and cell models for AD. Comprehensive investigation of the different forms of DNA methylation has proven to be a powerful discovery tool that has consistently resulted in major new and unanticipated discoveries that are rapidly accelerating neuroepigenomic research.

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Poster Presentation
Theme: 1. Diagnosis/assessment
Poster number: P084

Investigating mGluR5-amyloid-beta interactions in cognitive decline using translational touchscreen paradigms

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Cognitive decline is a core feature of Alzheimer's disease (AD) and there is no cure or treatment. Metabotropic glutamate receptor 5 (mGluR5) has been identified as a novel

therapeutic target through the recent demonstration of its involvement in a key pathogenic pathway. As yet, the role of mGlu5 in mediating specific cognitive phenotypes has not been explored using clinically translatable tests. This is an important step towards developing novel mGlu5-based therapies for cognitive dysfunction. Genetic mouse models are major tools to investigate mechanisms underlying cognitive decline however, to date, assessment of cognition in mice has been largely unrelated to the clinic. This project investigates how mGluR5 mediates cognition in AD mouse models using recently developed touchscreen tasks that allow the assessment of cognitive domains, directly relevant to impairments described in AD patients. Mice containing disease-causing mutations in genes encoding the amyloid precursor protein (APP), and presenilin-1 (PS1) will be examined using touchscreen tests relevant to the principal cognitive domains affected by AD. APP/PS1 mice show cognitive deficits in standard tests; however these transgenic mice have not been characterised using clinically relevant tasks. Animals will be trained to discriminate between two visual stimuli projected onto a touch-sensitive computer screen. Tasks will then be scaled in complexity to mimic tests used in the clinic. To establish the role of mGlu5 in mediating cognitive phenotypes in APP/PS1 mice, we will employ genetic and pharmacological tools to spatially and temporally restrict the receptor's expression. By establishing behavioural testing protocols that can be directly translated into clinical practice, this project has potential to facilitate the translation of pre-clinical treatments into clinical trials. Furthermore, investigating how mGluR5 modulates cognitive function in AD, and using this information to implement pharmacological interventions, will inform novel drug targets of direct clinical relevance.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P049

Improving pain assessment and treatment for people with cognitive impairment in the Emergency Department.

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Introduction: People with cognitive impairment (CI), including dementia, face substantially greater obstacles in receiving effective pain relief, as validated pain assessment tools and protocols for people with CI are not generally used in Australian emergency departments (ED). **Methods:** Two-year RCT in 8 Australian EDs in a pre/post-test design in 602 older people and a long bone fracture, with/without CI, and random assignment to pain assessment with the PAIN-AD (breathing, vocalization, facial expression, body language and consolability) and associated pain management. Primary outcome: Time to analgesia; Secondary outcomes: pain assessment, analgesia given. Analysis: Binary logistic model, adjusted for age, triage code, gender, ambulance analgesia and documented pain score. **Results:** 271 (45.1%) participants had CI (mean age 86), 84% were female and 94% presented after a fall. Participants with no CI waited 127.7 (average) minutes vs. participants with CI waited 162 minutes (average) for pain assessment and analgesia. 45% of participants with CI were given no analgesia and 19.4% were given one dose of paracetemol. PAIN-AD was used for 160 (44.8%) participants with CI, reducing analgesic wait time from 176.11 (SD 213) minutes to 123.9 (SD 123) minutes; < 60 minutes (n=180, 29.9%, 33min); >60 minutes (n=422, 70.1%, 182min. **Discussion:** Inadequate analgesia in the ED arises from non-use of pain screening

tools for people with CI, poor knowledge of pain as a reason for agitation/delirium and belief that people with CI are vulnerable to analgesic side effects. **Conclusion:** An acceptable pain response by ED clinicians for all older people, including people with CI, requires urgent attention: clinical procedure review, standardised pain assessment screen, nurse-initiated analgesic standing orders, targeted education/training in pain assessment.

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Poster Presentation
Theme: No Theme Allocated
Poster number: P073

Disruption of myelin lipid biosynthesis precedes tau pathology in the cortical pathogenesis of Alzheimer's Disease

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Introduction: The anatomical progression of neurofibrillary tangle (NFT) pathology, a hallmark of Alzheimer's Disease (AD), runs inverse to the course of developmental myelination, with regions of thinner myelin sheaths preferentially affected by AD. Lipids constitute more than 70% of myelin, with sulfatide and galactosylceramide (GalCer) comprising almost 30% of myelin lipids. Depletion of these prototypical myelin lipids has been reported in various age-related neurological diseases, including AD. Expression of sulfatide and GalCer is dependent on the production of their biosynthetic precursor, very long chain ceramide (VLC). This study addressed whether loss of myelin-enriched lipids correlates with increased NFT pathology and whether perturbations in this myelin lipid biochemical pathway occur in the pre-clinical AD state. **Method:** Lipids were extracted from brain tissue of subjects graded according to the Braak staging scheme for post-mortem NFT pathology. Mass spectrometry was used to quantify lipid levels in hippocampus, cerebellum, inferior temporal and superior frontal grey and white matter. Ceramide synthase activity in crude tissue homogenates was assayed using our recently-published fluorescent assay. **Results and Discussion:** Severe depletion of GalCer and sulfatide was identified in our tissue cohort with increasing AD pathology. Depletion of these myelin-enriched lipids was traced metabolically to loss of VLC. Synthesis of VLC is catalysed by ceramide synthase 2 (CERS2). We observed a deficiency in CERS2 activity as early as Braak stage I/II in temporal cortex, and Braak stage III/IV in hippocampus and frontal cortex, indicating that loss of myelin-specific ceramide synthase activity precedes NFT pathology in cortical regions. **Conclusion:** Decreased myelin ceramide synthesis is indicative of a defect in myelin maintenance during the pre-clinical stages of AD pathogenesis. We propose that this defect contributes significantly to myelin deterioration, synaptic dysfunction, and neurological decline. Our results support the notion that demyelination is a significant driving influence in AD pathogenesis.

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Theme: 3. Intervention/Treatment
Poster number: P050

Discovery of functionally selective C5aR2 ligands: novel modulators of C5a signalling activity in vitro and in vivo

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Introduction: Neuroinflammation has now been widely associated with a number of dementia related diseases. Activation of the innate immune system, specifically the complement system has been attributed a key role in many neurodegenerative diseases. The complement activation peptide, C5a, binds two seven transmembrane receptors; namely the C5a receptor 1 (C5aR1) and C5a receptor 2 (C5aR2). C5aR2 is a non-G-protein-signalling receptor whose biological role remains controversial. Some of this controversy arises due to the lack of selective ligands for C5aR2. This study aimed to discover novel selective C5aR2 ligands to explore the functional role of C5aR2. **Methods:** A small peptide library of 61 ligands based on the C-terminus of C5a was tested for the ability to displace 125I-C5a from C5aR2 membranes and counter-screened against C5aR1. A C5aR2 Î²-arrestin 2 recruitment assay was used to test ligand activity, and ligands were counter-screened for Î²-arrestin 2 recruitment via C5aR1. The functional role of ligands was investigated by looking at ERK1/2 phosphorylation and LPS-stimulated cytokine release in human monocyte derived macrophages (HMDM). Additionally, C5aR2 activity was confirmed in the presence of a C5aR1 antagonist. Finally one ligand was tested for the ability to modulate C5a-induced neutrophil mobilisation in vivo. **Results & Discussions:** Two ligands (P32 and P59) were identified as functionally selective C5aR2-ligands, exhibiting selective recruitment of Î² arrestin 2 via C5aR2, partial inhibition of C5a-induced ERK1/2 activation, and LPS-stimulated IL-6 release from HMDM in a C5aR2 dependent manner. Importantly, neither ligand could induce ERK1/2 activation or inhibit C5a-induced ERK1/2 activation via C5aR1 directly. Finally, P32 inhibited C5a-mediated neutrophil mobilisation in wild-type, but not C5aR2-/- mice. **Conclusion:** Here we report the first functionally selective ligands for C5aR2 with novel pharmacology that can selectively modulate C5a activity in vitro and in vivo, and thus will be valuable tools to interrogate C5aR2 function in dementia models.

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Theme: 3. Intervention/Treatment
Poster number: P082

Sleep, plasticity and neurodegeneration: Targeting sleep to improve cognition in Mild Cognitive Impairment

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A compelling body of evidence underscores the critical role sleep plays in learning, memory and brain plasticity. Two key components of sleep physiology which are intimately linked with memory consolidation include sleep spindles and slow wave activity (SWA, 0.5 - 4.0 Hz) in non-rapid eye movement sleep. These distinct electroencephalogram (EEG) features are important for sleep maintenance and neuronal plasticity, and age-related reductions in sleep spindles and SWA may explain cognitive decline in older age. Importantly, more than 60% of individuals with mild cognitive impairment MCI experience significant sleep disturbance. However, the relationship between disrupted sleep, cognitive impairment and neurodegeneration in this group is poorly understood. At present it is unclear whether altered sleep physiology in MCI is a risk factor for ongoing cognitive decline and progression to dementia. It is also necessary to identify the sleep characteristics which relate to neurodegeneration in critical key brain areas that are fundamental for sleep-dependent memory consolidation. Sleep spindles and SWA may serve as novel brain biomarkers of poor cognitive outcomes in MCI and by targeting these we can potentially modify the risk factors for developing dementia. Experimentally boosting sleep spindles and SWA during sleep results in improved memory and cognition in healthy individuals. Therefore if sleep quality is optimised by enhancing sleep microarchitecture, an exciting new treatment approach to prevent or slow cognitive decline becomes possible.

AIMS

1. Investigate key EEG features known to be associated with sleep-dependent memory processes and brain plasticity, to identify novel brain biomarkers of cognitive impairment and neurodegeneration,
2. Examine prospectively whether altered sleep microarchitecture predicts cognitive decline and disease progression in MCI over a 2 year follow-up period,
3. Conduct a clinical trial to deliver an early pharmacological intervention to enhance sleep spindle EEG features to optimise sleep quality and improve memory.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P002

Moderate consumption of alcohol modifies the risk of Alzheimer's disease and is associated with lower levels of cortisol

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Introduction: The search for a definitive set of validated blood based biomarkers that relate directly to either Alzheimer's disease (AD) pathology, or the onset of clinical symptoms is far from complete. A possible reason for this, is the underlying biological interaction between lifestyle and biology. In the current study we investigate the relationship between the well know stress hormone cortisol, and alcohol consumption with regards to risk of AD. **Method:** Using data from the Australian Imaging, Biomarkers and Lifestyle (AIBL) study, we tested for the presence of biological interaction between cortisol and alcohol consumption for the risk of AD. **Result:** Mean cortisol level in the AIBL HC group (N=422) at baseline was lower compared with the AD group (N=95), (HC: 143.3 (67.1) vs AD: 160.1 (72.1)). We found a significant interaction between alcohol consumption, cortisol levels and clinical classification (P=0.02), with no difference between HC and AD cortisol levels for those who consumed alcohol (P=0.5), compared with a large significant difference for those who consumed a moderate amount of alcohol (P=0.004). Individuals with high cortisol, who reported no alcohol consumption were 7.2 times more likely to develop AD compared with those with low cortisol who reported any alcohol consumption (p<0.0001, Synergy Index (SI): 11.6 (95%CI: 6.4-16.9)). Reducing the sample to only those who consistently consumed wine (N=293) compared with those reporting no alcohol consumption (N=224), we saw the effect increase, with those with high cortisol who reported no alcohol consumption 9.4 times more likely to develop AD compared with those with low cortisol who reported any alcohol consumption (p<0.0001, SI: 9.5 (2.9-15.9)). **Discussion and Conclusion:** These findings demonstrate the benefit of regular moderate consumption of alcohol to combat the increased risk of AD due to the stress hormone cortisol.

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Poster Presentation
Theme: 4. Prevention
Poster number: P060

Characterising the associations between sleep and physical activity in older adults at-risk for dementia

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Purpose: Sleep-wake dysfunction (SWD) is evident in up to 60% of individuals with Mild Cognitive Impairment (MCI). MCI is considered an 'at-risk' or transitional stage between normal ageing and dementia, with conversion rates of approximately 50% over five years reported in the literature. Of concern, SWD is linked with poorer cognition and clinical outcomes, and more rapid decline. Increasing evidence suggests that moderate and vigorous physical activity (MVPA) has a beneficial effect on sleep and cognition, however it is unclear how MVPA relates to SWD in older adults with MCI. **Methods:** Fifty-four participants with MCI were recruited from the Healthy Brain Ageing Clinic, Sydney, Australia. All participants underwent comprehensive medical, psychiatric and neuropsychological assessments. Total MVPA was calculated using the Active Australia Questionnaire (MVPA=[minutes of vigorous activity*2]+minutes of moderate activity). For comparison purposes, participants were stratified into the following MVPA groups: 0-9, 10-149, 150-299

and >300 minutes/week. Participants also wore an actigraphy watch for 2-weeks to assess SWD. **Results:** There were no significant differences between MVPA groups in terms of age, gender, depressive symptoms, global cognition and sleep onset, sleep offset or total sleep times. However, participants who reported 0-9 minutes/week of MVPA had significantly greater sleep disturbance (wake after sleep onset [F=11.5, p<0.000] and night-time awakenings [F=6.8, p=0.001]) in comparison to each of the other MVPA groups, which remained highly significant with post-hoc analyses. **Conclusion:** These findings suggest that even low levels of MVPA (below current recommendations of >150 mins/week) may have a beneficial effect on SWD in older adults with MCI. Further research is now required to examine how MVPA relates to sleep macro and microarchitecture as well as cognitive functioning in 'at-risk' individuals. Longitudinal follow-up of participants is also required to determine how MVPA relates to clinical trajectory.

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Theme: 1. Diagnosis/Assessment
Poster number: P003

Amyloid Imaging in Sleep Apnoea: Findings from AIBL-VETS

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Introduction: An association between sleep disturbance and Alzheimer's dementia (AD) has been suggested. Recent amyloid imaging studies have shown increased tracer retention associated with shorter sleep duration, initial insomnia and impaired generation of Non Rapid Eye Movement (NREM) Slow Wave Activity. Obstructive Sleep Apnoea (OSA) is a common disorder with a prevalence of 24% in men aged between 30 and 60 years. OSA has been associated with cognitive impairment and increased dementia risk but no amyloid imaging studies have been performed in subject suffering from this condition. **Methods:** We assessed Vietnam Veterans in the AIBL-VETS study of AD risk chronic combat related Post-Traumatic Stress Disorder. Veterans with polysomnographic confirmation of OSA were compared to those who did not have features of OSA according to the Pittsburgh Sleep Index Questionnaire. Amyloid imaging was perfomed using florbetaben (18^F-FBB). Standardised Uptake Value Ratios (SUVR) as a measure of amyloid burden were generated using the cerebellar cortex as reference region. **Results:** 18 veterans with OSA (mean age, 68.18Â±3.56 years) and 48 Veterans without OSA (mean age 68.17Â±3.74 years) underwent 18F-FBB PET. SUR was significantly higher in the OSA group than in the non-OSA group (1.39Â±0.31 vs 1.27Â±0.17, respectively, p <0.05). **Discussion and conclusion:** This preliminary result suggests an association between OSA and increased amyloid deposition of brain amyloid. OSA is a treatable condition so it may represent a treatable risk factor for AD. Prospective studies in larger cohorts are warranted.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P033

Work4Dementia: Development of an evidence-based intervention to build capacity and resilience for the Australian dementia care workforce

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Introduction: Dementia is a public health priority. A three-fold increase in the number of care workers in Australia is required to meet the demands associated with dementia over the next three decades. There are concerns aged care organisations cannot keep up with the increasing high care demands associated with this condition. This is worsened by high rates of turnover in the sector. Innovative strategies are required to attract and retain aged and dementia care staff as the unstable workforce has deleterious effects on both care workers and people with dementia (e.g., high job stress and poor quality care). Despite this urgent need it is not clear which interventions best enhance the dementia care workforce. **Aim:** I will apply findings from my PhD and postdoctoral research, as well as my clinical psychology expertise to offer unique insights on how to effectively improve the capacity and resilience of the dementia care workforce. **Previous Findings:** I identified a new construct, occupational communion (OC), which has implications for retaining dementia care workers in their jobs for longer. OC facilitates a sense of belonging based in social interaction at work, essential for positive coping with high job demands. Results showed that OC is a valid and reliable construct. OC has been tested in a theoretical model showing social interaction with clients and colleagues and can influence positive ways to cope with job demands such as isolation or grief and loss. **Research Program:** This fellowship will test the application of OC to inform the development of an innovative evidence-based intervention (Work4Dementia). The acceptability, feasibility and efficacy of Work4Dementia will be tested in six aged and dementia care organisations across Australia. Work4Dementia will ultimately reduce job stress and subsequent turnover, enhance work engagement and improve quality care outcomes for people with dementia and their families.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P004

Dementia in people with Intellectual Disability: A longitudinal study with a knowledge translation focus

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Introduction: The population with intellectual disability (ID) is ageing rapidly. People with ID appear to be at increased risk of dementia, often with younger onset and faster decline. Yet little research has investigated risk factors for dementia in ID, and there is a dearth of information pertaining to screening tools and diagnostic instruments for this group. Unclear service models and inadequate clinician training further impact their care. This project has two aims: firstly, investigating correlates of dementia in ID, and appropriate instruments for assessment; secondly, developing clinician resources and a pathway to care for people with ID and dementia. **Methods:** A longitudinal pilot study will be expanded to create a sample of 230 participants with ID aged over 40, recruited from disability services in NSW, with a high-risk sub-sample recruited via clinicians and aged-care services. Carer-report questionnaires will assess demographics, lifestyle, medical history, adaptive behaviour, life events, and declines

for the person with ID, and semi-structured carer interviews will assess symptoms of dementia. A self-report questionnaire for family carers will measure carer mental health, burden and supports. A sub-sample of participants with ID will complete medical and neuropsychological examinations. Potential improvements to current care models will be developed via a Delphi process with experts in the field. A new model will then be proposed. **Results:** Results will be used within a knowledge translation framework which includes developing an online training module for clinicians, and guidelines for assessing dementia in ID. **Discussion & Conclusions:** The study holds potential to identify the most appropriate screening and assessment tools to detect dementia in people with ID, and to reveal potentially modifiable risk factors for dementia in ID. The project aims to produce outcomes which can then be used to rapidly improve the nature of dementia assessment for older Australians with ID.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P005

Positive association of MR susceptibility and amyloid-Î² in non-demented individuals suggesting a potential role of iron in frontal circuit dysfunction

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Introduction: Normal aging and Alzheimer's disease (AD) are associated with increased levels of cerebral iron. Recent developments of magnetic resonance imaging (MRI) techniques such as quantitative susceptibility mapping (QSM) is believed to reflect non-heme iron deposition, allowing to investigate the association of iron with other well-established biomarkers of AD such as amyloid-Î² (AÎ²) prior to the onset of the AD pathology. It has been shown that in AD iron level increases mainly in tau tangles and AÎ² plaques, however, the process and timeframe leading to this accumulation is not well understood. This study aims to investigate the association between regional iron and AÎ² among non-demented subjects prior to AD. **Methods:** MRI data including QSM and T1W as well as 11C PiB-PET from 51 HC and 15 individuals with mild cognitive impairment (MCI) were collected as part of the Australian Imaging Biomarkers and Lifestyle (AIBL) study. Different anatomical regions were obtained by spatially normalizing anatomical templates to T1W image of each subject followed by a rigid alignment to QSM and PET images. The PiB SUVR and iron concentration were obtained by intensity normalized the PET and QSM images using the cerebellum gray matter and posterior ventricle, respectively. For regional analysis, robust mean signal intensity was computed in four cortical lobes and sub-cortical regions (caudate, putamen and pallidum). The normalized values were adjusted for age, gender and APOE Îµ4 carrier status. **Result:** Correlation analysis showed a significant correlation between regional iron and AÎ² in the frontal lobe ($r=0.27$, $p<0.05$) and caudate ($r=0.334$, $p<0.01$) as shown in Fig. 1. **Conclusions:** Significant associations were found between cerebral iron and amyloid in non-demented elderly individuals. The positive correlation in caudate and the frontal lobe suggests a potential role of iron in frontal circuit dysfunction which leads to impairment of executive function and inhibitory processes.

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Theme: 1. Diagnosis/Assessment
Poster number: P026

Association of cerebral blood flow and amyloid-Î² status in preclinical Alzheimer's disease

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Introduction: Global and regional reductions in cerebral blood flow (CBF) have been reported in Alzheimer's disease (AD). However, these CBF changes have been only investigated in prodromal AD and no study has used MRI to identify such differences between healthy controls (HC) with high or low amyloid-Î² (AÎ²) deposition. This study aims to investigate the association between AÎ² and rCBF in preclinical AD using state of the art multiphase pseudo-continuous ASL (MP-PCASL). **Methods:** 42 HC underwent PiB-PET and MP-PCASL as part of the AIBL study. AÎ² status was determined using CapAIBL while rCBF was computed using an in-house processing pipeline comprising of motion correction, spatial and temporal denoising and quantification. The regional CBF values were adjusted for age and thalamus was used as a reference region for CBF normalisation. **Results:** Using a cut-off value of 1.5 for SUVR values, 32 HC were classified as low AÎ² (HC-) and 10 as high AÎ² (HC+). Comparing HC+ to HC-, CBF was significantly lower in the neocortex as well as inferior temporal, frontal, parietal and posterior cingulate regions ($p<0.01$). **Conclusions:** Significant differences in CBF were found between HC with high and low AÎ² burdens. MP-PCASL offers a highly sensitive and non-invasive tool that can detect reduced cerebral flow in preclinical AD. Furthermore, the high sensitivity of MP-PCASL could be useful for subject screening in clinical trials.

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Theme: 4. Prevention
Poster number: P061

Depression in Dementia

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Introduction: Neuropsychiatric symptoms like depression are common in people with Alzheimers disease (AD) and are a frequent cause of distress and reduced quality of life. This study will identify factors that may lead to the development of depression and other neuropsychiatric symptoms in AD and additionally test a novel intervention to try and

prevent these symptoms from occurring. Cognitive bias modification (CBM) targets attentional and interpretative biases associated with anxiety and depression. This has been shown to be effective in reducing depressive symptoms in younger adults without cognitive impairment and may also have a role in preventing the development of depressive symptoms in people with dementia. **Methods:** We will recruit 300 depression-free individuals with mild/moderate severity AD and randomise them to active or control CBM over a 2-year period. The primary outcome of interest is the difference in the incidence of depression between the groups. Additional outcomes of interest will include quality of life, other neuropsychiatric symptoms, cognitive performance and carer burden. Participants will undergo regular assessments to determine any clinical and lifestyle factors that may be important in the development of these outcomes. Additionally, a sub-group of 40 individuals will undergo 2 magnetic resonance imaging scans (baseline and 2 years) to explore neuroanatomical predictors of depression and other neuropsychiatric symptoms. **Discussion:** Alzheimers dementia is a common disorder with devastating consequences for sufferers and their families. The impact of this disease is undoubtedly accentuated by the presence of neuropsychiatric symptoms. Our understanding of the aetiology of these symptoms is relatively poor and few interventions exist for their prevention and treatment, and these are frequently associated with unacceptable side effects. The proposed study will enable a better understanding of neuropsychiatric symptoms in AD and trial a simple, safe and cost-effective treatment that could be easily implemented into everyday clinical practice.

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Poster Presentation
Theme: 4. Prevention
Poster number: P070

Systematic review of associations of sedentary behaviour with cognitive function or dementia in mid-age and older adults

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Introduction: There is a need to identify behavioural risk factors to reduce the risk of cognitive decline and dementia and progression of those conditions. Sedentary behaviour is ubiquitous in contemporary society and preliminary evidence suggests that sedentary behaviour may affect cognitive outcomes at various stages of the lifecourse. The aim of this study was to review the literature to examine associations of sedentary behaviour with cognitive function or dementia in mid-aged and older adults. **Methods:** Databases were searched for articles published to April 2016. Studies were included if they measured sedentary behaviour/s and cognitive function or dementia, and were conducted in the relevant study population, i.e. aged 45 years and older. Information on study characteristics and results were extracted. **Results & Discussions:** Fifteen studies (14 observational and one case control), representing 25,905 participants from six countries were included. 26 of 41 associations were statistically significant. Objectively-measured sedentary behaviour was associated with lower integrity in parahippocampal white matter, poorer visual memory, and in people with a genetic risk for Alzheimer's Disease, higher cerebral blood flow. Computer use was beneficially associated with global cognitive function, dementia risk, verbal memory, and executive function. Television viewing was detrimentally associated with psychomotor speed, executive attention, immediate and delayed verbal memory, episodic

memory, and global cognition, and development of Alzheimer's Disease. One study found higher self-report total sedentary behaviour was associated with faster visual search and perceptual speed, however no associations for television time or objectively-measured sedentary behaviour were observed. Different sedentary behaviours were beneficial or detrimental for cognitive function and development of dementia in mid-aged and older adults. Research is needed to understand the physiological mechanisms underpinning these relationships and causality. **Conclusion:** Sedentary behaviour/s are associated with cognitive function or dementia. This study highlights the importance for cognitive health of activities undertaken while being sedentary.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P035

Music Playlists and Mood Regulation in People with Dementia and Depression

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Introduction: Depression is common in dementia and is a primary factor associated with a decline in the quality of life of people with dementia and their caregivers. It is also both a risk factor and a prodromal symptom of dementia, and is associated with accelerated cognitive decline. There is evidence that music can have a powerful effect on people with dementia even in cases of significant cognitive impairment. However, previous research suggests that depression has an important influence on the affective impact of music on the listener. While music therapy interventions involving the presence of a trained therapist are generally tailored to the individual needs of patients, interventions using pre-recorded musical playlists seldom account for both individual music tastes and psychological profile. The research to be conducted will further explore ways for designing music programs for self-management of moods in people with dementia that will consider both individual taste and mental health status. **Method:** An initial phase of this research will involve a 3x2x2 factorial experiment to test the relative impact of tempo, mode and lyrics on the mood of people with mild dementia, in order to test the contribution of these components of music on people with differing symptomatic profiles. Pre and post-mood self-report mood measures will be triangulated with behavioural observation and physiological measures. **Results:** Not available at this time. **Discussion**: This research will result in an increased understanding of the impact of music on quality of life of people with dementia and will demonstrate how multiple variables interact in the effect that music has on mood. The findings will ultimately inform the development of an engaging and cost-effective tool for reducing depression in people with dementia using music.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P036

Impact of a virtual dementia experience on medical and pharmacy students knowledge, attitudes and self-reported behaviour toward people with dementia

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Introduction: Medical practices and community pharmacies should be structured according to dementia-friendly community guidelines to ensure accessibility for people with dementia. Medical practitioners and pharmacists should be equipped with the necessary knowledge and skills to create these environments. Alzheimer's Australia Victoria's Virtual Dementia ExperienceTM (the Experience) uses a multi-sensory simulation of light, sound, colour and visual content to immerse participants into the virtual world of a person with dementia. This Experience can educate medical and pharmacy students about dementia-friendly communities in preparation for their future healthcare roles. This study aims to quantitatively and qualitatively evaluate the impact of the Experience on medical and pharmacy students knowledge, attitudes and self-reported behaviour toward people with dementia. **Method:** Third year medical (105) and fourth year pharmacy (250) Monash University students will be invited to participate in a non-randomised controlled study in 2016-17. Of these students, 110 will undertake the Experience. To evaluate the Experience, all 355 students will be invited to complete pre- and post-Experience surveys. The 20-item Dementia Attitudes Scale will be used to evaluate the affective, behavioural, and cognitive components of students attitudes (O'Connor et al 2010). Students who undertake the Experience will also be invited to participate in one of eight focus groups. **Result & Discussion:** This study is due to commence in 2016 as part of the lead author's NHMRC-ARC Dementia Research Development Fellowship. **Conclusion:** Education about dementia-friendly communities should be provided to future medical practitioners and pharmacists during their undergraduate training. This research is focussed on an area where there is a clear identified need for greater healthcare professional understanding and engagement. Knowledge gained will be used to provide an evidence base for Australian academics designing medical and pharmacy curriculum, to build capacity of Australia's future healthcare professionals and optimise clinical care for older Australians with dementia.

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Poster number: P036

Optimising medication use to maintain or improve quality of life in aged care facility residents with and without dementia

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Introduction: In the absence of a cure, maintaining or improving quality of life is a central goal of dementia management. This often involves using medications to treat signs and symptoms of dementia and co-morbidities. Despite this, the impact of medication use on quality of life has not been extensively explored in Australian aged care facility residents with and without dementia. This study aims to investigate the relationship between medication use and quality of life in aged care facility residents with and without dementia. **Method:** The objectives of this study are to: systematically review factors related to medication use and their association with quality of life; prospectively investigate the association between

medication use and quality of life; design, implement and evaluate a targeted intervention to optimise medication use for the purpose of maintaining or improving quality of life; identify factors important for wider implementation of the intervention into clinical practice; and evaluate the outcomes of this study internationally. **Result & Discussion:** This study is due to commence in 2016 as part of the lead author's NHMRC-ARC Dementia Research Development Fellowship. **Conclusion:** This study offers an innovative approach towards improving Australian dementia management, by investigating the under-researched association between medication use and quality of life. The results of this research will guide health professionals to better manage medications.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P006

Spatial learning and memory in Huntington's disease

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Background: Cognitive assessment research in the neurodegenerative diseases is lacking tasks that allow direct translation of findings from animal models to human trials, resulting in a critical gap in assessment of potential treatments. This project will focus on spatial memory and dementia in Huntington's disease (HD) to create a brain-informed cognitive outcome measure for testing treatments. Spatial memory deficits in HD are related to striatal and hippocampal pathology, and animal models of HD link reduced hippocampal brain-derived neurotrophic factor (BDNF), a key neuroplasticity protein that declines in HD, to spatial memory impairments. Despite clear functional disability in HD (e.g., findings one's way home), the association between spatial memory deficits and BDNF levels in human HD is unknown. Several treatments in the pipeline for HD are specifically targeted at restoring BDNF. The specificity of spatial memory to the hippocampus and striatum in HD makes spatial memory an ideal cognitive outcome for testing BDNF-relevant treatments for HD. **Method:** During the project we will create the first comprehensive analysis of spatial memory impairments in HD, and determine patterns of brain volume loss in striatal and hippocampal formations. With the use of this battery of spatial memory tests, we will assess the efficacy of treatment in the context of an international HD clinical trial. Prof Stout leads the cognitive assessment component of several clinical trials in HD, creating an opportunity to translate measures of spatial memory to test treatments. **Significance:** This project is in the initial stages, but its results will yield cognitive assessment strategy that specifically maximises the potential for homologies across species in cognitive phenotyping, which will improve translational outcomes in HD research.

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Theme: 1. Diagnosis/Assessment
Poster number: P007

Frontoparietal cortical network connectivity and executive functioning in older adults

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Introduction: Advancing age is associated with a decline in executive functioning, with marked deficits in this cognitive domain among the earliest clinical signs of neurodegeneration and future dementia. Long-range connectivity between remote brain regions is an important factor underpinning a number of cognitive processes, with connectivity between frontal and parietal cortices strongly implicated in working memory and executive control. In this study, we used resting-state electroencephalography (EEG) to characterise the relationship between long-range synchronisation of oscillatory activity (a marker of connectivity) in the frontoparietal network and executive functioning in older adults. **Method:** Fifteen healthy older adults (aged 53-76 years) were assessed using the Spatial Working Memory (SWM) subtest from the Cambridge Neuropsychological Test Automated Battery (CANTAB). Resting EEG (3 min; eyes open) was recorded in a separate session, and frontoparietal network connectivity was determined by averaging debiased weighted phase-lagged index (wPLI; a conservative measure of phase synchronisation) for electrode pairs F3-P3 and F4-P4. **Results & Discussion:** A significant correlation was observed between SWM task performance and frontoparietal network connectivity, with stronger phase synchronisation between frontal and parietal electrodes, specifically in the alpha frequency band (8-12 Hz), associated with fewer errors and more efficient strategy use. **Conclusion:** These findings suggest that frequency-specific long-range connectivity in the frontoparietal network is a strong predictor of higher-order executive functioning in older adults. This may have important implications for the early detection of cognitive decline and dementia.

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Poster number: P008

Modelling age-related changes in brain dynamics

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Introduction: The brain exhibits structural adaptations as we age. Such structural changes make the white matter sparser and increase the path length between cortical areas. The functional consequences of such structural changes remain poorly understood. **Method:** We model the whole-brain dynamics utilising the anatomical connectivity obtained from cohorts of young (15-30 years) and elderly (76-94 years) adults. The model is tuned to match the statistical dependences observed between cortical regions. **Result:** The results of this study demonstrate that the influence of the structural connectivity over the functional connectivity is stronger for the younger cohort, and the overall metabolic cost is higher for the older cohort. As a function of age, regions that show increased synchronisation are mostly located within the same hemisphere, whereas regions that show decreased synchronisation are mostly located in different hemispheres. **Discussion and Conclusion:** Our results suggest that our modelling approach constitutes a promising framework to characterise changes in brain dynamics with age. The understanding of healthy brain ageing is a fundamental benchmark for diagnosis of neurodegenerative age-related disorders such as dementia. Our framework allows the test of numerous hypothesis and interventions, which will be explored in the future.

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Theme: 1. Diagnosis/Assessment
Poster number: P009

Retinal vascular changes are associated with neocortical beta amyloid scores in the elderly

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Introduction: There is mounting evidence in recent years suggesting that the retina can provide an easily accessible window to brain pathology during early stages of dementia, specifically Alzheimer's disease (AD). The retina shares common physiological processes with the brain and thus is an excellent target area to study AD-related symptoms in-vivo. We studied retinal vascular changes and their association with cerebral beta amyloid plaque load in an elderly cohort to further establish the link between retinal biomarkers and cerebral pathology in AD. **Methods:** 75 patients (79±5 yrs, 22male) with no clinical diagnosis of AD were studied. All patients had a magnetic resonance image (MRI) and a florbetaben positron emission tomography (PET) scan. PET images were analysed based on the standardised uptake value ratio (SUVR). Following this, all patients were asked to attend Macquarie Eye clinic for a thorough clinical ocular examination and measurement of arterial pulse (RAP) retinal venous pulse (RVP) amplitude using the Dynamic Vessel Analyser. **Results:** The mean neocortical beta amyloid (Aî²) SUVR was 1.35±0.31 (0.97-2.32). Intraocular pressures were normal (14± 3 mmHg). We observed a positive association between RAP amplitude and Aî²-SUVr ($p<0.05$, $r=0.33$). The correlation between RVP amplitude and Aî²-SUVr was negative ($p<0.005$, $r=0.4$). **Discussion and Conclusion:** This study demonstrated a significant correlation between amplitude of retinal vascular pulsatility and neocortical Aî² scores. Future studies will investigate this correlation in an established AD cohort to further elucidate whether these biomarkers have a correlation not only with cerebral Aî² plaques but with the development of subsequent clinical dementia. If a clinical correlation is confirmed, screening of eyes in those considered at risk of AD may provide an alternative non-expensive simple tool for establishing increased risk profiles and potentially for monitoring potential therapies.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P038

Knowledge translation in dementia care: A review of the evidence for 'Appreciative Inquiry' as a method to facilitate organizational change

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Introduction: It can be difficult for service providers to be aware of, and use, relevant research-derived knowledge of best practice in dementia care. Timely, effective knowledge translation becomes more challenging when policy reforms demand rapid change - and the evidence base may be unclear but commercial stakes are high, e.g. consumer directed care. One approach gaining popularity is Appreciative Inquiry - a strengths-based technique with roots in positive psychology and business management. Some Australian service providers have engaged change consultants to facilitate this process. Our question: How has Appreciative Inquiry been used in dementia care settings, and with what types of outcomes? **Method:** We conducted a scoping conceptual review of the dementia care literature (2010+) to determine how Appreciative Inquiry has been used and evaluated (measures and outcomes). **Result & Discussions:** Fewer than 20 relevant articles were found. Beyond qualitative process reports on creating 'team vision', no compelling evaluations of knowledge translation or sustainable change outcomes in dementia care were identified. One study reported dementia care staff enjoyed the imaginative narrative approach of Appreciative Inquiry, despite it being initially deemed 'woolly thinking' by sceptical clinicians. The method was also used with consumers in participatory action research, e.g. to learn what older people want from care. **Conclusion:** In dementia care, Appreciative Inquiry has been used to broker vision-setting conversations with staff and/or consumers. There is a dearth of evidence for outcomes - should this obstruct using Appreciative Inquiry as a technique for facilitating change in translating research-derived knowledge into practice? Strategies harnessing 'feel good' and 'innovative thinking' may have value, e.g. help re-engage staff in settings already negative for change efforts. While awaiting quality research to demonstrate improved measureable care-related, staff-based, or organization-derived change outcomes, we explore practical considerations for dementia care providers interested in Appreciative Inquiry. Hallmarks of transformational leadership will be highlighted.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P057

The role of copper in Ubiquitin-dependent protein degradation in Alzheimer's disease

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Disruption to copper homeostasis is a feature of Alzheimer's disease (AD). Recently it was discovered that copper reduces Amyloid Precursor Protein (APP) endocytosis from the plasma membrane and promotes its ubiquitination. The importance of this finding is underlined by studies that indicate that endocytosis is a key step in amyloidogenic processing of APP to form neurotoxic amyloid beta (AÎ²) peptides. Ubiquitin plays a fundamental signaling role in proteasome-mediated protein degradation, endocytic protein sorting and targeting membrane proteins to lysosomes for degradation via autophagy. My hypothesis is that APP amyloidogenic processing is modulated by copper-responsive ubiquitination of APP, signaling it towards a degradative pathway rather than an endoctyic pathway where it encounters the enzymes responsible for AÎ² generation, namely Î²- and Î³-secretase. **Specific aims:** Aim 1: To determine the role of Cu-responsive ubiquitination of APP

on its localization and degradation in cultured mouse neurons. Aim 2: To compare Cu-responsive ubiquitination of APP in differentiated neurons that have been re-programmed from healthy and AD patient human fibroblasts using induced pluripotent stem cells (iPSCs). Aim 3: To determine if mutations that cause familial AD affect Cu-responsive ubiquitination of APP using cultured mouse and human fibroblasts. Aim 4: To identify novel Cu-responsive ubiquitin targets in AD-affected and healthy control fibroblasts using an ubiquitin-omics approach. I propose that copper is a physiological co-factor for the ubiquitination of APP, a neuroprotective mechanism that reduces the level of amyloidogenic processing. There is evidence from human clinical and animal trials that drugs designed to restore brain metal homeostasis provide therapeutic benefit for the treatment of AD. However, knowledge of their mechanism of action is still limited. This study will provide vital molecular information on the effect of copper on ubiquitination and provide new insight into the mechanism of action of metal ionophores, a promising disease modifying AD therapy.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P057

Promoting microglial function in Alzheimer's disease through copper delivery

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Despite intensive research into disease mechanisms of Alzheimer's disease (AD), an overarching problem is the lack of translatability of treatments to human disease. A significant number of promising therapeutics emerged from animal studies yet have failed to translate clinically, reflecting the limitations of currently available AD models. Thus the need for a physiological preclinical model for drug screening in AD is clear. The importance of microglia to inflammatory and phagocytic processes in AD, particularly in late onset AD, and their emerging role in synaptic plasticity indicates their presence as vital to a preclinical AD model. Additionally, the reported differences between human and murine microglia indicate that human-derived models are essential to fully appreciate the role that these cells play in AD. Currently no effective protocols exist for the generation of human microglia, either through direct reprogramming or from stem cells. Our collaborator recently published a novel bioinformatic tool, Mogrify, to predict transcription factor networks that control cell identity allowing effective reprogramming from one somatic cell to another. In order to develop patient-specific preclinical models with improved translatability we will use Mogrify and transcription factor-mediated reprograming to directly obtain mature microglia from fibroblasts, stem cells and monocytes from AD and cognitively normal patients. We will use the reprogrammed Alzheimer's microglia and 3D co-cultures containing microglia, neurons and astrocytes to investigate the mechanism of action of potential therapeutics on amyloid phagocytosis, transcriptional changes and synaptic remodelling in AD. We will test a family of neuroprotective and bioavailable copper-delivering compounds developed by our team. These studies will provide mechanistic insights into action of copper compounds on microglia to inform the development of next generation compounds for AD.

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Theme: 3. Intervention/Treatment
Poster number: P051

The utility of mass spectrometry for investigating iron proteins in Alzheimer's disease

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Metals such as copper, zinc and iron exist in trace amounts, but are essential to all life and play a critical role in cellular processes in the brain. When metal homeostasis in the brain is altered, such as via the accumulation of metals with age, neuronal damage, oxidative stress and brain pathologies are observed. This accumulation includes labile metals and metalloproteins, and can lead to neurodegenerative effects such as those seen in Alzheimer's disease. Alzheimer's is the leading cause of dementia, and affects nearly 350,000 Australians at a cost of $4.9 billion in direct health care expenditure. Many proteins involve a metal co-factor, but only a small fraction of these have been characterised. Traditional proteomics techniques do not reveal information on the metal status of a protein. Further, the current approach to metal biology involves bulk analysis of total metal levels in tissue, and does not provide information on the number or type of metalloprotein alterations. The lack of mechanistic detail from these approaches has led to only limited insight. Rather than focusing solely on the presence of the individual metal species, advancement of the field hinges on understanding the specific relationship between biometals like iron and proteins. This project will generate functional information on iron-containing proteins in the Alzheimer's brain using newly developed mass-spectrometry techniques targeted for the measurement of metal-containing proteins. This will provide detailed information on the fundamental molecular mechanism of iron in Alzheimer's disease, and more broadly, aid in understanding the role of metals in neurodegenerative disease.

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Poster Presentation
Theme: No Theme Allocated
Poster number: P074

Forging New Links: A New Theory for the Role of Iron Metabolism in Neurodegenerative Disease

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Curing dementia requires new targets for drug discovery. Using Caenorhabditis elegans as a tractable model system, I will examine deleterious changes in redox metabolism by creating new transgenic C. elegans, expressing both genetically encoded redox sensors and proteins associated with neurodegenerative disease, e.g. AÎ². These novel animal models will be used to examine how age-related change in iron/mitochondrial/neuronal redox chemistry drive neurodegenerative disease pathogenesis. I will use my knowledge of X-ray spectroscopy to characterise the changes in iron coordination that drive neurodegenerative disease and evaluate the neuronal proteome to identify age- and disease-specific changes to the

complement/function of mitochondrial proteins. These activities will accelerate the search for a cure by identifying gene products that modulate mitochondrial function/iron homeostasis during neurodegeneration. By harnessing world-leading technology and implementing novel analytical approaches to data reduction I have already demonstrated that X-ray microscopy can visualise the distribution of metalloproteins in vivo [1]. This provides a unique tool for studying ferrobiology of disease. This fellowship capitalises on unique Australian resources, including the renowned dementia research expertise of the Florey Institute for Neuroscience and Mental Health and world-leading capabilities of the Florey, University of Melbourne and Australian Synchrotron. [1] SA James et al, 'Ï†XANES: In vivo imaging of metal-protein coordination environments', Sci Reports (2016) 6: 20350

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Theme: No Theme Allocated
Poster number: P081

Novel targeted degradable multifunctional poly(vinyl-co-ester) nanoparticles for Alzheimer's disease applications

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The aim of the proposed project is the design of novel biodegradable multifunctional carriers based on poly(vinyl-co-ester)s, which can be readily imparted with stealth and targeting properties, as the next generation brain delivery systems. The nanoparticle systems will be designed to be able to co-deliver diagnostic and therapeutic cargo for Alzheimer's disease. A range of well-defined glycopolymers will be synthesized and tested for their ability to prevent the aggregation of amyloid β.

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Theme: 1. Diagnosis/Assessment
Poster number: P041

A scoping study for the Australian National Dementia Registry

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Introduction: Clinical registries are databases collecting information about patients diagnosed with a particular disease, patients who use a particular health resource or undergo a particular procedure. The current scoping study looks at the feasibility and sustainability of establishing an Australian national registry of patients diagnosed with dementia, irrespective of type of dementia or age. **Method:** The scoping study is informed by review of the policy documents on clinical (quality) registries in Australia (ACSQHC, 2014), a systematic review of the international literature and online resources on dementia registries

worldwide. The study involves consultations with relevant stakeholders and experts, including dementia researchers, carers of patients with dementia, managers of existing clinical registries, data linkage specialists, and ICT services. **Result:** The review of the literature and online sources identified 24 dementia and/or Alzheimer's disease registries worldwide, including population-based, research, quality, and case registries, as well as research volunteer registries. Stakeholders and expert consultations, and the review of relevant Australian policy documents, have helped to identify potentially effective recruitment strategies, and the minimum dataset for the planned Australian National Dementia Registry. This process has also helped to identify practical, ethical, and legislative challenges in development of the online database for the registry, in recruitment of patients with dementia and their carers, and in future data linkage. The next major step in the ongoing scoping study is determining funding sources which will ensure successful development and long-term operation of the registry. **Discussions and Conclusion:** The planned Australian National Dementia Registry has a potential to be an invaluable tool to collect clinical and epidemiological data on dementia, to monitor performance of health and aged care services, and facilitate participation in treatment trials. These data can improve the quality of care for people with dementia and their carers, and support and stimulate dementia research in Australia Australian Commission on Safety and Quality in Health Care (2014). Framework for Australian clinical quality registries. Sydney: ACSQHC.

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Theme: 1. Diagnosis/Assessment
Poster number: P010

Understanding irony: Employing The Awareness of Social Inference Test to inform differential diagnosis of dementia

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Introduction: Assessment of social cognition is increasingly recognised as an important component towards an accurate clinical diagnosis of behavioural-variant frontotemporal dementia (bvFTD). It is also helpful for differentiating bvFTD from typical Alzheimer's disease (AD). Surprisingly, however, few validated clinical instruments to assess social cognition exist. The Awareness of Social Inference Test (TASIT) assesses interpretation of basic emotions, sincere and sarcastic interactions, using ecologically valid video vignettes. While it has shown good sensitivity to detect bvFTD, its lengthy administration has limited the translation of the TASIT to the clinic. **Method:** Here, we evaluated the new short version of the TASIT " the TASIT-S" in 25 bvFTD patients, 23 AD patients and 25 healthy controls. The TASIT-S was recently developed using Rasch analysis and confirmatory factor analysis to reduce the number of items, while maintaining the structure of the original TASIT and is divided into: Part 1 (Emotion Evaluation) and Part 2 (Social Inference), which is subdivided into 'Sincere' and 'Sarcastic' exchanges. **Results & Discussions:** On Part 1, both bvFTD and AD groups were impaired when compared with controls (p values <.001). After controlling for cognitive impairment, using Addenbrooke's Cognitive Examination-Revised, however, only bvFTD were impaired (p=.034), whereas the AD group was not significantly different from controls

(p=.492). On Part 2, both bvFTD and AD group performed within normal limits in their ability to interpret sincere exchanges (p values >.05). Importantly, however, the bvFTD group was impaired in the interpretation of sarcastic exchanges (p=.004), whereas again AD performed within normal limits (p=.477), even after accounting for cognitive ability. **Conclusion:** These results confirm the utility of the TASIT-S in identifying social cognition impairment in bvFTD. The test is much shorter than the original TASIT (administration time ~20 mins) and should be included in the clinical assessment when considering a differential diagnosis of bvFTD.

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Theme: 4. Prevention
Poster number: P062

Computerised Cognitive Training in Older Adults with Parkinson disease, Mild Cognitive Impairment or Dementia: Convergence and Divergence across Meta-Analyses

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Introduction: Computerised cognitive training (CCT) is a safe and efficacious intervention for cognition in healthy older adults, but efficacy varies across domains and design choices, and little is known about the effects of CCT in older adults with cognitive impairments. **Method:** We searched Medline, Embase, PsychINFO, CINAHL and CENTRAL for randomised controlled trials (RCTs) of CCT in older adults with Parkinson disease, mild cognitive impairment (MCI) or dementia. Overall cognition, individual cognitive domains, psychosocial functioning and everyday function were pooled separately for each population. **Results:** The overall effect on cognition in MCI across 13 RCTs was small (Hedges g=0.29, 95%CI 0.12â€“0.45). Small to moderate effects were found for global cognition, attention, working memory as well as learning and memory with the exception of non-verbal memory. In dementia RCTs statistically significant effects were found on overall cognition (k=11, g=0.26, 95%CI 0.01â€“0.52) as well as visuospatial skills and psychosocial functioning, but these pooled effects were driven by three trials of virtual reality or Nintendo Wii. Seven RCTs in Parkinson disease revealed a small and statistically significant effect size on overall cognition (g=0.23, 95%CI 0.014â€“0.44). Larger effects were noted on working memory, processing speed and executive function. There were no evidence for statistical heterogeneity or publication bias and no adverse events were reported. **Discussions and conclusion:** CCT is efficacious on overall cognition in people with MCI or Parkinson disease. Domain-specific effects vary across populations. This technique warrants longer-term and larger trials that examine effects on conversion to dementia. Conversely, evidence for efficacy in people with dementia is weak and limited to trials of immersive technologies.

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Poster Presentation
Theme: 4. Prevention
Poster number: P063

Zebrafish models of familial Alzheimer's disease for understanding molecular mechanisms and drug discovery

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Introduction: To prevent or delay Alzheimer's disease (AD) onset we must understand its underlying molecular mechanisms. In human disease modeling, zebrafish can offer the most sensitive detection of changes in gene and protein expression in response to mutation. We have developed and analysed the first zebrafish models of familial AD (fAD) mutations in the PRESENILIN genes (in which the majority of fAD mutations occur). **Methods:** We analysed early changes in brain gene and protein expression due to single, heterozygous mutations in the zebrafish's endogenous PSEN1 gene. These represent the initial molecular events and stresses that, in humans, lead to development of AD decades later. **Results:** 1) Single, heterozygous, endogenous fAD mutations cause very significant changes in young adult (6 month) brain gene and protein expression 2) Changes in behavior and gene expression are seen in 6- and 3-day-old fish respectively. This permits use of these fish in screening of chemical libraries 3) Systems biology analysis of gene and protein expression data implies changes in ATP, insulin signalling, and other cellular systems as early, common effects of fAD mutations. 4) These effects apparently occur in the absence of Amyloidbeta accumulation but may promote Amyloidbeta accumulation at later stages 5) Systems biology analysis shows that recognised risk factors for late onset AD cause similar profiles of altered brain gene expression as the fAD mutations. 6) Neurodegenerative changes may exist in 2-year-old (aged, infertile) fish. **Conclusions:** A) We can use zebrafish to understand the initial molecular changes that ultimately lead to AD B) Both systems biology-based interrogation of drug databases and chemical library screening with zebrafish may find drugs to prevent or delay AD onset C) The dramatic molecular and behavioural changes observed from single, heterozygous, endogenous fAD mutations imply that animals with multiple mutant transgenes are not close models of the disease.

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Poster number: P071

Can a new view of Alzheimer's disease genetic data give better directions for prevention or treatment?

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Introduction: For two decades the amyloid hypothesis has dominated research into understanding Alzheimer's disease (AD) and the search for therapeutic drugs. Now, some movement away from the amyloid hypothesis is evident with a granting agency refusing to fund drug discovery projects based on it (the Alzheimer's Drug Discovery Foundation) and leaders in AD research acknowledging inconsistencies between the hypothesis and disease pathogenesis, at least for the common, late onset form of the disease (e.g. De Strooper & Karran, Cell, 2016). However, the genetic data from analysis of early onset, familial AD (fAD)

is still seen as largely consistent with a central role for Amyloidbeta peptide in disease pathogenesis. But is it? Can the genetic data be interpreted from a different angle to provide a more predictive view of disease mechanism? **Methods & results:** The majority of dominant mutations causing fAD occur in the PRESENILIN genes PSEN1 and PSEN2. These genes encode 'holoproteins' that become cleaved internally to activate the gamma-secretase activity that produces Amyloidbeta. In a recent review in the Journal of Alzheimer's Disease we proposed that the PSEN genetic data is consistent with a central role in fAD of the PSEN holoprotein rather than gamma-secretase activity. Data from our PSEN fAD mutation model zebrafish now indicate that failure of PSEN holoprotein function may also contribute to the sporadic, late onset form of AD. Published evidence indicates a central role of PSEN holoproteins in cells' ability to cope with hypoxia and that PSEN holoprotein is required for efficient lysosome function and breakdown of protein aggregates. **Conclusions:** Research into the function of the holoprotein forms of the PSENs may be a fruitful avenue for understanding the basis of both early and late onset forms of AD. Interventions promoting healthy brain vasculature and lysosome function may prevent or delay AD onset.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P039

A telehealth intervention to delay functional decline in community-dwelling people with dementia

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Introduction: Functional decline is one of the core features of dementia and is associated with reduced quality of life, considerable impact on carers, high healthcare costs and institutionalisation. There is evidence that non-pharmacological interventions that promote functional independence and provide the carer with skills training can delay decline, reduce carer impact and improve quality of life of the person with dementia. The use of telehealth technologies to deliver the intervention may reduce the costs of delivering the intervention, increase accessibility and facilitate research translation. **Method:** This research project involves two phases. First, we will conduct a pilot study involving ten people with dementia and their carers to determine the feasibility of delivering the intervention using telehealth. The first two consultations will take place in the home and involve assessment and familiarisation with the technology. The remaining consultations (up to eight) will be conducted via videoconferencing technology. The feasibility study will inform a larger study in which we compare the efficacy of telehealth delivery of the program with face-to-face delivery. **Result:** The feasibility project will provide information about the proportion of people (and their carers) that are willing and able to participate, the modifications required for telehealth delivery and the acceptability of telehealth delivery. The larger trial will provide information regarding efficacy (functional independence, quality of life, activity engagement and symptoms) and costs of care. **Discussions and Conclusion:** There is a need to investigate new strategies to translate evidence based interventions that delay functional decline into clinical practice. If found to be effective, this approach may be particularly useful for people living in rural and remote areas who have limited access to staff with expertise in dementia care.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P011

Common and divergent neural correlates of anomia in amnestic and logopenic presentations of Alzheimer's disease

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Introduction: The majority of logopenic variant primary progressive aphasia (lv-PPA) cases harbour Alzheimer pathology in the brain, suggesting that lv-PPA constitutes an atypical presentation of Alzheimer's disease (AD). However, even if caused by Alzheimer pathology, clinical manifestations of lv-PPA differ from those observed in typical AD: in lv-PPA, aphasia is the main feature while typical AD is characterised by impaired episodic memory. Anomia or impaired naming, however, is present in both disorders. Whether these AD presentations share anatomical and mechanistic neurocognitive processes of anomia has not been fully investigated. **Methods:** We studied naming and other single-word performance, and its relationship with regions of brain atrophy in 23 typical AD and 22 lv-PPA cases with presumed underlying Alzheimer pathology. All cases underwent MRI and cortical thickness calculations using FreeSurfer. **Result & Discussions:** Whereas both AD groups displayed some degree of anomia and impaired word comprehension, those deficits were severe in lv-PPA and accompanied by a range of linguistic deficits, comprising phonological substitutions, superordinate semantic paraphasias and abnormal single-word repetition. Analysis of cortical thickness revealed that anomia was correlated with thinning in the left superior temporal gyrus in both groups. In typical AD it was also associated with thinning in the right inferior temporal regions. The analysis of single-word comprehension in turn evidenced convergent cortical thinning involving both fusiform gyri in typical AD and in lv-PPA. These findings suggest that these common areas of atrophy are involved in the shared semantic deficits of both groups. **Conclusion:** This evidence shows that anomia in lv-PPA and typical AD results from the common involvement at multiple steps of word processing, in particular semantic and lexical retrieval; however, lv-PPA display a more marked involvement spanning phonological processing.

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Theme: 1. Diagnosis/Assessment
Poster number: P012

BDNF Val66Met moderates memory impairment, hippocampal function and tau in preclinical autosomal dominant Alzheimer's disease

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Background: The brain-derived neurotrophic factor (BDNF) Val66Met polymorphism is implicated in synaptic excitation and neuronal integrity, and has previously been shown to moderate AÎ²-related memory decline and hippocampal atrophy in preclinical sporadic Alzheimer's disease (AD). However, the effect of BDNF in autosomal dominant AD (ADAD) is unknown. We aimed to determine the effect of BDNF Val66Met on cognitive function, hippocampal function, tau and AÎ² in preclinical ADAD. We explored effects of apolipoprotein E (APOE) Îµ4 on these relationships. **Methods:** The Dominantly Inherited Alzheimer Network (DIAN) conducted clinical, neuropsychological, genetic, biomarker and neuroimaging measures at baseline in 131 mutation non-carriers (NC) and 143 preclinical ADAD mutation carriers (MC) on average 12 years prior to clinical symptom onset. BDNF genotype data were obtained for MCs (95 Val66 homozygotes, 48 Met66 carriers). **Results:** Among preclinical MCs, Met66 carriers had worse memory performance, lower hippocampal glucose metabolism and increased levels of CSF tau and phosphorylated tau (p-tau) than Val66 homozygotes. Cortical AÎ² and CSF AÎ²42 levels were significantly different from NC's but did not differ between preclinical MC Val66 homozygotes and Met66 carriers. There was an effect of APOE on AÎ² levels but not cognitive function, glucose metabolism or tau. **Discussions and Conclusions:** As in sporadic AD, the deleterious effects of AÎ² on memory, hippocampal function, and tau in preclinical ADAD mutation carriers are greater in Met66 carriers. To date, this is the only genetic factor found to moderate downstream effects of AÎ² in ADAD.

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Theme: 1. Diagnosis/Assessment
Poster number: P013

Genetic risk prediction for selection of those at extremes of risk for Alzheimer's disease in the PISA study

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Introduction: While the burden of dementia occurs late in life, neuropathology accumulates for decades prior to onset of dementia. Interventions to modify the course of the disease have the greatest potential to avert neuronal death and later disease burden if they are introduced during this crucial window, well before the onset of clear cognitive decline. It is thus imperative to develop methods to identify those at the very early stage of dementia. This is the aim of the Prospective Imaging Study of Aging: Genes, Brain and Behaviour (PISA) study, which seeks to 1) Identify healthy middle-aged Australians at high risk of dementia; 2) Discover biological markers of early neuropathology; 3) Identify modifiable risk factors, and 4) Establish the very early phenotypic and neuronal signs of disease conversion. **Method:** We are utilizing APOE genotype and polygenic risk scores (PRS) to identify individuals at high and low risk of AD. We are levering our extensive in-house cohorts, comprising ~16,000 individuals between the ages of 40 and 70yrs with available GWAS data to generate a genetically enriched cohort for studying the precursors and lifestyle risk factors for AD. **Result & Discussions:** For AD, a high prediction accuracy of an AUC of 78.2% can be achieved by a prediction model including APOE genotype, and PRS (containing GWAS association SNPs

with P value <0.5) with the PRS adding significant predictive value over APOE alone. Our own work has shown that the AD PRS is associated with reduced hippocampal volume in those without a dementia diagnosis, including healthy older adults and those with mild cognitive impairment (MCI). **Conclusion:** Using cutting-edge genetic prediction, the PISA study is an at risk AD cohort enriched by genome-wide risk prediction, aiming to identify early markers of prodromal Alzheimer's disease that are detectable as early as middle age.

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Theme: 4. Prevention
Poster number: P064

A multi-faceted intervention to enhance cognition in older people at risk of cognitive decline

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Introduction: Rapid population ageing is leading to an increasing proportion of the population living with cognitive impairment and dementia. There is an urgent need to focus on preventative actions to reduce the future number of dementia cases. The pathophysiology of dementia and cognitive decline is complex, therefore a multi-faceted approach incorporating both exercise and dietary factors may convey greater cognitive benefits than a single intervention administered in isolation. Few studies have taken the approach of combating cognitive decline by combining exercise with dietary supplementation. This study will be a 6 month randomised controlled trial (RCT) to investigate the combination of a multimodal exercise program, combined with omega-3 fatty acid, vitamin D and protein supplementation, to enhance cognition in older people experiencing early signs of memory impairment. This study will also evaluate the longer-term impact of the multi-faceted intervention, including the ability of individuals to incorporate these changes into their lifestyle. **Methods:** This 12-month, community-based, double-blind, placebo controlled, randomised trial will involve a 6-month supervised and structured program followed by a 6-month maintenance (translation) phase. Participants (n=148) with subjective memory impairment (SMI) aged 60-85 years will be randomised to: 1) a multi-modal exercise program involving progressive resistance training (PRT) and aerobic training combined with omega-3, vitamin D and protein supplementation, or 2) a sham exercise program and placebo supplements. **Results and discussion:** Recruitment for this study will commence in October 2016 and baseline testing will commence in January 2017. It is anticipated data collection for this study will be complete in early 2019. **Conclusion:** In summary, this study will target prevention and early intervention through a novel combination of exercise and dietary supplements in elderly who are at risk of further cognitive decline.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P052

The effect of aromaticity on short peptide hydrogels for cell culture applications

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Introduction: Self-assembled hydrogels assemble through non-covalent interactions such as stacking and hydrogen bonding, and have been used to culture a variety of cell lines including HeLa, Caco-2 and fibroblasts. Their tuneable nature makes them ideal candidates for three dimensional cell culture, as their properties can be tuned upon modification of either the peptide backbone or aromatic N-terminal capping group. This capping group is often the widely used as a protecting group fluorenylmethyloxycarbonyl, or Fmoc, however in this work a variety of heterocyclic capping groups are used to control the properties of an N-capped diphenylalanine gelator. **Method:** Gelators were prepared through standard solid phase peptide synthesis techniques. Hydrogels were formed using a pH switch method, whereupon the gelator was dissolved at pH 9, followed by acidification using glucono-delta-lactone, resulting in gel formation. Hydrogels were characterised using rheology, atomic force microscopy (AFM), circular dichroism (CD) and electrochemical impedance spectroscopy (EIS). **Results & Discussion:** Four different capping groups were employed, where either the hydrogen bonding potential or degree of nitrogen substitution on the N-terminal capping group is varied, to probe the effect of these parameters on self-assembly. Zeta potential measurements and EIS were used to monitor the self-assembly process during gelation. The morphology of the hydrogel has been studied by AFM, Figure 1, and the mechanical strength of these hydrogels tested using rheology. **Conclusion:** From characterisation across different length scales, a model of the self-assembly for these four gelators can be discerned. The morphology of the fibres seen by AFM is due to different self-assembly pathways, and this strongly correlates to the different stiffnesses observed by rheology This work gives an insight into the factors governing the self-assembly of short peptide gelators and will be useful in the future use of these hydrogels as three dimensional cell culture materials.

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Theme: No Theme Allocated
Poster number: P075

Biometal Dyshomeostasis in Dementia with Lewy Bodies

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Dementia with Lewy bodies (DLB) is the second most common form of dementia after Alzheimer's disease (AD) accounting for up to 1 in 4 of all dementia cases. DLB is characterised by fluctuations in mental state, visual hallucinations and parkinsonism. The predominant pathological feature of DLB is the presence of Î±-synuclein Lewy bodies and Lewy neurites in the brainstem, limbic region and cortical areas. Lewy bodies are round, filamentous inclusions whereas Lewy neurites are diffuse presynaptic Î±-synuclein aggregates which affect synaptic function. Lewy pathology is also a feature of several other neurodegenerative diseases including Parkinson's disease (PD) and multiple system atrophy. Collectively, these conditions are termed synucleinopathies and likely share common pathogenic mechanisms that lead to cell death and tissue atrophy. Of these synucleinopathies, only PD has been extensively studied to date. In addition to its PD-like

pathology, DLB also shares pathology with AD including amyloid-beta (A-beta) plaques and tau neurofibrillary tangles. There is little known about the pathogenesis of DLB and it is largely assumed to be similar to AD and PD given the pathological and symptomatic overlap. Due to this lack of understanding, there are no specific therapies for DLB and treatment relies on AD therapeutics which do not alter progression of the disease. Understanding underlying disease mechanisms is crucial for identifying valid targets for therapeutic intervention. Metal dyshomeostasis has been implicated in the pathogenesis of both AD and PD and is a major target of ongoing development of new therapeutics for these conditions. The convergence of Î±-synuclein, A-beta and tau pathology in DLB suggests a role for metal dyshomeostasis in the pathogenesis of DLB. This fellowship will extend current knowledge of AD and PD to investigate biometal dyshomeostasis in DLB and whether it represents a valid target for the development of disease modifying therapeutics.

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Theme: 2. Care/Living With Dementia
Poster number: P040

BPSD-CARE: a person-centred approach to managing behavioural and psychological symptoms of dementia in residential care

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Introduction: Rates of behavioural and psychological symptoms of dementia (BPSD) amongst people living in residential aged care facilities (RACF) are high. Over 90% of Australian aged care residents exhibit clinically significant BPSD. BPSD, especially when severe, are difficult to manage and can put patients, carers and residents at risk. Sweden has a long tradition of quality registries aimed at securing high quality care in a variety of clinical settings. The Swedish BPSD registry program was initiated to ensure and improve residential care for people with BPSD, reduce BPSD and improve quality of life. This project adapts the Swedish BPSD program for use in Australia (BPSD-CARE). **Method:** Participants (care staff, residents, next-of-kin) will be recruited from Goodwin Aged Care. Eligible residents will be continuously recruited into the study over a 24 month period and complete the 10 month intervention program. The intervention comprises the active use of the BPSD-CARE program in combination with regular online tutoring and education of staff. **Results & Discussions:** Efficacy of the BPSD-CARE intervention program will be evaluated using pre- and post-measures and a within-subjects repeated measures design. Semi-structured interviews with RACF staff and next-of-kin will assess perceptions of the efficacy of the intervention. This project will evaluate the efficacy of BPSD-CARE to reduce the prevalence of BPSD and the use of medication to manage BPSD in Australian RACF. The unique contribution of this research is the evaluation of BPSD-CARE on RACF staff, their attitudes towards dementia care and quality of interactions with residents. For the first time, impact of BPSD-CARE on next of kin satisfaction with the care provided will also be evaluated. **Conclusion:** This project will inform the development of a program which will provide the multidisciplinary teams working within RACF with the specialised training and skills needed to provide care for residents with BPSD.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P053

Effects of BACE inhibition on synaptic connectivity

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Overview: Inhibition of BACE1 (Î²-site amyloid precursor protein cleaving enzyme 1) is a promising future treatment for Alzheimer's disease which aims to decrease production of the amyloid-Î² peptide from the amyloid precursor protein. BACE inhibitors also affect the functions of multiple proteins which are not associated with Alzheimer's disease pathology, but rather have important roles in the brain. In particular, the Seizure-related gene 6 (Sez6) family of proteins, Sez6, Sez6-like (Sez6L) and Sez6-like 2 (Sez6L2), are major BACE1 substrates. Sez6 is required for the normal development of dendrites and excitatory synapses(1) and plays an ongoing role in excitatory synapse function in the adult mouse brain (Munro & Carrodus et al, unpublished). In this study, we will assess whether long-term BACE1 inhibition compromises synapse function, focusing initially on the altered activity of Sez6 family proteins. **Aims:** 1) Identify neuronal and behavioural changes associated with chronic BACE inhibition, and the extent to which key BACE1 substrates contribute to these outcomes. This is conducted in vitro in neuron cultures and through the use of wild-type and Sez6 family knockout mouse lines. 2) Quantify changes in the synaptic proteome following chronic BACE inhibition. 3) Identify consequences of BACE1 deletion in neurons important for learning and memory. 4) Identify clinically relevant biomarkers of BACE inhibitor efficacy. **Results:** When a Î²-secretase inhibitor (C3, Millipore) was applied to cultured mouse cortical neurons (after the development of dendrites), a decrease in synapse number was observed in wild-type but not Sez6 family knockout neurons. This indicates that preventing the production of BACE1 shed Sez6 family ectodomains decreases synapse number in vitro. **Conclusion:** Sez6 family proteins are BACE1 substrates that play an important role in synapse formation, maintenance and behaviour. (1) Gunnersen, J.M., et al., Sez-6 proteins affect dendritic arborization patterns and excitability of cortical pyramidal neurons. Neuron, 2007. 56(4).

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Poster number: P065

Development of a unified list of drugs associated with drug-induced cognitive impairment

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Introduction: To date 406 medicines including 225 currently marketed in Australia have confusion listed as a side effect in their product information or in reports from post-marketing surveillance. The Canadian Adverse Reaction Database also highlights that this potential adverse event (AE) occurs frequently, holding 6193 reports of suspected AEs of drug-related confusion. Despite this wealth of data, we still do not know the full contribution of medicines

to iatrogenic cognitive impairment. This research will be conducted to develop a comprehensive list of probable drugs inducing cognitive impairment. **Methods:** First, different signal detection methods will be used in corroborating data sources to detect drugs inducing AEs of neurocognitive disorders (NCDs). Bayesian techniques will be used in the US Food and Drug Administration Adverse Event Reporting System and Australian Government Department of Veterans' Affair (DVA) claims database. Prescription sequence symmetry analyses will also be used in DVA database to detect medicines inducing delirium. Detected associations will be classified into known or new by reviewing product information documents and conducting systematic reviews and meta-analyses of published literature on drugs inducing NCDs. The new identified signals will then be adjudicated. The drugs' mechanism of action will be reviewed; whether the drug crosses the blood-brain barrier and causes apoptosis. Also, sources of false-positive signals will be identified; an example being using the Longitudinal Evaluation of Observational Profiles of Adverse Events Related to Drugs to examine protopathic bias when a drug is prescribed for a prodrome of the conditions of concern. Confirmatory analyses will be conducted using formal epidemiological studies in DVA dataset and Australian ongoing longitudinal population-based cohorts. **Conclusion:** The research outputs will assist prescribers in clinical decision-making, possibly avoiding the prescribing of high risk drugs for patients with a high index of suspicion for drug-induced dementia, thus preventing this type of dementia from developing.

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Theme: 3. Intervention/Treatment
Poster number: P054

Fatty acid-binding protein 5: an intracellular protein regulating the blood-brain barrier transport of docosahexaenoic acid and cognitive function

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Introduction: Docosahexaenoic acid (DHA) is an essential fatty acid required for cognitive function. The brain has limited ability to synthesise DHA and therefore plasma-derived DHA must be transported across the blood-brain barrier (BBB). This study investigated whether fatty acid-binding protein 5 (FABP5) regulates the BBB transport of DHA and therefore cognitive function. **Methods:** The uptake of 14C-DHA was measured in human brain microvascular endothelial cells (hCMEC/D3) with and without FABP5 genetic silencing and in brain microvascular endothelial cells isolated from wild-type (FABP5+/+) and FABP5 deficient (FABP5-/-) mice. The BBB transport of 14C-DHA was assessed in FABP5+/+ and FABP5-/- mice using an in situ transcardiac perfusion technique. Endogenous brain concentrations of DHA were measured in FABP5+/+ and FABP5-/- mice using gas chromatography with flame ionization detection, and cognitive function was assessed using a modified water maze, novel object recognition, and T-maze memory paradigms. **Results:** FABP5 siRNA transfection decreased FABP5 mRNA in hCMEC/D3 cells by 53.2 ± 5.5%, and this was associated with a 44.8 ± 13.7% reduction in FABP5 protein expression and 14.1 ± 2.7% reduction in 14C-DHA cellular uptake. 14C-DHA uptake into brain endothelial cells from FABP5-/- mice was reduced by 48.4 ± 14.5% relative to those from FABP5+/+ mice. The BBB transport of 14C-DHA was decreased by 36.7 ± 12.4% in FABP5-/- mice and this was associated with a 27.4 ± 10.3% reduction in endogenous brain DHA levels. FABP5-/- mice exhibited decreased spontaneous alternations (T-maze), a lower discrimination index (novel object recognition) and impaired spatial learning (water maze). **Discussion and Conclusion:** This study has demonstrated that

FABP5 regulates the BBB transport of DHA, playing an important role in maintenance of cognitive function. FABP5 may therefore be potentially manipulated to enhance the CNS access of DHA in conditions where the brain levels of DHA are decreased, such as Alzheimer's disease.

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Theme: 3. Intervention/Treatment
Poster number: P083

The role of proteoglycans in neurodegeneration

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With Dementia affecting a large number of people worldwide, often with lifelong consequences, new and effective approaches to enable long-lasting therapeutic interventions are required. An estimated 298 000 Australians were diagnosed as having dementia in 2011 and this is estimated to increase to 400 000 by 2020. Stem cells have provided some positive results in the treatment of neurodegenerative disorders however, further information is required to more fully understand the mechanisms controlling disease onset and potential models of repair. Proteoglycans (PGs) are proteins ubiquitous to the cell surface and the extracellular matrix (ECM) and include two major families, the chondroitin sulfate proteoglycans (CSPGs) and the heparan sulfate proteoglycans (HSPGs). Both CSPGs and HSPGs are key components of the ECM and play important roles in neural development. Mesenchymal stem cells (MSCs) are relatively easy to obtain, have a large capacity for self-renewal, and can differentiate into a variety of cell types including neural cells. In contrast, human embryonic derived neural stem cells (NSCs) are much less abundant, difficult and controversial to obtain, and importantly have a much lower capacity for expansion and self-renewal. The proposed study will examine the HS and CS PG sugars in human MSCs compared to human NSCs during neural lineage commitment. Multiple studies have demonstrated a role for these sugars during normal development of the nervous system, however how these sugars interact with and control human stem cells and in particular how they control neural lineage commitment is as yet unknown. Methods developed by our group have improved our ability to differentiate human MSCs toward specific neural lineages and may enable us to generate lineage-specific cells in substantially greater numbers for use in therapeutic applications for treatment of dementias.

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Poster number: P066

In search of an active solution to alcohol-related dementia

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Introduction: Alcohol-related dementia is one of the leading causes of preventable dementia in Australia, and the only treatment currently available is alcohol rehabilitation. Emerging evidence from animal models, however, shows that exercise may protect against the neurotoxic effects of alcohol1. We plan to investigate whether neurotoxic and cognitive deficits arising from alcohol abuse may be recovered with abstinence combined with voluntary exercise. **Method:** We will use rodent models to provide the first comprehensive analysis of how chronic alcohol exposure precipitates behavioural and neuropathological symptoms of dementia. Rats will be allowed to consume alcohol for 6 months, and then subjected to a period of enforced abstinence. Throughout abstinence, rats will have free access to a running wheel, or housed under standard conditions. Extensive analysis of neural injury and cognitive ability will be carried out at various points across the experiment. Cognitive capacity will be measured using a battery of complex tasks available on a novel touchscreen platform. These provide measures across a range of cognitive domains, are analogous to tests used on humans and therefore translationally relevant. They will provide a systematic analysis regarding the specific cognitive impairment that follows alcohol abuse, and further which domains are recoverable and which undergo irretrievable damage. **Results and Discussions:** Here I will explain the validity of the behavioural models, and the clinical implications of this research. I will also present the cognitive and neuropathological profile of young naieve rats which provide the baseline for this study. **Conclusion:** This research will provide important evidence regarding the potential for a readily translatable intervention (voluntary exercise) to be employed in the treatment of alcohol-related dementia.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P042

Consumer Directed Care: Understanding and promoting participation and care outcomes for people living with dementia in receipt of a Home Care Package

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Overview: In Australia, policy reforms which emphasise consumer choice and control are occurring in both the aged and disability sectors. One example is Home Care Packages (HCPs) for older Australians which are now delivered within a Consumer Directed Care (CDC) framework. International literature suggests CDC presents challenges for service providers and older consumers, especially for those living with dementia. These include: the desire and capacity of the person with dementia to direct their care; the capacity and approach of care providers; and the presence and capacities of a carer. To evaluate the extent to which CDC within the HCPs program can deliver quality care outcomes for people with dementia this program of research will explore to what extent, and by what strategies the objectives of CDC can be met for people living with dementia within the HCP program. **Methods:** Study 1. A systematic literature review will define concepts associated with CDC for

people with dementia. Approaches to evaluation of participation in care planning and management will also be identified. Study 2. A Nominal Group Technique will generate consumer and expert consensus regarding CDC service and client variables and methods for use with people with dementia and their carers. Study 3. Tools and methodologies will be developed and validated to assess: Capacity, Activation and Satisfaction with CDC for people with dementia and their carers; and CDC orientation of care providers. Study 4. A multi-method approach will explore control and participation in the delivery of HCPs for people with dementia including: interviews; repeated observations and use of the client and carer (proxy) measurement tools. Study 5. Outcomes will be translated in a pilot intervention to build the capacity of care providers to deliver CDC, and the capacities of consumers with dementia (and their carers) to be active participants in their care.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P086

Communicating the diagnosis of dementia

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Background: A project is underway to revise the 2003 General Practitioner (GP) Dementia Guidelines This poster will report one section of the revised guideline – "Communicating the Diagnosis of Dementia". **Methodology:** Nine general practice dementia guidelines released since 2008 were reviewed. A list of topics covered by these and the 2003 GP Dementia Guidelines were constructed. Questions were formulated on each topic using an iterative process. A literature review was conducted around each topic following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) protocol. Two groups, a Guidelines Update Committee and an advisory group, consisting of consumers, carers and experts in dementia from a variety of backgrounds provided input on this process. Sections were further developed using information from forums of carers, consumers and health professionals. The guide will be trialled in general practice and further developed. **Results & Discussion:** Section on Communicating the Diagnosis: GPs need to use a person-centred approach (e.g. consider language, culture, education, and whether the person wants to know their diagnosis); have carer(s) present if available; assess readiness and the risk of raising a strong emotional reaction to the possibility of dementia; talk to the person with dementia, not only their carer(s); provide the person with dementia, and the carer(s) with support and information when discussing the diagnosis; discuss the implications of the diagnosis and make follow-up plans. Suggestions from the forums included an example of specific wording that could be used by the GP. **Conclusion:** The guidelines provide the GP with practical advice about communicating the diagnosis of dementia.

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Poster Presentation

Theme: 2. Care/Living with Dementia
Poster number: P087

Supporting the carer of a person who is living with dementia

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Background: A project is underway to revise the 2003 General Practitioner (GP) Dementia Guidelines This poster will report one section of the revised guideline – "Supporting the carer of a person who is living with dementia." **Methodology:** Nine general practice dementia guidelines released since 2008 were reviewed. A list of topics covered by these and the 2003 GP Dementia Guidelines were constructed. Questions were formulated on each topic using an iterative process. A literature review was conducted around each topic following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) protocol. Two groups, a Guidelines Update Committee and an advisory group, consisting of consumers, carers and experts in dementia from a variety of backgrounds provided input on this process. Sections were further developed using information from forums of carers, consumers and health professionals. The guide will be trialled in general practice and further developed. **Results & Discussion:** Section on carer support: GPs need to provide information on dementia as a disease process with education on dementia including available financial support and tailored to the carer's situation; consult with carer(s) on the impact of caregiving / advise carer(s) to consult with their own GP in this regard while acknowledging the positive aspects of caregiving and the good job being done; provide practical strategies to support the carer; include the carer in management of the patient whenever possible and appropriate; refer as necessary to sources of support in the community; provide written information and refer to consumer/ carer organisations. **Conclusion:** The guidelines cover a range of strategies that the GP may use to provide carer support.

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Poster Presentation
Theme: 4. Prevention
Poster number: P067

Assessing differences in demographics and risk factors between autopsy proven dementia and Parkinson's disease patients

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Introduction: Lewy bodies, which are abnormal aggregations of the synaptic protein alpha-synuclein, are a very common pathology found in the brains of patients with dementia. Recent studies have shown that more than 50% of patients with Alzheimer's disease (AD) pathology have some Lewy bodies in the brain, and in some dementia patients (~10-15%) Lewy bodies are the major pathology found. These patients are called Dementia with Lewy bodies (DLB). Lewy bodies are also found in the brainstem of patients with Parkinson's disease (PD). It remains unclear whether there are demographic differences between pathologically confirmed patients with PD versus DLB versus AD, and whether they have different or

overlapping risk factors. **Methods:** Longitudinally followed AD, DLB and PD patients and controls (N=373) who donated their brains to the Sydney Brain Bank for research purposes were selected following ethics approval. All cases with AD or Lewy body pathology, as well as cases with no significant neuropathology were included. Cases with infections, cerebrovascular disease and neoplasms were excluded. Data extraction from research records will utilise a designed proforma to capture key demographic, family history, clinical and risk factor features. Chi-square analyses will be performed to determine differencecs between groups in these key variables. **Expected Outcomes:** From the captured data, important demographic differences and inheritance patterns for each different disease cohort will be identified, including identifying DLB families for future gene discovery. **Conclusions:** This study will determine any demographic and risk factors differences (or similarities) between DLB, AD and PD, providing cohorts for further tissue based studies to elucidate differences in pathomechanisms initiating these different dementia phenotypes.

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Poster Presentation
Theme: 4. Prevention
Poster number: P068

Ageing and dementia in Aboriginal Australians: promoting vitality, identifying decline and supporting communities

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Introduction: Like many populations, the Aboriginal population of Australia is ageing rapidly and dementia is a growing concern and burden on communities. Prevalence of dementia is at least 3 times higher in Aboriginal peoples compared to the general Australian population, often with younger onset. However, little is known regarding the risk factors for cognitive decline, nor about the most accurate and culturally appropriate ways to identify cognitive decline in its early stages. This has a significant impact on the ability to plan and provide for appropriate prevention and early intervention strategies. **Method:** The initial development stage of the project will include analysis of existing databases and new surveys, semi-structured interviews and focus groups with Aboriginal community members to gain insight into Aboriginal perspectives on cognitive assessment and healthy ageing, along with key risk factors for cognitive decline. This will support development of an evidence-based healthy brain ageing program in collaboration with older Aboriginal people. The second evaluation stage will involve a preliminary randomized controlled trial with 100 older Aboriginal people to assess whether a multifaceted program using computer technology can improve cognitive function, increase physical activity levels and improve quality of life. **Results:** This study will generate culturally appropriate cognitive assessment resources and validated strategies for promoting healthy brain ageing. This will improve functioning and wellbeing for older Aboriginal people in the short-term and ultimately aims to prevent or delay onset of dementia in this high risk population. **Discussion and Conclusion:** Globally, many cases of dementia are potentially preventable and this is also likely in Aboriginal communities, but culturally sensitive approaches are required. The extensive formal consultation and analysis at the core of the project will provide the foundations for future development of innovative dementia prevention strategies, with the potential for all Australians to benefit.

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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P055

How do mutations in autophagy receptors cause FTD and ALS?

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Introduction: Frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) share genetic, clinical and pathological overlap. A number of genes implicated in both diseases code for autophagy receptors. In living cells autophagy breaks down protein aggregates, however these aggregates are characteristically present in post-mortem diseased neurons. Autophagy receptors target specific proteins to the autophagic machinery, including aggregate-prone proteins that are important in FTD/ALS pathology (e.g. SOD1, tau, TDP-43). We will determine if disease-associated autophagy receptor variants (e.g. SQSTM1/p62, OPTN, UBQLN2, VCP) alter common pathways that impair the targeting or breakdown of protein aggregates. **Methods:** We will express autophagy receptors (wild type or variant) in NSC34 cells, then isolate the expressed proteins and bound interacting partners by immunoprecipitation. Proteins will be trypsinised and identity determined by mass spectrometry. Our bioinformatics pipeline (R-studio, String and KEGG analysis) will determine biological pathways affected by expression of disease variants when compared with normal counterparts. This will identify proteins and protein pathways that are aberrantly regulated in the presence of defective autophagy receptors. **Results & discussion:** We have performed pilot studies and show that the autophagy receptor SQSTM1/p62 lacking an ubiquitin-associated (UBA) domain, Î”UBA, has a different protein interaction network compared with the wild type protein. The Î”UBA protein interactome was enriched for heat shock proteins (protein chaperones), autophagy mediators known to be involved in autolysosome formation and proteins associated with Alzheimer's disease and ALS/FTD (including TDP-43). **Conclusions:** Our proof-of-concept pilot study shows that protein networks, including those that may be involved in neurodegeneration, are affected by the expression of a disease variant. Future experiments will expand on this concept to include additional SQSTM1/p62 variants as well as variants in the autophagy receptors OPTN, UBQLN2 and VCP. Using an integrated bioinformatics approach we will identify pathways that may later be targeted for therapeutic benefit.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P043

Development and implementation of evidence-based deprescribing guidelines for people with dementia

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Introduction: People with dementia (PWD) often take multiple medications to treat the symptoms of dementia and their other co-morbidities. Approximately 50% of PWD take 5 or more regular medications, so called polypharmacy, which is associated with increased adverse drug reactions, hospitalisations and mortality. Ensuring optimal medication use in PWD involves consideration of medical, functional and social issues and goals of care. It involves both prescribing medications that will help achieve these goals and deprescribing medications for which risk may outweigh benefit. Unfortunately, half of older adults with dementia are taking at least one medication where the potential harms outweigh the potential benefits, and therefore this medication(s) should be considered for deprescribing. There are currently no deprescribing guidelines for PWD, which GPs report as a significant barrier to optimising medication use in this population. The aim of this project is to develop medication class specific, evidence-based deprescribing guidelines for people with dementia and implement them in Australia. **Methods:** The guidelines will be developed following a GRADE based process. Briefly, a guideline development team will review the literature and formulate recommendations which will then undergo external review by clinical experts, end-users and stakeholders. The guidelines will address when deprescribing of specific medications (cholinesterase inhibitors, memantine and benzodiazepines) may be considered and how to conduct deprescribing of these medications (i.e. whether it needs to be tapered and what monitoring should be conducted). It will also include a review of clinical considerations including patient and carer views towards withdrawal, with a focus on the individuals' lived experience and consumer relevant outcomes. Implementation will consist of a multi-faceted approach including online educational activities and consumer directed strategies. **Discussion and Conclusions:** Evidence-based deprescribing guidelines for people with dementia will address a significant barrier to deprescribing inappropriate medications in practice which may result in improved patient outcomes.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P014

Implementation and validation of the Centiloid transformation

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Background: A common quantitative output value for AÎ² imaging across tracers and methods will improve clinical and research use. A method has recently been developed by an international team of AÎ² imaging experts for this purpose that produces a unit of measurement called the Centiloid (Klunk et al, Alzheimers Dement, 2015). This approach was

implemented on AÎ² imaging studies performed with 18F-NAV4694 (NAV) and 11C-PiB (PiB). **Methods:** Fifty-five participants underwent PET imaging between 50-70 min after injection of PiB and NAV: 10 healthy young controls (33±7 yo), 25 healthy elderly controls (74±8 yo, MMSE 29±1), 10 mild cognitive impairment (75±9 yo, MMSE 27±3), 3 frontotemporal dementia (68±5 yo, MMSE 27±1), and 7 Alzheimer's disease (73±11 yo, MMSE 24±2) patients. Spatially normalized images were analyzed using the standard Centiloid regions (cortex and whole cerebellum reference region) downloaded from the Global Alzheimer's Association Interactive Network website (GAAIN; http://www.gaain.org). The non-standard reference regions, cerebellar cortex, pons, and whole cerebellum+pons were also investigated. **Results:** Both radiotracers presented an almost identical dynamic range of neocortical SUVR (linear slopes=1.09±0.01) and Centiloid values, the latter ranging from -30 to 130 Centiloids. Both tracers were highly correlated (R2>0.97), irrespective of the reference region used for the scaling. We further validated the Centiloid transformation by comparing the results from the standard approach and our own imaging analysis software, while using the same cortical and whole cerebellum masks from GAAIN. Our software yielded results that differed by 1-2% from the standard SPM approach. A correction was implemented to adjust for this small discrepancy. **Conclusions:** Both 11C-PiB and 18F-NAV4694 results can now be calculated in the common language of Centiloids by centers across the world using the data supplied through the GAAIN website. This is an important step towards better use of the clinical and research potential of AÎ² imaging.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P018

Generating continuous and categorical measures from tau imaging studies with 18F-AV1451, 18F-THK5317 and 18F-THK5351: The Tau MeTeR scale

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Objectives: It has been postulated that tau stereotypically spreads from the mesial temporal cortex (MTC) into neocortex and that tau deposition restricted to MTC might be just part of the ageing process, suggesting that both the amount and the location of these tau deposits are likely to be relevant in regards to disease staging, prognosis and progression. We implemented a stereospecific approach to generate both continuous and categorical measures that reflect tau spreading and deposition in order to make results from tau imaging studies clinically relevant and easy to interpret. **Methods**: Sixty-five participants underwent tau and AÎ² imaging with 18F-AV1451 and 18F-florbetapir (58 HC, 6 MCI, 1 AD), while 79 received 18F-THK5317 or 18F-THK5351 and 18F-flutemetamol (25 HC, 19 MCI, 5 AD). Three tau-masks were constructed: Mesial-temporal (Me) comprising entorhinal cortex, hippocampus, parahippocampus and amygdala; Temporoparietal (Te) comprising inferior temporal, fusiform, supramarginal and angular gyri, posterior cingulate/precuneus, superior and inferior parietal, and lateral occipital; and Rest of neocortex (R) comprising dorsolateral & ventrolateral prefrontal, orbitofrontal, gyrus rectus, superior and middle temporal, and anterior cingulate. A threshold was established for each mask and tracer. A global SUVR was determined by averaging the SUVR of the three composite regions. Categorically, a study was deemed high when at least two of three regions showed high tracer retention. The

relationship between AÎ² and tau was also explored. **Results:** A categorical classification using global cut-offs of 1.35 SUVR (18F-AV1451), 1.25 SUVR (18F-THK5317) and 1.85 SUVR (18F-THK5351), yielded similar classification than obtained through the three composites. While the sample size is still low, both tracers showed that MTC was high irrespective of AÎ² levels, in contrast with the other two neocortical regions where high cortical tau was mainly associated with high AÎ². **Conclusion:** We have developed a scale that accounts for the particularities of tau deposition, yielding both continuous and categorical measures of tau imaging studies.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P021

Assessing AÎ² & tau pathology in Vietnam war veterans with chronic Post-Traumatic Stress Disorder

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Objectives: Epidemiological studies indicate a nearly twofold increase in risk of dementia associated with Post Traumatic Stress Disorder (PTSD) in military cohorts, however mechanisms contributing to this relationship are poorly understood. The aim of this study was to investigate if Vietnam war veterans without mild cognitive impairment or dementia, but with chronic combat related PTSD show evidence of Alzheimer's disease (AD) pathological markers, as assessed by amyloid and tau imaging with PET. **Methods:** Sixty-seven male participants -30 veterans with chronic PTSD (aged 67.9±2.6 years) and 37 controls (aged 74.3±8.3 years)- underwent both tau and amyloid PET imaging scans with 18F-AV1451 and 18F-florbetaben or 18F-flutemetamol, respectively. While 18F-AV1451 SUVR was calculated using the cerebellar cortex as reference region, the whole cerebellum and the pons were used as reference regions for 18F-florbetaben and 18F-flutemetamol, respectively. **Results:** Despite the PTSD cohort being significantly younger than the controls, there was a significant difference in the age-corrected 18F-AV1451 retention between the PTSD and control groups in the mesial temporal cortex (1.19±0.12 vs. 1.12±0.17, p=0.03), temporoparietal (1.21±0.12 vs. 1.13±0.13, p=0.01) and frontotemporal (1.14±0.12 vs. 1.06±0.13, p=0.012) regions. There was no significant difference in amyloid burden between the groups **conclusions**: Our preliminary findings suggest that chronic PTSD might be associated with higher neocortical tau deposition later in life. Further work is required to determine if chronic PTSD itself, or associated lifestyle factors account for this observation.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P024

Revisiting, revising and refining the natural history of AÎ² deposition and its effects on neurodegeneration and cognitive decline in sporadic Alzheimer's disease

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Background: We used 72-month longitudinal data from the AIBL study to calculate the rates of AÎ² deposition. **Methods:** 201 participants (149HC; 34MCI; 20AD) were evaluated at enrollment and every 18 months for a mean follow-up of 4.9 (range 2.5-10.6) years.Participants underwent neuropsychological examination, MRI, and a PiB-PET scan. A 1.4 SUVR (25 Centiloids-CL-) was used to discriminate high from low AÎ² burdens. Irrespective of their AÎ²-status, participants with a positive rates of AÎ² deposition, deemed to be on the AD-pathway were used for the analyses. **Results:** At baseline significantly higher AÎ² burdens were observed in AD (2.3±0.4 SUVR/91±26 CL) and MCI (2.0±0.7 SUVR/77±27 CL) when compared to HC (1.4±0.4 SUVR/25±7 CL). At follow-up 164 (82%) of the participants showed positive rates of AÎ² accumulation. Confirming our previous findings our new assessment with a longer follow-up showed AÎ² deposition spanning more than two decades, averaging 30 (CI 25-39) years to go from the levels observed in AÎ²-HC (1.2±0.1 SUVR/10±1 CL) to those observed in mild AD, with rates of 0.048 -CI 0.041-0.056- SUVR/yr (3.8 -CI 3.2-4.4- CL/yr), between the threshold of PiB abnormality to the levels observed in AD. As AD progresses, the rate of AÎ² deposition slows, approaching a plateau. There were no significant associations between the rates of AÎ² deposition and the rates of hippocampal or grey matter atrophy. There was a significant association between rates of AÎ² deposition and rates of episodic memory decline only in AÎ²+HC accumulators (R2=0.20; p=0.04), association that disappeared after adjusting for baseline AÎ²-burden. **Conclusions:** Our new assessment with a longer follow-up confirmed our previous findings that AÎ² deposition is a slow and protracted process, likely to extend for more than two decades. Despite this wide time-window, the effects of AÎ² accumulation over cognition seem to be limited to the early stages of accumulation suggesting that anti-AÎ² therapeutic interventions aimed at modifying the course of AD, should be administered at preclinical stages of the disease.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P027

Computational Analysis of PET by AIBL (CapAIBL): A cloud-based processing pipeline for the quantification of PET images

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Objectives: Evaluate a recently developed cloud-based analysis method for Positron Emission Tomography (PET) on a database of C11 and F18 Î²-Amyloid (AÎ²) tracers as well as F18-FDG. **Methods:** The Computational Analysis of PET by AIBL (CapAIBL) is a publically available cloud-based platform (https://capaibl-milxcloud.csiro.au) where PET images are spatially normalised to a standard template using an adaptive atlas approach [1], SUVR normalised and quantified. Four hundred and fifty four participants underwent MRI and PET scans with 18F-Flutemetamol (N=180), 11C-PiB (N=381), 18F-Florbetapir (N=171), 18F-Florbetaben (N=148),18F-NAV4694 (N=47) and 18F-FDG (N=34). Each PET image was analysed using CapAIBL. The SUVR normalisation was performed using each tracer's reference region (Cerebellum GM for 11C-PIB, 18F-Florbetaben, 18F-NAV4694 and 18F-FDG, Pons for 18F-Flutemetamol and Whole Cerebellum for 18F-Florbetapir). For validation purposes, the images were also quantified using their corresponding MR. The error in neocortical SUVR between CapAIBL PET-only approach and the MR-based quantification was assessed using the coefficient of determination (R2) and mean absolute percentage error (MAPE). **Results:** The error in neocortical SUVR quantification was lower than 5% and was comparable across tracers. **Conclusions:** As the use of PET AÎ² tracer becomes more prevalent, there is going to be a greater need for standardised methods to analyse and quantify these images. CapAIBL can accurately quantify AÎ² PET images without MR, with a similar degree of accuracy across tracers.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P029

Differential Diagnosis in Alzheimer's Disease and Dementia with Lewy Bodies via VMAT2 and Amyloid Imaging

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Background: The noninvasive evaluation of nigrostriatal dopaminergic integrity by PET can provide useful information for the differential diagnosis between dementia with Lewy bodies (DLB) and Alzheimer's disease (AD). **Objectives:** To evaluate the diagnostic potential of imaging striatal monoaminergic terminal integrity with the novel vesicula monoamine transporter type 2 (VMAT2) radioligand [18 F]AV-133 and PET to distinguish DLB from AD. **Methods:** Fifty participants [9 DLB, 11 AD, 20 Parkinson's disease (PD) and 10 healthy age-matched control subjects (HC)] underwent [18F]AV-133 PET studies. Additionally, 20 participants underwent amyloid imaging PET scans with either [11C]PiB or [18F]florbetaben. VMAT2 density was calculated through normalized tissue uptake value ratios (RT) at 120-140 min after injection using the primary visual or the cerebellar cortex as reference region. Comparison of the RT for [18F]AV-133 was done between the different clinical diagnostic groups. **Results:** Significantly lower striatal VMAT2 densities were observed in DLB and PD when compared to AD and HC, especially in the posterior putamen. In contrast to PD and DLB, no reductions were observed in AD patients when compared to HC. **Conclusions:** [18F]AV-133 allows assessment of nigrostriatal degeneration in Lewy body diseases. In contrast to amyloid imaging, VMAT2 imaging with [18F]AV-133 can robustly detect reductions of dopaminergic nigrostriatal afferents in DLB patients, assisting in the differential diagnosis from AD.

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Theme: 1. Diagnosis/Assessment
Poster number: P031

Web-Based PET and MR quantification using CurAIBL

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Anatomical MR imaging for Alzheimer's disease looks at patterns of atrophy in key structures associated with the disease. Visual inspection is typically limited to the identification of gross changes, in the inferior temporal lobe and ventricles. Using the same cloud computing platform as CapAIBL for PET quantification, a new atrophy report is publically available. CurAIBL (Computational qUantification of mRi from AIBL) enhances visual inspection with z-score map of cortical thickness, normative graphs, and tables with volume of key structures in relation to a reference population. MR images are first rigidly registered to the MNI average brain, and segmented into gray and white matter and CSF using Expectation Maximisation Segmentation algorithm. The images are then parcellated using the 20 most similar atlases, selected from a database of 843 images. Hippocampus volume is extracted using the Harmonized Protocol for Hippocampal Volumetry. Cortical GM and hippocampal volumes are reported on a graph with confidence interval for an aged-matched normal population. Cortical thickness is computed and mapped to a normalised template. Z-score map of cortical thickness is computed and reported as a 3D rendering. Key volumes, graphs and mesh rendering are display on a pdf report which is emailed to the user at the end of the procedure. If a PET image is also provided, the CapAIBL platform is used to analyse the PET using the extracted MR information, and a combined PET-MR analysis report is sent. CurAIBL is a tool to aid visual interpretation of MR images. Volumes of key structures in relation to a normal population can provide early warnings of abnormal atrophy. Patterns of cortical thinning can be also used as a tool for differential diagnosis (such as FTD). CurAIBL provides an efficient clinical inspection tool for MR imaging and when used in conjunction to CapAIBL for PET quantification such as Amyloid-beta or Tau markers, it offers a comprehensive imaging assessment of Alzheimer's disease.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P034

Imaging Findings from the Australian Imaging Biomarkers and Lifestyle study of ageing (AIBL)

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Introduction: AIBL commenced in late 2006 with 1,100 participants and included beta-amyloid imaging and MRI in 30%. Assessments have been repeated every 18 months and imaging was expanded and participants replenished so that presently AIBL has baseline amyloid scans on 1,070 participants and 3 or more time point imaging in over 300. **Method:** Participants were recruited from advertising and Memory Clinics, were aged 60+ with no history of stroke or serious medical disease and normal (HC) (60%), MCI (20%) and AD (20%). Cognitive assessment, blood analysis and imaging were performed at each time point. Follow up of the initial cohort to 90 months is almost complete. **Results:** At baseline the prevalence of positive amyloid scan in HC rises steeply from 10% in persons aged 60-69 to over 50% if aged >80. The prevalence is strongly influenced by APOE genotype. Amyloid burden is higher in those with untreated hypertension and diabetes. Amyloid burden increases at 2-3% per year in those accumulating and this process takes 30 years to reach the typical level of mild AD. Rate of cognitive decline and clinical progression (HC:MCI:AD) is strongly related to the presence of amyloid but in HC this is moderated by genetic factors including APOE and BDNF alleles. Clinical progression is faster when hippocampal atrophy or episodic memory impairment is also present. **Discussion and Conclusion:** AIBL discoveries have contributed substantially to new guidelines for earlier diagnosis of Alzheimers disease and to the implementation of dementia prevention trials in those with asymptomatic or prodromal Alzheimers pathology. The large cohorts with and without AD pathology provide gold standard cohorts invaluable to researchers in lifestyle, blood and CSF biomarker, genetic and other discovery areas. The addition of tau imaging and in-depth genetic and epigenetic characterization to AIBL promises further novel and important discovery.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P037

The effect of AÎ² deposition, neurodegeneration and their interactions on the cognitive trajectories of healthy older adults in the AIBL cohort

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Background: Beta-amyloid deposition and/or neurodegeneration have been documented in a considerable number of reports about cognitively unimpaired healthy elderly individuals, however, it is still unclear what are the long-term cognitive consequences of their presence, and if they have an independent or synergistic effect on cognition. The objective of the study was to characterise the clinical and cognitive trajectories of healthy elderly controls

using both a two-imaging (AD pathology and neurodegeneration) marker construct. **Materials and Methods:** Five hundred and seventy-three (573) cognitively unimpaired individuals (73·1±6·2years; 58% female) from the Australian Imaging, Biomarker and Lifestyle (AIBL) study were assessed. Beta-amyloid status (A) was determined with either PiB, flutemetamol, or florbetapir; while neurodegeneration (N) was established using hippocampal volume. For the two-marker construct individuals were categorised as either A-N-, A+N-, A+N+, or suspected non Alzheimer disease pathophysiology (A-N+, SNAP). Domain-specific and global cognitive composite scores were assessed longitudinally over six years using linear mixed effect models. **Results:** Nine percent of HC were classified as A+N+, 15% as A+N-, 54% as A-N-, and 22% as SNAP. APOE Æ 4 carriage was more frequent in A+N+ (54%) and A+N- (48%) than in A-N- (21%) and SNAP (18%). Generally, no significant differences in baseline cognitive scores were observed for A+N- and A+N+ compared to A-N-, however, they presented significantly faster cognitive decline than A-N-. The A-N- and SNAP groups did not show significant decline over time, although SNAP was sometimes associated with lower baseline cognitive scores. **Conclusions:** Increasing marker abnormality was reflected in faster cognitive decline, indicating a synergistic effect. Completely distinct cognitive trajectories were observed in those with AD and non-AD pathology, likely suggesting different underlying pathophysiological mechanisms.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P015

Recruiting a preclinical cohort with AÎ² positive subjects

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Introduction: As therapy strategies and clinical studies focus on preclinical individuals, there is a need to recruit large cohorts of asymptomatic elderlies with high cortical Î²-amyloid (AÎ²) deposition. PET scanning can image in vivo AÎ² deposition in the brain, but with high cost. This study suggests several strategies to minimize the cost of recruiting healthy elderlies as confirmed by PET scan. **Methods:** Subjects older than 60 from the AIBL study were used. Amyloid PET scan (AU$2000) was considered the ground truth to identify individuals with abnormally high AÎ² brain level (sensitivity 100% and specificity 100%). Three options were considered. 1) Scan each recruited subjects with PET until reaching the targeted cohort size (100); 2) perform prior to PET scan a blood test (AU$100) to screen APOE Æ 4 (E4) allele carriers (sensitivity of 60.4% and specificity of 79.5%); 3) perform a more expensive blood test (AU$200) to screen in addition to E4 allele carrier, subjects positive for a blood panel (Abeta1-42, CXCL-13, IgM-1, IL17, PPY & VCAM-1; sensitivity of 50.5% and specificity of 96.8%). The total cost of recruitment was compared between the three options. **Results:** Prevalence of high AÎ² was 39%. For a final cohort of 100 individuals, the number of subjects to recruit and the total cost for the three strategies were respectively: 256 and AU$564,000 (~US$395,000), 425 and AU$348,000 (~US$244,000), and 508 subjects for a total cost of AU$321,000 (~$225,000). **Conclusions:** close to 50% cost reduction in recruiting individuals older than 60

with confirmed AÎ² by PET could be achieved by selecting subjects carrying at least one E4 allele. A further 8% cost saving could be achieved by adding extra blood exams.

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Theme: 1. Diagnosis/Assessment
Poster number: P020

Age of Onset for different bio-markers of Alzheimer's disease

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Background: Abnormal levels of AÎ² deposition in the brain are reached prior to evidence of neurodegeneration and cognitive impairment. An understanding of the age of onset of these different markers, and what factors affect them, is of clinical interest for the understanding of underlying mechanisms that may delay onset or stop progression of the disease. **Methods:** The ages at which 317 AIBL participants reached abnormal levels on six markers of disease (namely AÎ² deposition (SUVRâ‰¥1.5), Hippocampus Volume (â‰¤5.87cm3), AIBL-PACC4 (â‰¤-6 [four summed z-scores, therefore 4*1.5SD]), Episodic Memory, Executive Function and Language Composites5 (â‰¤-1.5SD)) were calculated using models of disease progression. Cox proportional hazards models of survival and Kaplan-Meier plots were employed to determine if the six different markers had varying ages of onset of abnormal levels. **Results:** The Kaplan-Meier plots suggested that the ordering or age of onset for the six markers was AÎ² deposition/Hippocampus Volume/AIBL-PACC followed by Episodic Memory, Executive Function and Language. However, in Æ 4 carriers it was clear that AÎ² deposition had the earliest onset. A 40% risk of having abnormal AÎ² deposition occurred 22 years earlier in Æ 4 vs non-Æ 4 carriers. **Conclusions:** The order of onset of abnormal levels of disease markers as measured here appears to align with other findings previously reported in the literature.

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Poster Presentation
Theme: 2. Care/Living with Dementia
Poster number: P078

Study protocol: translating and implementing a support and education based intervention to improve driving cessation outcomes for people with dementia

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The issues around driving and dementia have emotional, social, legal, and ethical ramifications. Health professionals acknowledge the difficulties of managing driving cessation with people with dementia and their families. Dementia has a profound effect on capacity for driving, although a diagnosis of dementia does not immediately preclude someone from safe driving, at some stage they will have to stop. Without intensive practical and emotional support to plan for, and eventually cease driving, people with dementia are at risk for depression, reduced community mobility, social isolation, unsafe and unlicensed driving, and injury or loss of life. Despite the concerns for community safety and the safety and wellbeing of people with dementia, no theory-driven driving cessation interventions are in routine clinical practice in Australia. The UQDRIVE-People-with-Dementia intervention is a theoretically driven, comprehensive support and education based driving cessation intervention for people with dementia and their families that it is individualised according to geographic location and to lifestyle goals of participants. The intervention includes seven modules covering education and practical support. It will be embedded in primary care and community settings to optimise the timing of delivery for people with dementia and their families. A pragmatic cluster randomised controlled trial with regions as the unit of randomisation, and a wait-list control will be undertaken. An iterative mixed methods approach will be applied to understanding outcomes, including wellbeing and community mobility. Community mobility will be measured objectively with novel Smartphone GPS technology. A process analysis will be conducted to understand the facilitators and barriers to intervention delivery in primary care settings in metropolitan and regional areas.

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Theme: 1. Diagnosis/Assessment
Poster number: P016

The Surface Functionalization of Upconversion Nanocrystals for Blood-Brain Barrier Crossing and Potential Theranostics

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Introduction: Blood-Brain Barrier (BBB), a crucial physiological structure between blood and brain tissues, strictly regulates the movement of cells, molecules and ions between the circulatory system and brain to protect the brain, heavily limiting the delivery of drug to the brain circulation. [1] This BBB remains the therapy of central neuron diseases (e.g. amyotrophic lateral sclerosis, Alzheimer's disease, Parkinson's disease, brain tumour) a formidable challenge although tremendous efforts to develop effective strategies for neurological disorders treatment have been made in the past decades [2]. Lanthanide doped upconvertion nanoparticles (UCNPs) show their unique advantages to cross BBB, such as fine tuning shape/size/surfaces, background free, photo stable, and high deep tissue penetration, [3] which will benefit to investigate the underlying mechanisms of how nanoparticles cross the BBB. **Method, Result & Discussions:** In this study, we investigate how nanoparticles with different surfaces effect on BBB penetration using UCNPs as model. We synthesize UCNPs with varieties of function groups, and then identify the preferable surfaces of UCNPs that can efficiently pass the adhesive BBB through testing in cell and animal model.

Through this study, we will explore the potential application of UCNPs in brain drug delivery or deep tissue imaging as fluorescence trackers and a carriers. References 1. Daneman, R. Ann Neurol. 2012, 72, 648-672. 2. Cecchelli, R.; Berezowski, V.; Lundquist, S.; Culot, M.; Renftel, M.; Dehouck, MP.; Fenart, L. Nat Rev Drug Discov. 2007, 6, 650-61. 3. Zhou, B., Shi, B., Jin, D., Liu, X. Nature Nano. 2015,10, 924â€“936

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Theme: 1. Diagnosis/Assessment
Poster number: P017

Development and validation of the first culturally based quality of life tool for Aboriginal Australians living with dementia or cognitive impairment

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Introduction: Dementia is highly prevalent in Aboriginal Australians, with Aboriginal caregivers reporting that major improvements are required to the quality and cultural security of dementia care. Enhancing quality of life (QoL) is the central goal of residential and community care services for their clients with dementia. A valid QoL tool enables person-specified areas of need to be identified over a number of domains, and treatment and care strategies to be planned and evaluated accordingly. Despite the need there is no valid QoL measure for Aboriginal Australians living with dementia or other forms of cognitive impairment. This project aims to develop such a tool. **Method:** A mixed methods approach will be applied in which Aboriginal consultation and participation is at the forefront. Aboriginal Australians living in residential care or accessing community care in Perth will be invited to take part in focus groups and in-depth interviews for tool development. This will be followed by reliability and validity testing of the QoL tool with older Aboriginal Australians with cognitive impairment (including dementia) living in Perth and Melbourne. **Result and Discussions:** Networking has begun with different stakeholders for their participation in a steering committee. Derbarl Yerrigan Aboriginal Health Service in Perth has recently approved this project. An Aboriginal research officer is to be employed towards the end of this year. The resulting QoL tool will be disseminated with training packages for inclusion into policy and procedures of service providers and interested organisations. Data on the factors affecting the QoL of this population will be provided to leading authorities and policy makers. **Conclusion:** A quality of life tool can be used by service providers to evaluate the effectiveness of dementia treatment, care and support, with enhancing the quality of life of elders being an area of genuine need for Aboriginal Australians.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P019

An investigation into the neural substrates of the cognitive deficits in Mild Cognitive Impairment, and the mechanisms of action of a novel treatment

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Introduction: Mild Cognitive Impairment (MCI) causes a slight but noticeable decline in cognitive abilities, and is associated with an increased risk of developing dementia. Currently, there is no treatment for MCI, and Alzheimer's disease medications do not satisfactorily consider its diverse underlying pathophysiology. Furthering our understanding of the neural mechanisms underpinning the cognitive deficits present in MCI is vital for the conceptualisation of the condition's underlying pathophysiology, and the development of targeted treatments. This NHMRC-ARC Dementia Research Development Fellowship project aims to: 1.) further our understanding of MCI pathophysiology, and 2.) determine the mechanisms of action of a potential multi-target treatment for MCI. Two studies will be conducted to assess the two central aims of this project. **Method and Proposed Outcomes:** Study 1 will assess the neural correlates of episodic memory, executive function, and perceptual reasoning in people with MCI, mild Alzheimer's disease, and healthy age-matched controls. This study will triangulate a range of physiological measures and biomarkers with cognitive function including electroencephalography (EEG), functional magnetic resonance imaging (fMRI), genetic risk factors, and plasma inflammatory markers. This work will look for changes in the function and structure of neural networks with the aims of elucidating individuals who may have an increased risk of developing Alzheimer's disease, and detecting novel pathways for possible treatments. Building on the findings from Study 1, Study 2 will investigate the mechanisms of action of Sailuotong (SLT) in people living with MCI with a 12 week randomised placebo-controlled pilot trial. SLT is a three-herb formula consisting of standardised extracts from Ginkgo biloba, Panax ginseng, and Crocus sativus (saffron), and has been shown to improve cognitive function in healthy adults and people with vascular dementia. This work will determine whether SLT may be a viable treatment for MCI.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P022

Cognitive Assessment Strategies for Clinical Trials in Dementia

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Introduction: Dementing disorders are defined by cognitive impairment linked to functional disability, thus cognitive assessment forms the cornerstone of the neurodegenerative diseases. No guidelines have emerged, however, to support the selection of rational, evidence-based approach to cognitive assessment in clinical trials. Furthermore, even in major dementia trials, cognitive outcomes with severely limited psychometric properties and sensitivity are often used, thus limiting the detectability of treatment effects. **Method:** As an illustrative example, we describe the Australia-led development of a sensitive cognitive battery and composite score for Huntington's disease clinical trials. The method used expert opinion, systematic literature review, and a clinical-trial like study of 250 participants at 20 sites internationally to determine practice effects, psychometric properties, feasibility and

tolerability for participants and site staff, and pragmatic issues such as time of testing, and the development of composite measures that can be used as primary outcomes. **Results and Discussion:** The HD-CAB is now being administered in five commercially-sponsored Huntington's clinical trials across a total of nearly 100 clinical sites and by more than 120 trained cognitive examiners using methods that meet GAMP-5 and regulatory standards. Quality controls procedures show that the data are high quality, with few missing observations, and that standardised methods can be implemented by examiners following rigorous training with good results. Trial results will begin to emerge in 2017, but the processes we have put into place provide a framework for developing evidence-based cognitive assessment methods and implementing them using industry standards and across many research sites. **Conclusion:** The rational development of cognitive battery, along with psychometric considerations for the construction of cognitive composites that can be used as primary outcomes in clinical trials, has the potential to accelerate the progress and quality of clinical trials in neurodegenerative diseases, thus increasing the efficiency of progress toward treatments.

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Poster Presentation
Theme: 2. Care/Living with Dementia
Poster number: P077

Therapeutic signing and music interventions to improve wellbeing and connection between community dewelling people with dementia and their primary caregivers

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In spite of the prevalence of dementia in the Australian population and its significant negative effect on people with dementia (PWD) and their caregivers (CG), there is limited evidence-based research to support the use of music interventions for PWD/CG dyads living at home. Areas of the brain responsible for music processing are retained until late in the trajectory of dementia. For the PWD this capacity to respond to music activities facilitates reminiscence and successful social engagement. As a consequence, CGs can relate with their loved one in meaningful and satisfying ways. Music interventions also provide a non-pharmacological alternative to assist with management of challenging dementia symptoms (agitation, anxiety, and apathy), offering CGs strategies to use in the home.
This project aims to investigate effects of community singing groups and home-based music interventions for PWD/CG dyads on:

1. anxiety, quality of life, agitation, apathy and cognitive function in PWD.
2. life satisfaction, carer satisfaction, flourishing, and depression in CGs.
3. quality of the PWD/CG relationship.

This therapeutic music program has the potential to: 1) support a sustained and fulfilling relationship between the PWD and their primary caregiver; 2) alleviate psychosocial and emotional difficulties that are commonly experienced by PWDs and their CGs; and 3) assist PWD and their CGs to remain together in the family home for as long as possible. As people will be recruited with early-mid stage dementia, supportive strategies will be established before the disease progresses, thereby building on knowledge that music memory is retained into later stages of the disease. These outcomes are recognised as important ethical and economic considerations in dementia care. Supporting the CG to manage dementia symptoms and care for their loved one at home may improve quality of life for the PWD/CG

dyad while also significantly reducing healthcare costs for society.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P023

Dual and multiple proteinopathies in neurodegenerative dementias â€“ risk factors, prognostic indicators and clinical ramifications

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Background: 'Dementia' encompasses a number of different clinical syndromes, each subserved by distinct histopathological signatures of insoluble protein aggregates and spread. Converging evidence now indicates the overlapping deposition of pathologic proteins in at least 50% of dementia syndromes. The deposition of dual/multiple proteinopathies impacts on dementia phenotype and severity, and has important clinical implications for diagnosis and development of substrate-specific interventions, particularly since targeting and alleviating one proteinopathy without the other is unlikely to successfully ameliorate dementia in affected patients. However, the prevalence, clinical ramifications and associated risk factors of dual/multiple proteinopathies remains largely unknown with the 2014 updated consensus criteria for Alzheimer's disease stating that the clinical phenotype of mixed pathologies is uncertain'. **Methods:** The Sydney Brain Bank (SBB) holds 643 longitudinally-studied patients with a pathologically-confirmed clinical dementia syndrome and 90 cognitively normal individuals with no significant neuropathology. The present study will assess all dementia cases categorized by disease duration into three groups of short, average and prolonged disease to determine: (1) The prevalence of dual/multiple proteinopathies in the main neurodegenerative clinical dementia syndromes, which proteins most commonly co-occur and the predilection sites of these; (2) When during the disease course do multiple proteins become pathological and/or the clinical relevance of dual/multiple proteinopathies; (3) If the presence of dual/multiple proteinopathies in the main neurodegenerative clinical dementia syndromes change the clinical course; (4) If there are separate risk factors for the presence of dual/multiple proteinopathies in the main neurodegenerative clinical dementia syndromes. **Project Significance:** By investigating the prevalence, risk factors and clinical ramifications of dual/multiple proteinopathies in patients with dementia, this study will provide critical information to aid the clinical recognition of patients at-risk, and the identification of substrate-specific targets for the development of therapeutic interventions.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P044

Understanding and preventing physical and cognitive decline and falls in older people with dementia

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Introduction: More than 60% of community-dwelling older people with dementia (CDWD) fall annually and approximately 40% have multiple falls. There is limited evidence that falls can be prevented in CDWD. There is also a lack of evidence in relation to preventing cognitive and physical decline in this population, particularly with home-based programs. This fellowships' research program aims to promote independence, prevent functional decline/falls, with the overarching goal of improving quality of life for CDWD.
Specifically it will a) explore the association between physical and cognitive performance, and falls in CDWD, b) develop and pilot novel approaches to fall prevention in CDWD, c) assess the feasibility of adapting new and emerging technologies in falls prevention to the needs of CDWD and d) implement and evaluate the impact of assessing functional cognition in Aged Care Rehabilitation. **Methods:** Prospective cohort study (Study 1; n=177, 12-months), uncontrolled exercise intervention study (Study 2; n=42, 6-months), pilot feasibility studies, pilot randomised control trial (cognitive training), translational/implementation study (assessing functional cognition). **Results:** Study 1: Poorer executive function increases the risk of multiple falls in CDWD. Taking â‰¥6 medications, reaction time and balance were mediators of the relationship between executive function and falls. Study 2: A tailored, home-based exercise program improved balance, concern about falls and planned physical activity, but resulted in worse knee extension strength and no change in depression scores in CDWD. **Discussion and conclusions:** Furthering our understanding of fall risk and decline in CDWD will enable us to continue working towards developing interventions that target the identified amenable factors and reduce fall risk, fall injury and decline. Successful strategies that maintain independence, optimise physical, functional and cognitive performance and reduce falls are desperately needed for CDWD. The economic benefit and potential positive impact for older people with dementia and their carers is substantial.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P045

Improving dementia care by creating research connections that encourage increased collaboration and translation of research into real outcomes for people with dementia

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Introduction: Improving care for people with dementia remains critical for the 353,800 people living with dementia in Australia. Through the Partnership for Better Health Initiative, the National Health and Medical Research Council (NHMRC) recognised bringing together clinicians, consumers, researchers and decision makers to work on priority areas as essential for translating research into health and health systems improvement.This poster reports on the

extent to which this model, adopted by the NHMRC funded Partnership Centre Dealing with Cognitive and Related Functional Decline in Older People (CDPC), is developing a growing collaborative environment focused on improving care for people living with dementia. **Method:** The CDPC's knowledge-to-action approach brings together consumers, clinicians, academic, and industry partners to: support research and implementation of tested models of care; synthesise and disseminate existing research; conduct collaborative new research; and build capacity to translate research into practice. Mixed method longitudinal analysis of CDPC activities is conducted through ongoing collection of data, measuring how the CDPC network increases connectedness resulting in increased translation of research into practice. Analysis draws together interviews and surveys with CDPC network members and CDPC quarterly monitoring data. **Results & Discussions:** Ongoing social network analysis shows new collaborative ties among increased CDPC membership with a measurable shift from within sector collaboration to cross-sector collaboration. At the same time there has been considerable increase in numbers of organisations implementing CDPC research-supported system change projects. A shift in number of non-academic based researchers, including consumers themselves, involved in the CDPC has also occurred, as has the increased dissemination of research findings. **Conclusion:** The CDPC is successfully developing collaborative relationships between clinicians, consumers, researchers and decision makers. Continued growth of these partnerships will enhance research translation into best practice care for people living with dementia in Australia.

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Poster Presentation
Theme: 2. Care/Living With Dementia
Poster number: P046

Promoting age friendly communities preferences for inter-generational respite care services for older people with cognitive decline and children residing in the community: preliminary results

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Introduction: For long term sustainability of respite programs and to improve outcomes for clients, it is important that service models reflect an understanding of consumers' preferences and needs rather than clinical viewpoints alone. Preferable respite services may include Intergenerational care (InGen) that encourage the care of children and older people in a shared setting for mutual benefits. As part of exploring the acceptability of integrated models, an economic feasibility study provides analytical rigour to inform stakeholder decision-making regarding the introduction of new respite services. This project explored the initial phase of a feasibility study that involved: 1) identification of feasible models of InGen services in the Australian setting; 2) collection of information relating to preferences and willingness to pay for new types of InGen services. **Method:** Using the Delphi process, a panel of experts developed and identified feasible InGen. The design of the survey tool that was used to elicit preferences and estimate the demand for InGen models involved a systematic literature review, interviews and pilot studies. Based on the Contingent Evaluation Method, individuals were asked about their preferences and willingness to pay for status quo services versus innovative InGen services. **Result:** The Delphi process narrowed the feasible InGen services in the Australian setting to two models, i.e. shared campus and visiting campus.

Preliminary results from the survey indicate that respondents do have a preference for InGen services, however, their additional willingness to pay compared to the status quo is low. **Discussion and Conclusion:** Future research will identify the economic drivers of demand and the price levels consumers are willing to pay for InGen services. Once demand for these services is understood, information regarding the supply side will be collected and analysed. The demand and supply analyses are then brought together to identify probability of outcomes under various scenarios.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P025

Prevalence of dementia among Australian women aged over 70: application of capture-recapture methodology on data from multiple sources

Michael Waller*[1], Gita Mishra[1], Annette Dobson[1]

1 School of Public Health, University of Queensland, Herston, QLD, Australia

Introduction: Accurate estimates of dementia are needed to plan for health service needs. This study used linked data to estimate the prevalence of dementia in Australian women. **Methods:** There were 12,432 women born between 1921 and 1926 who completed an Australian Longitudinal Study on Womens Health survey. These data were linked to records of aged care assessments and services, hospital admissions, drug prescriptions, and death certificates, to estimate the prevalence of dementia. Capture-recapture methods were used to estimate the number women with dementia not identified from any of the available sources. **Results:** Over 16 years follow-up, 20.4% (95% CI (19.7%, 21.1%)) of women were recorded as having dementia from at least one data-source. Using capture-recapture methods, this estimate increased to 26.2% (95% CI (25.5%, 27.0%)). **Discussions and Conclusion:** This analysis demonstrates the importance of using multiple data sources, and capture-recapture methods, when estimating the total number of women with dementia.

Dr Rachel Wong
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Poster Presentation
Theme: 3. Intervention/Treatment
Poster number: P056

Supporting healthy ageing in postmenopausal women with resveratrol: study protocol

Rachel Wong*[1], Frini Karayanidis[1], Jennifer Schneider[1], Peter Howe[1]

1 University of Newcastle, NSW, Australia

Introduction: Postmenopausal women suffer disproportionately from dementia, which we hypothesise may be partly attributable to loss of cerebrovascular benefits of estrogen. Our previous research has demonstrated the efficacy and safety of resveratrol (an ingredient found in berries and grapes) on vasodilator function and cognition. We now aim to test whether regular supplementation with resveratrol (a phytoestrogen) can improve cerebral perfusion, cognition, mood, physical function, bone health and well-being in

postmenopausal women. **Methods:** In a randomised, double-blind, placebo-controlled, crossover intervention, 170 women aged 45-85 years who are at least 12 months postmenopausal will take 75mg of resveratrol or placebo, twice daily, each for 12 months. They will undertake the NIH Toolbox battery of cognitive tests that covers domains of attention, executive function, processing speed, episodic and working memory. The primary outcome will be the overall cognitive performance, which is the sum of Z-scores of all tests. Transcranial Doppler (TCD) ultrasound will be used to record basal blood flow velocity and intracranial stiffness in the middle cerebral artery. Cerebrovascular responsiveness to hypercapnia, cognitive testing and photic stimuli using TCD will assess the ability of the cerebral vasculature to increase delivery of blood in response to demands. Other outcomes will include measures that are relevant to the overall well-being and quality of life of postmenopausal women. They include mood, physical function (i.e. balance and grip strength, dexterity), pain perception, menopausal symptoms, DEXA assessment of bone mineral density and adiposity, blood lipids, glucose, insulin, HbA1C, selected inflammatory biomarkers, osteocalcin, estradiol and follicle-stimulating hormone levels. **Conclusion:** This will be the first study to explore whether postmenopausal deficits in cognition, mood and self-perception of well-being are modifiable by enhancing cerebral perfusion. Findings will also provide the first clinical evidence if early intervention (<10 years since onset of menopause) can attenuate the decline in cognition with aging.

Dr Nawaf Yassi
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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P085

Vascular Cognitive Risk Score: quantifying the vascular burden in Alzheimer's Disease

Nawaf Yassi*[1,2], Patricia Desmond[3], Colin Masters[2]

1 Departments of Medicine and Neurology, Melbourne Brain Centre, The Royal Melbourne Hospital, University of Melbourne, Parkville, Victoria, Australia
2 The Florey Institute of Neuroscience and Mental Health, Parkville, VIC, Australia
3 Department of Radiology, Royal Melbourne Hospital, University of Melbourne, Parkville, Victoria, Australia

Understanding the variable underlying pathophysiological substrate of the dementias is of great importance as this represents a key target for putative therapies. The two most common pathologies in dementia, Alzheimer's disease and cerebrovascular disease, are often coexistent in an individual patient to a variable degree, and hence treatment approaches should account for this balance. Characterising the contribution of each pathology in a single patient represents a critical step towards developing more effective treatments. This research project will explore multiple patterns of cerebrovascular disease using MRI studies in the Australian Imaging, Biomarker and Lifestyle Study of Ageing (AIBL), with the aim of developing a numeric score, the *vascular cognitive risk score*, reflecting the contribution of cerebrovascular disease to cognitive impairment in this cohort. Furthermore, concurrent assessment of PiB PET data will allow the estimation of the relative contribution of both Alzheimer pathology and vascular pathology in individual patients. We will aim to validate the findings in external cohorts and using a new prospective cohort of patients with vascular cognitive impairment and mixed dementia. A quantitative assessment of the relative contribution of vascular disease to a given patient's cognitive decline represents a major paradigm shift in diagnosis and prognosis, as well as informing future therapeutic trials.

A/Professor Mark Yates
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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P028

National Roll Out and Evaluation of the Dementia Care in Hospitals Program

Mark Yates*[1,2], Sean MacDermott[1,2], Meredith Theobald[1], Michelle Morvell[1], Jenny Watts[2], Lisa Lane[2]

1 Ballarat Health Services, Victoria, Australia
2 Deakin University, Victoria, Australia

Background: The Dementia Care in Hospitals Program (DCHP) is an all-of-hospital training and education program to improve awareness of, and communication with, patients with cognitive impairment (CI) in the acute sector. The DCHP was developed at Ballarat Health Services and has been implemented in twenty-five hospitals across Victoria. Department of Health funding is supporting a national rollout with a detailed evaluation by Deakin University. **Method:** A stepped-wedge methodology will be implemented in leadership hospitals in Adelaide, Canberra, Perth and Hobart. The target population on participating wards is all acute admissions aged over 65 and found to have CI using a validated assessment tool. The primary outcome is the change in the rate of Adverse Events experienced by participants with CI at invention compared to baseline. Sub-analyses will adjust for each adverse event using a Generalised Linear Model. The impact of the DCHP on patient quality of life, hospital length of stay and costs, carer satisfaction, staff knowledge and change in practice will also be evaluated. **Results & Discussion:** Three of the four sites have developed cognition pathways, completed baseline, and commenced intervention. Introducing universal screening for over-65s has proven challenging and has impacted on overall participant numbers. The pooled prevalence of CI at baseline is 37%. Screening rates vary across sites due to reluctance to change existing hospital processes. **Conclusion:** Translational research in the complex environment of acute hospitals presents constant challenges when research requirements must be balanced against everyday needs and external environmental factors. Nevertheless, this project demonstrates that the DCHP can be implemented nationally in regional and metropolitan settings. Environmental factors, such as implementation of revised National Safety and Quality Health Service (NSQHS) standards and variation in the use of CI tools, require further investigation. A longer-term evaluation to identify the determinants of maintenance and sustainability is recommended.

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Poster Presentation
Theme: 4. Prevention
Poster number: P069

Untreated Hypertension is Associated with Longitudinal AÎ² Accumulation over Six Years: Results from the AIBL Study of Ageing

Paul Yates[1,2], Christopher Rowe*[1], David Ames[2,4], Colin Masters[2,3], Ralph Martins[5,6], Samantha Burnham[7], PaulMaruff[8], Kathryn Ellis[2,4], Victor Villemagne[2,3]

1 Austin Health, Victoria, Australia
2 University of Melbourne, Victoria, Australia

3 Florey Institute for Neuroscience and Mental Health, Victoria, Australia
4 National Ageing Research Institute, Victoria, Australia
5 Sir James McCusker Alzheimer's Disease Research Unit, WA, Australia
6 School of Psychiatry and Clinical Neurosciences, UWA, WA, Australia
7 CSIRO, WA, Australia
8 Cogstate Ltd., Victoria, Australia

Introduction: Midlife hypertension is associated with a significantly higher risk of both AD-dementia and dementia due to cerebrovascular disease, and antihypertensive treatment is associated with better cognitive outcomes in clinical trials. Hypertension has been associated with cross-sectional AÎ² PET imaging measures, however whether antihypertensive treatment influences the longitudinal accumulation of AÎ² is not known. We used AÎ² PET imaging to determine whether treatment of hypertension influenced accumulation of AÎ² over six years' follow-up. **Methods:** 140 cognitively-normal participants from the AIBL Study with 11C-PiB PET imaging at 18-monthly intervals over six years. Only participants with three or more PET assessments were included in analysis. Linear mixed models regression was performed for AÎ² SUVR (dependent variable) and Baseline Hypertension Status (Normotensive/Treated Hypertension/Untreated Hypertension), Time (and their two- and three-way interactions), as well as age, gender, education, APOE Îµ4, cholesterol, glucose, smoking and BMI. **Results:** Age, APOE Îµ4, Gender, Time, and APOE Îµ4 x Time were all associated with longitudinal measures of AÎ² burden. There was also a significant difference in change in AÎ² over time between individuals with normal blood pressure, untreated- and treated hypertensives, with participants with untreated high blood pressure at baseline showing greatest increases in AÎ² over time. Findings remained significant after adjustment for BMI, cholesterol, glucose and smoking. **Conclusion:** In hypertensive cognitively-normal controls, use of antihypertensive medication was associated with less AÎ² accumulation over time compared with their untreated peers. Although observational only, this study provides some in vivo biomarker evidence supporting that lifestyle risk factor modification may mitigate the pathology of AD.

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Poster Presentation
Theme: 1. Diagnosis/Assessment
Poster number: P030

Association of Cerebrovascular disease and Alzheimer's disease Biomarkers with and Longitudinal Cognitive Decline

Paul Yates[1,2], Victor Villemagne[2,3], David Ames[2,4], Colin Masters[2,3], Ralph Martins[5,6], Patricia Desmond[2,7], SamanthaBurnham[8], Paul Maruff[9], Kathryn Ellis[2,4], Christopher Rowe*[1]

1 Austin Health, Victoria, Australia
2 University of Melbourne, Victoria, Australia
3 Florey Institute of Neuroscience and Mental Health, Victoria, Australia
4 National Ageing Research Institute, Victoria, Australia
5 McCusker Alzheimer's Disease Research Unit, WA, Australia
6 University of Western Australia, WA, Australia
7 Melbourne Health, Victoria, Australia
8 CSIRO, WA, Australia
9 Cogstate Ltd., Victoria, Australia

Background: Cerebrovascular disease (CVD) is commonly seen to co-exist with Alzheimer's disease. Recent studies suggest that the two pathologies may mediate distinct, additive

insults on cognitive performance. We examined the contribution of subclinical CVD (sCVD) and AÎ² burden at baseline to risk for incident dementia over six years. **Methods:** 219 non-demented participants from the AIBL Study (169 normal cognition, 50 mild cognitive impairment) with 3-Tesla MRI and 11C-PiB PET at baseline and clinical assessments over 18-monthly intervals over six years. Persons with a history of clinical stroke were excluded from AIBL. Participants were classified as AÎ²+ if PiB Neocortical SUVR â‰¥1.5 and sCVD+ if MRI evidence of stroke or significant sCVD. Incident cognitive decline and dementia were determined from clinical panel consensus following neuropsychological test performance at each timepoint. Cox proportional hazard regression was performed including AÎ² and sCVD, age, APOE Îµ4 status, gender and education as covariates, and cognitive decline, or dementia, as outcome variables. **Results:** 25% of participants were classified as having cognitive decline and 16% progressed to dementia. While both sCVD and AÎ² were associated with incident dementia in univariate analyses, the interaction between sCVD and AÎ² was not. Only the association with AÎ² remained significant after adjustment for all covariates (Hazard ratio [for decline] 3.8, p<0.001; [for dementia] HR=7.4, p<0.001). In participants with normal cognition at baseline, risk for incident dementia at six years was only significant in those with AÎ² and sCVD at baseline (HR=25.9, p=0.004). **Conclusion:** In this non-demented cohort, AÎ² more strongly predicts incident cognitive decline and dementia than subclinical CVD. Subclinical CVD lowered the threshold for incident dementia in those with AÎ², although sCVD alone was not sufficient to predict future dementia. These data also have implications for clinical trials in preclinical and prodromal AD.

Australian Government

NHMRC National Institute for Dementia Research

Australian Government
NHMRC National Institute for Dementia Research

Abstracts

Australian Dementia Forum

Melbourne Convention & Exhibition Centre
15-17 October 2017

www.nnidr.gov.au

Introduction

NHMRC National Institute of Dementia Research

The number of Australians with dementia is projected to nearly triple by 2050. This will place increasingly significant burdens on our society, healthcare system and economy. At present, there is no known effective therapeutic intervention that will cure or delay the progression of dementia; and not all identified risk factors can be modified (for e.g. age, gender, genetics). The NHMRC National Institute for Dementia Research (Dementia Institute) was established by the Australian Government in 2015 with $200 million in new funding to address this significant health challenge through boosting dementia research.

It is in this context that we welcome you to the Australia Dementia Forum: Progress on the Boosting Dementia Research Initiative, to take place in Melbourne between 15 and 17 October 2017. Timed to immediately precede with Alzheimer's Australia's 17th biennial conference, **Be the change**, the Forum will bring together Australia's dementia researchers who are working to address the challenge of Alzheimer's disease and other dementias, providing fertile ground for accessing the latest research breakthroughs and exploring collaborations relevant to the **NHMRC Dementia Institute Strategic Roadmap for Dementia Research**.

Forum speakers include international and national keynote presenters, preeminent researchers, including from the Institute's Dementia Research Team Grant holders and recipients of International dementia research funding, policy makers, and community and research leaders.

The Forum provides the 73 NHMRC-ARC Dementia Research Development Fellows, who are reaching the mid-point of their four year program of research, an exciting opportunity to highlight their achievements to date. The convening of Special Interest Groups and other networking events round out discussions and provides the catalyst for new collaborations across the dementia research community.

The NHMRC Dementia Institute also takes the opportunity to share knowledge and information about its research activities, providing an initial overview of outcomes from the significant investment that the Boosting Dementia Research Initiative has made.

Programme Committee

Professor Colin Masters, Chair	Florey Institute, The University of Melbourne
Professor Kaarin Anstey	Australian National University
Janice Besch	National Institute for Dementia Research
Professor Michael Breakspear	Queensland Institute of Medical Research (QIMR) Berghofer
Professor Elizabeth Beattie	Queensland University of Technology
Professor Annette Dobson	The University of Queensland
Professor Jürgen Götz	Clem Jones Centre for Ageing Dementia Research (CJCADR), Queensland Brain Institute
Dr Alexandra Grubman	Monash University
Dr Sandra Garrido	Western Sydney University
Professor Glenda Halliday	Central Clinical School, University of Sydney
Joan Jackman	NHMRC Cognitive Decline Partnership Centre
Professor Sue Kurrle	The University of Sydney
Dr Moyra Mortby	Australian National University
Professor David Phillips	National Health and Medical Research Council
Dr David Sykes	Alzheimer's Australia
Professor Robert Williamson	University of Melbourne

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NHMRC National Institute for Dementia Research

Round Table Sessions

Sunday 15 October – By Invitation

10.00 – 12.00
Room 106

Round Table 1: The long and winding road to prevention: ensuring dementia prevention research makes an impact

Dr Helen Macpherson, Flinders University; Professor Kaarin Anstey, Australian National University

This round table event will include dementia prevention researchers to facilitate a high-level discussion regarding research translation and knowledge exchange between research, policy and practice. Clinicians, representatives from relevant government and NGOs including Alzheimer's Australia and consumer advocacy groups will be invited to participate.

12.30 – 15.30
Room 106

Round Table 2: Safe and effective use of medicines in people living with dementia

Dr Lisa Kalisch, University of South Australia; Professor Deborah Rowett, University of South Australia.

This round table will focus on the safe and effective use of medicines in people living with dementia. It will bring together researchers and health professionals who have an interest in better understanding the adverse effects of medicines in people living with dementia. It will provide opportunities for research collaboration and developing new research directions relating to the safe and effective use of medicines in people living with dementia, and the formation of an ongoing special interest group on this topic.

12.30 – 15.30
Room 101

Round Table 3: Understanding mechanisms in dementia, identifying biomarkers and drug discovery using stem cell models

Dr Anthony Cook, University of Tasmania; Dr Alexandra Grubman, Monash University; Dr Anna King, University of Tasmania; Dr Rodrigo Medeiros, University of Queensland;Dr Lezanne Ooi, University of Wollongong; Dr Bradley Turner, Florey.

Tuesday 17 October – All Welcome

12.30 – 15.30
Room 101

Round Table 4: Special Interest Group – Expression of interest. Delaying functional decline in people with dementia through rehabilitative therapies

Dr Kate Laver of Flinders University invites you to attend a brief session to express interest in the establishment of a special interest group.

This will bring together a multidisciplinary group with industry partners and consumers who have expressed a commitment to further research and knowledge translation efforts dedicated to delaying functional decline in people with dementia.

Programme

Sunday 15 October

08.30 – 17.00 Registration desk open – Poster boards available

16.00 – 17.00 **CONFERENCE OPENING SESSION**

Chair: Professor Colin Masters, Chair of the Program Committee, ADF2017

Welcome to Country

The Honourable Greg Hunt Minister for Health
Welcome

John Quinn
I'm not JUST another statistic

Maree McCabe CEO, Dementia Australia
Our Important Partnership for People with Dementia

Janice Besch Director, NHMRC Dementia Institute
Progress on the Boosting Dementia Research Initiative

Programme

17.00 – 18.00 ADF2017 Keynote Speaker

Chair: Professor Ralph Martins, Edith Cowan University & Macquarie University

Professor Sam Gandy

Mount Sinai Hospital Professor of Alzheimer's Disease Research

There is no evidence so far to prove that current Aβ-lowering trials will show any meaningful benefit for memory or other brain functions and there is unlikely to be anytime soon a medicine that is administered for decades from midlife to death as a means of preventing Alzheimer's Disease (AD). A range of new approaches to postponing the symptoms of AD – interventions when amyloid is present in the brain but before the appearance of symptoms must be considered. This is the future challenge for researchers and pharma alike in addressing the burden of dementia.

18.00 – 20.00 **Welcome Reception** – Performance: Musical Memories Dementia Choir

Monday 16 October

08.00 – 08.30 ADF2017 Opening Addresses

Chair: Janice Besch, Director, NHMRC Dementia Institute

08.00 – 08.15 **Professor Anne Kelso**, CEO, NHMRC

08.15 – 08.30 **Professor Graeme Samuel**, Chair, NNIDR Board and President, Alzheimer's Australia

08.30 – 10.45 Plenary Speakers

Chair: Professor Robert Williamson, University of Melbourne

08.30 – 09.15 **Professor Glenda Halliday**

Central Clinical School, University of Sydney

Non-Alzheimer's degenerative dementias: identifying prodromal genetic/familial phenotypes, modifying factors and protein variations involved in progression

Associate Professor John Kwok, Associate Professor Amy Brodtmann, Professor Olivier Piguet

Research is generating new knowledge necessary for advancing the diagnosis of the non-Alzheimer's disease dementias. We will identify the preclinical forms of frontotemporal dementia and Lewy body dementia using similar methods to those successfully employed to advance diagnosis of Alzheimer's disease. Importantly, our team has the capacity to translate these protocols into clinical practice and into further advances in biological knowledge that is necessary for future therapeutic targeting.

09.15 – 10.00 **Associate Professor Ian Blair**

Australian School of Advanced Medicine, Macquarie University

Developing insight into the molecular origins of familial and sporadic frontotemporal dementia and amyotrophic lateral sclerosis

Associate Professor Julie Atkin, Associate Professor Tim Karl, Dr Lezanne Ooi

There is strong evidence that frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) represent a spectrum of neurodegenerative disease with common origins. A combined study of FTD/ALS patient cohorts will provide greater power to identify these shared molecular origins. We aim to discover gene variants that cause, predispose, or modify onset and progression of inherited and sporadic FTD/ALS, and validate and study our discoveries in new cell and animal models of these disorders.

10.00 – 10.45 **Professor Michael Breakspear**

Queensland Institute of Medical Research (QIMR) Berghofer

Prospective Imaging Study of Ageing (PISA): genes, brain and behaviour

Dr Christine Guo, Dr Michelle Lupton, Ms Kerrie McAloney, Dr Robert Adam, Dr Olivier Salvado, Associate Professor Gail Robinson

The Prospective Imaging Study of Ageing (PISA) has been designed to identify those Australians at risk of dementia whilst they are still relatively young. PISA leverages a polygene risk score (PRS) to identify healthy mid-life Australians at high future risk of dementia, and follows them longitudinally with a comprehensive battery of imaging, genetics, neuropsychology, lifestyle and clinical assays. In this talk we will present early progress in each of those domains, highlighting the various logistic, governance, ethics and pragmatic

Programme

challenges that we have overcome in order to execute the study according to our over-arching vision. We will also highlight the new collaborative links between wet and dry labs, memory clinics, population health, biomedical engineering, psychology and translational imaging that PISA is fostering.

10.45 – 11.00 **MORNING TEA**

11.00 – 12.30 Plenary Speakers

Chair: Professor David Phillips, Associate Director, National Health and Medical Research Council

11.00 – 11.45 **Professor Jürgen Götz**

Clem Jones Centre for Ageing Dementia Research (CJCADR), Queensland Brain Institute

From basic pathomechanisms to therapeutic interventions

Dr Dan Blackmore, Dr Victor Anggono, Dr Rodrigo Medeiros

A concise overview of the research activities at CJCADR including: a new mechanism for local Ab-mediated Tau translation in the somatodendritic domain; ultrasound as a new treatment modality for AD; physical exercise for amelioration of decreased neural stem cell numbers, neurogenesis and cognitive deficits; a novel pathway that mediates Aβ-induced loss of AMPA receptors in mammalian central neurons; molecular mechanisms linking inflammation to Aβ and tau pathology as well as cognitive decline.

11.45 – 12.30 **Associate Professor Amy Brodtmann**

Florey Institute, The University of Melbourne

Vascular mechanisms of neurodegeneration: drivers and determinants of dementia

Dr Sheila Patel, Dr Vanessa Brait, Dr Jess Nithianantharajah, Dr Lachlan Thompson, Professor Louise Burrell

The evidence is compelling: vascular burden is the greatest determinant of late life cognition. The volume of evidence linking vascular risk and dementia is conclusive. All late-onset dementia syndromes, especially Alzheimer's disease, are driven or exacerbated by vascular brain burden. We aim to examine how vascular burden causes dementia. Understanding the mechanisms means that we can prevent and treat the global epidemic of dementia. An update on animal and human projects will be presented.

12.30 – 13.30 **LUNCH**

13.30 – 15.00 Plenary Speakers

Chair: Professor Michael Breakspear, QIMR Berghoffer

13.30 – 14.15 **Professor Henry Brodaty**

University of New South Wales

Maintain your brain

Dr Megan Heffernan (UNSW), Dr Maria Fiatarone Singh (USyd), Dr Michael Valenzuela (USyd)

The internet based intervention targets modifiable risk factors for dementia in general and AD in particular, namely physical inactivity, cognitive inactivity, depression, and being overweight or obese, diabetes (type 2), as well as advice regarding high blood pressure and smoking. Our aim is to determine the efficacy and cost-effectiveness of a multi-modal targeted intervention delivered and monitored on the internet to reduce the rate of cognitive decline in non-demented community dwelling persons aged 55-75 years and in the long-term to delay the onset of dementia.

14.15 – 15.00 **Professor Rob Sanson-Fisher**

School of Medicine and Public Health, University of Newcastle

The ACcoRD Program

The Australian Community of Practice in Research in Dementia (ACcoRD) is a national, multidisciplinary research team dedicated to developing, implementing and evaluating strategies to improve the wellbeing and quality of care provided to people living with dementia and their care partners. Studies underway include: the development of acceptable and robust measures for assessing the unmet needs of people living with dementia and their care partners; the views of consumers, nurses, general practitioners and geriatricians regarding the acceptability and feasibility of the NHMRC guidelines for dementia care; medico-legal impediments to providing high-quality person-centred care; and the application of strong research methodology to test the effectiveness of strategies to improve important outcomes for people with dementia and their care partners.

Programme

15.00 – 15.30 **AFTERNOON TEA**

15.30 – 17.30 **Dementia Centre for Research Collaboration (DCRC)**

Chair: Dr Moyra Mortby, Australian National University

Professor Henry Brodaty, Professor Kaarin Anstey, Professor Elizabeth Beattie

DCRC Directors' Overview

Professor Marita McCabe (ACU)

Consumer Directed Care in Residential Aged Care: Implementation and Evaluation of the Resident at the Centre of Care (RCC) Program

Dr Matt Paradise (UNSW)

An MRI index of cerebrovascular disease burden: development and validation

Dr Maree Farrow (UTas)

Memory performance is associated with exposure to risk factors for Alzheimer's disease

Dr Kate Stevens (WSU)

Time Travelling with Technology (TTT): Applying and Evaluating Behavioural and Psychosocial Benefits of Liquid Galaxy-Based Reminiscence Therapy for People with Dementia

Dr Cindy Jones (Griffith U)

Sexualities & Dementia: Improve Knowledge, Attitudes & Practices in Aged Care Via Interactive Live Webinars

18.00 – 20.00 **COCKTAIL RECEPTION AND POSTER SESSION**

Tuesday 17 October

08.30 – 10.30 **Cognitive Decline Partnership Centre (CDPC)**

Chair: Professor Susan Kurrle, The University of Sydney

Ms Louise Heuzenroeder

Consumer involvement in development of Clinical Practice Guidelines and Principles of Care for People with Dementia and Associated Consumer Companion Guide

Dr Kate Laver (Flinders)

What do members of the public believe regarding efficacy of treatments for dementia? A systematic review

Dr Morag Taylor (UNSW)

Slow gait speed is associated with executive function decline in older people with mild to moderate dementia

Dr Suzanne Dyer (Flinders)

The effects of different built environments in residential care on consumer-reported outcomes and healthcare resource use

Dr Tracy Comans (Griffith U)

Demonstrating value based health care is an essential element of evaluating new and existing services

10.30 – 11.00 **MORNING TEA**

11.00 – 11.30 **Dementia Research Development Fellows: Research Addressing the Challenges of Living with Dementia and Delivering Quality of Care**

Chair: Professor Kaarin Anstey, Australian National University

Dr Julia Gilmartin-Thomas (Monash)

Qualitative and quantitative impact of a virtual dementia experience on medical and pharmacy students' knowledge, attitudes and self-reported behaviour toward people with dementia

Dr Fiona Kumfor (USyd)

Why do patients with frontotemporal dementia misinterpret social cues? The importance of context

11.30 – 12.45 **Dementia Research Development Fellows Panel Discussion: New Research to Improve Assessment & Diagnosis**

Programme

Chair: Professor Glenda Halliday, The University of Sydney

Dr Loren Mowszowski (USyd)
Detecting subtle functional decline in prodromal dementia

Dr Shaun Frost (CSIRO)
Eye imaging for early detection of Alzheimer's disease

Dr Mitchell Goldsworthy (Adelaide)
TMS-EEG indices of cortical effective connectivity and physical activity in older adults

Dr Nawaf Yassi (Florey)
Cortical Cerebral Microinfarcts on 3T MRI in Alzheimer's Disease

Dr Scott Ayton (Florey)
Cerebral quantitative susceptibility mapping predicts β-amyloid-related cognitive decline

12.45 – 14.00 **LUNCH**

14.00 – 15.00 **Dementia Research Development Fellows Panel Discussion: Intervention and Treatment Studies**
Chair: Professor Annette Dobson, The University of Queensland

Dr Kylie Radford (UNSW)
Life course social and biomedical factors associated with dementia in Aboriginal Australians

Dr Belinda Brown (Murdoch)
Update on the Intense Physical Activity and Cognition (IPAC) Study

Dr Kathryn Munro (UoM)
Effects of BACE inhibition on synaptic connectivity

Dr Edwin Tan (Monash)
Acetylcholinesterase inhibitors and risk of stroke and death in people with dementia

15.00 – 15.30 **AFTERNOON TEA**

15.30 – 17.15 **Dementia Research Development Fellows Panel Discussion: Understanding the Mechanisms: Towards New Targets, New Compounds for Dementia Drug Development**
Chair: Dr Alexandra Grubman, Monash University

Dr Emma Louise Burrows (Florey)
Progressive behavioural flexibility impairments in the APP/PS1 mouse model of Alzheimer's disease as measured by translatable touchscreen technology

Dr Yen Ying Lim, (Florey)
BDNF Val66Met increases rate of memory decline, hippocampal volume loss and tau accumulation in autosomal dominant Alzheimer's disease

Dr Shantel Duffy (USyd)
The longitudinal relationship between anterior cingulate glutathione and executive functioning in individuals at-risk for dementia: a magnetic resonance spectroscopy study

Dr Erin McAllum (Florey)
Metalloproteomic changes in dementia with Lewy bodies

Dr Simon James (Florey)
Iron, copper, and zinc concentration in Aβ Plaques in the APP/PS1 mouse model of Alzheimer's disease correlates with metal levels in the surrounding neuropil

Dr Sarah Rea (UWA)
An ALS-FTLD associated mutation of SQSTM1/p62 attenuates oxidative stress signalling and autophagy

Dr Samamtha Barton (Monash)
Using patient iPS-derived oligodendrocytes harbouring a C9ORF72 mutation to identify disease causing mechanisms in ALS-FTD

17.15 – 17.30 **AWARDS PRESENTATION AND CLOSE**

Keynote Speakers

Professor Sam Gandy MD PhD

Mount Sinai Professor of Alzheimer's Disease Research

Professor Sam Gandy is an international expert in the metabolism of the substance called amyloid that clogs the brain in patients with Alzheimer's. In 1989, Dr Gandy and his team discovered the first drugs that could lower formation of amyloid.
Dr Gandy has written more than 250 original papers, chapters and reviews on this topic. Dr Gandy has received continuous NIH funding for his research on amyloid metabolism since 1986. Dr Gandy is Professor of Alzheimer's Disease Research, Professor of Neurology and Psychiatry, and Associate Director of the Mount Sinai Alzheimer's Disease Research Center, and Chair, National Medical and Scientific Advisory Council of the Alzheimer's Association.

Dr Gandy is a member of the Faculty of 1000 Biology and serves as a Consulting Editor for The Journal of Clinical Investigation. He also serves on the Editorial Advisory Boards for the journals Public Library of Science-Medicine (PLoSM), Neurodegenerative Diseases, and Current Alzheimer Research.
He is Associate Editor of the journals Molecular Neurodegeneration and Alzheimer Disease and Associated Disorders. From 1996-2006, Dr Gandy was Director of the Cold Spring Harbor Laboratories/ Wellcome Trust Annual Summer Course on the Neurobiology of Human Neurological Disorders. In 2000, he became chief organizer for the Cold Spring Harbor Laboratories Bi-Annual Winter Biotechnology Conference on Therapeutic Opportunities in Neurodegenerative Diseases and continued in that role until 2010. Dr Gandy is also the Founding Director of the Mount Sinai Center for NFL (National Football League) Neurological Care.

Professor Anne Kelso AO

Chief Executive Officer (CEO) National Health & Medical Research Council

Following her PhD at the University of Melbourne, Professor Kelso undertook research in immunology at the Swiss Institute for Experimental Cancer Research, the Walter and Eliza Hall Institute of Medical Research and the Queensland Institute of Medical Research. From 2000 until 2006, she was also Director/CEO of the Cooperative Research Centre for Vaccine Technology. She then returned to Melbourne as Director of the WHO Collaborating Centre for Reference and Research on Influenza from 2007 until she took up her role with NHMRC in April 2015. She was appointed Officer in the Order of Australia in June 2007 for service to science.

Professor Kelso is a member of several Government and international committees, including the Australian Medical Research Advisory Board (advising the Minister for Health on the strategy and priorities for the Medical Research Future Fund), the Board of the Global Alliance for Chronic Diseases and the Board of Trustees of the International Human Frontier Science Program Organization.

Professor Graeme Samuel AC

Chair NNIDR Board and National President Alzheimer's Australia

Professor Graeme Samuel AC is a Vice Chancellor's Professorial Fellow in Monash University's Business School and co-director of the Monash Business Policy Forum. He is also Chair of the Victorian Taxi Services Commission, a Commissioner of the National Rugby League, a Councillor of the Australian National University, President of Alzheimer's Australia, and Chair of the South Eastern Melbourne Primary Health Network.

Professor Samuel has held a number of roles in public life including former Chairman of the Australian Competition and Consumer Commission. He was appointed an Officer of the Order of Australia in 1998. In 2010 he was elevated to a Companion of the Order of Australia.

Invited Speakers

Professor Glenda Halliday

Central Clinical School, University of Sydney

Professor Glenda Halliday is an Australian Professor of Neuroscience leading a research program of 70 researchers tackling non-Alzheimer's neurodegeneration that stems from her work on frontotemporal and motor neurodegenerative syndromes, and Parkinson's disease. She is also Director of the Sydney Brain Bank. She received her degrees at University of New South Wales, and postdoctoral training at Flinders University prior to an ARC Queen Elizabeth II Fellow and NHMRC research fellowships since 1988, joining NeuRA in 1993. She has published more than 300 research papers and 2 books, and attracted $30m in grant funding. Prof Halliday is on the editorial boards of 5 international journals, on Scientific Advisory Boards for 3 research institutes (one international), and is a committee member for a number of international organizations, including the International Brain Research Organization (a member organization of UNESCO). She was elected president of the Australian Neuroscience Society (ANS 2006-2007), awarded the 2011 ANS Nina Kondelos Prize, and named a high achiever in Australian Health and Medical Research by NHMRC.

Associate Professor Ian Blair

Faculty of Medicine and Health Science, Macquarie University

Associate Professor Ian Blair's research career has focused on determining the molecular basis of a variety of neurological disorders including ALS/MND, FTD, hereditary sensory neuropathy (HSN), Charcot Marie Tooth disorder (CMT), the spinal cerebellar ataxias (SCA), Joubert syndrome, and bipolar disorder. At Macquarie University, his team works to unravel the molecular and cellular basis of ALS and FTD. His group has played a key role in several ALS/FTD gene discoveries including identification of mutations in the TDP-43 and FUS genes. These discoveries have opened new chapters in ALS/FTD research and led to effective diagnostic tests for ALS, CMT1A and HSN1.

Professor Michael Breakspear

Group Leader, QIMR Berghofer Medical Research Institute & Coordinator program of Mental Health research

Professor Michael Breakspear is Group Leader at QIMR Berghofer and coordinator of the Program of Mental Health Research. He trained in Medicine and Physics at the University of Sydney and completed his psychiatry training at the Black Dog Institute, Sydney. He combines computational modelling with advanced neuroimaging techniques to study neurodevelopmental and neurodegenerative disorders. He is a psychiatrist in the Brisbane Prison Mental Health Service.

Professor Jürgen Götz

Inaugural Director, Clem Jones Centre for Ageing Dementia Research, Queensland Brain Institute, Brisbane

Professor Jürgen Götz is the inaugural Director of the Clem Jones Centre for Ageing Dementia Research at the Queensland Brain Institute in Brisbane. Götz studied biochemistry in Switzerland and earned his PhD in immunology with Nobel Laureate Köhler in Germany. After postdoctoral work at UCSF and at Novartis, he became a group leader in Zürich, before moving to Sydney in 2005, and Brisbane in 2012. A major focus of his laboratory is the generation and analysis of transgenic animal models to gain a better mechanistic understanding of Alzheimer's disease and to develop therapeutic interventions targeting two key molecules in disease, tau and amyloid-beta.

Associate Professor Amy Brodtmann

Co-Division Head, Behavioural Neuroscience, NHMRC Clinical Career Development Fellow at the Florey Institute for Neuroscience and Mental Health in Melbourne, Australia; Stroke Neurologist, Austin Health; Cognitive Neurologist and Clinic Director, Eastern Cognitive Disorders Clinic, Box Hill Hospital

Associate Professor Amy Brodtmann is a stroke and cognitive neurologist at Austin Health and director of the Eastern Cognitive Disorders Clinic. She is the recipient of many awards and grants for her work in stroke and dementia, including NHMRC project grants, post-Graduate, post-Doctorate, and clinical Career Development Fellowships, and is CIA on a Dementia Research Team Grant. She sits on the editorial boards of Neurology and the International Journal of Stroke, the board and committee of Alzheimer's Australia Victoria Dementia Research Grants, is an inaugural member of the Wicking Strategic Review Panel, and is a founding member of the Australian Frontotemporal Dementia Association. Her research focuses on the imaging of brain network degenerations following stroke, post-stroke behavioural

Invited Speakers (continued)

syndromes, and the diagnosis and management of focal onset dementias.

Professor Henry Brodaty

Director Dementia Centre for Research Collaboration, Co-Director of the Centre for Healthy Brain Ageing at UNSW, Scientia Professor of Ageing and Mental Health, University of New South Wales; Consultant Psychogeriatrician, Aged Care Psychiatry and Head of the Memory Disorders Clinic, Prince of Wales Hospital.

Professor Brodaty's research interests include: i) prevention of cognitive decline with ageing. He is leading Maintain Your Brain, funded by an NHMRC/NNIDR team grant, which will be the world's largest trial of an internet based intervention to prevent cognitive decline and dementia; ii) Cognitive health and ageing: What predicts cognitive decline in older people? CHeBA is conducting a population based study of >1000 older people to discover what are risk and protective factors; iii) how to improve detection and management of dementia by GPs; iv) the effects of dementia on family carers and on how best to help them; iv) ways to improve quality of life in people with dementia; v) reducing behavioural and psychological symptoms of dementia (BPSD); vi) improving care in nursing homes; and, vii) living well to 100, research on centenarians and near centenarians. Henry is on the editorial board of several journals and has been the recipient of a number of awards. Henry's lifetime achievements have been recognised with the award of AO and the 2016 Ryman Prize.

Professor Rob Sanson-Fisher

Director, Health Behaviour Research Group, School of Medicine and Public Health, University of Newcastle

Laureate Professor Rob Sanson-Fisher is Director of the Health Behaviour Research Group, School of Medicine and Public Health, University of Newcastle. An internationally recognised leader in health behaviour research, his work successfully combines behavioural approaches to knowledge translation, health promotion, health service evaluation and chronic disease control. He has published over 470 peer-reviewed journal articles and obtained some 100 competitive research grants, with a total value over $36 million. His research interests include exploring health care provider behaviour and adoption of best evidence practice, and the development, implementation and evaluation of interventions to improve health outcomes for vulnerable population groups.

Professor Kaarin J Anstey

Professor of Psychology and Population Health, Australian National University

Professor Kaarin J. Anstey is a Professor of Psychology and Population Health at the Australian National University and Director of the Dementia Collaborative Research Centre - Early Diagnosis and Prevention. Her research interests focus on the prevention of dementia, and the impact of cognitive impairment on activities such as driving. Anstey led the first online dementia risk reduction intervention called Body Brain Life that is soon to be trialled in Primary Care. Anstey is a Director of the Alzheimer's Australia Dementia Research Foundation and the Global Council on Brain Health, an initiative of the US AARP and UK HelpAge organisations.

Professor Elizabeth Beattie

Professor of Aged and Dementia Care, School of Nursing, Queensland University of Technology

Professor Elizabeth Beattie, Professor of Aged and Dementia Care, School of Nursing, Queensland University of Technology, is a psychogeriatric nurse educated in Australia, the UK and the US who has been involved in dementia-focused clinical practice, education and research for 30 years. She directs the Dementia Collaborative Research Centre Carers and Consumers and the Queensland Dementia Training Study Centre. Elizabeth has an international nursing leadership profile and a sustained record of competitive research funding and publication. Her research is focused on improving the quality of care and quality of life of people living with dementia and those who support them.

Professor Susan Kurrle

Geriatrician, Kur-ring-gai Hospital, Sydney

Professor Susan Kurrle is a geriatrician practising at Hornsby Ku-ring-gai Hospital in northern Sydney, and Batemans Bay Hospital in southern NSW, and she holds the Curran Chair in Health Care of Older People in the Faculty of Medicine at the University of Sydney. Since 2012 she has led the NHMRC Partnership Centre on Dealing with Cognitive and Related Functional Decline in Older People. This Centre focuses on research and implementation projects dealing particularly with the care aspect of dementia.

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Keynote Speaker's Abstract

Professor Sam Gandy
ADF2017 Keynote Speaker

Mount Sinai

There is no evidence so far to prove that current Aß-lowering trials (beginning at age 65 or above) will show any meaningful benefit for memory or other brain functions. There is unlikely to be anytime soon a medicine (analogous to statins for cardiovascular disease and insulin for diabetes) that is administered for decades from midlife to death as a means of preventing AD. In the cases of statins and insulin, the FDA and society as a whole have agreed that their risk–benefit ratios are acceptable. Any new medication for AD that is worth the risk of ingestion for decades must be effective and must do no harm anywhere in the body. The Aß-lowering drugs in the current pipeline fall well short of this goal. Professor Gandy's talk will be wide ranging, setting the scene for two days of intensive discussions. He will consider the challenges for researchers and drug companies specific to this disease; a range of new approaches to postponing the symptoms of AD – interventions when amyloid is present in the brain but before the appearance of symptoms; promising genes and precision medicine; combinatorial approaches; new interventions aimed at tau and inflammation; and environmental factors and interventions.

Invited Speakers' Abstracts

Prof Glenda Halliday

Email: glenda.halliday@sydney.edu.au

Non-Alzheimer's disease degenerative dementias – identifying prodromal genetic/ familial phenotypes and modifying factors, and protein variations involved in progression

The University of Sydney

Glenda Halliday, John Kwok, Amy Brodtman and Olivier Piguet for the Team (Halliday, Hodges, Lewis, Piguet, Kril, Kwok, Villemagne, Kiernan, Rowe, McKeith & Als)

Background and Aims – As recently achieved for Alzheimer's disease (AD), comprehensive data on the preclinical phase/s for the non-AD neurodegenerative dementias are now required to establish new diagnostic criteria. We will identify and characterise a large cohort of asymptomatic inherited forms of the main non-AD neurodegenerative dementias using established methodology and pathologically confirm the disease phenotype in the probands of these families. We will establish differences in protein 'strains' between these phenotypes.

Cohort identification – Two types of cohorts are being targeted and ethics has been approved or is in process for the following sites - in Sydney the Brain and Mind Centre, Royal Prince Alfred Hospital, Macquarie University, Woolcock Institute and Concord Hospital; in Melbourne Eastern Health, Austin Health and the Florey.

1) families with underlying TDP-43 pathologies (Sydney and Melbourne). 125 Sydney families with genes associated with the pathology identified prior to funding. Additional 579 Sydney cases now screened and 55 families identified (180 families of the 185 target). 29 postmortem confirmed. Targeted families in Melbourne identified.

2) families with underlying a-synucleinopathy (Sydney only). 23 pathologically confirmed Sydney families identified prior to funding. Completed screening of 45 Sydney cases and 8 families identified (30 families of the 140 target). Awaiting final analyses of 364 Sydney cases from Brain and Mind clinic (~70 families at current rate) and still to screen Macquarie clinic (66 families identified).

New protocols – Neurology trainee and genetic counsellors recruited. Protocols include challenging initial assessment (clinical, psychometrics), brain imaging (MRI, PET), biofluid collections (genetics as above, CSF pathological proteins), and research on modifiable factors (sleep, movement, metabolism).

Protein strains – Assessment of a-synuclein strains for different pathologies (the common neuronal Lewy bodies versus the less common glial cytoplasmic inclusions) has been completed. Significant differences in the properties of the a-synuclein strains from the different pathologies has been identified. In contrast to the pathological a-synuclein strain from neurons, the pathological a-synuclein from glia has been shown to become self-propagating/transmissible in both genetically-modified cells and animal models. Further, the prion-like a-synuclein from glia is resistant to a number of inactivation methods. The characteristics of the less common prion-like a-synuclein from glia are very similar to those of pathological prions, suggesting similar cautions to prevent disease transmission.

Next steps – Determine and assess TDP-43 pathological strains. Collect and assess data to be able to propose new criteria for prodromal TDP-43 pathologies (in association with the Genetic Frontotemporal Dementia Initiative or GENFI) and a-synucleinopathies (in association with the Consortium for Lewy Body Disease Researchers) and validate the new criteria with our international collaborators in their cohorts.

Associate Professor Ian Blair

Email: ian.blair@mq.edu.au

Research into origins of dementia and related neurodegenerative disease: Developing insight into the molecular origins of familial and sporadic frontotemporal dementia and amyotrophic lateral sclerosis

Macquarie University

Ian Blair 1, Julie Atkin 1, Roger Chung 1, Gilles Guillemin1, Lezanne Ooi 2, Denis Bauer 3, Mark Molloy 4 Justin Yerbury 2, Nicholas Cole 1, Tim Karl 5.

1. Faculty of Medicine and Health Sciences, Macquarie University;
2. Illawarra Health and Medical Research Institute, University of Wollongong;
3. Transformational Bioinformatics, CSIRO;
4. Chemistry & Biomolecular Sciences, Macquarie University;
5. School of Medicine, Western Sydney University.

There is strong evidence that frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) represent a spectrum of neurodegenerative disease with common origins. A combined study of FTD/ALS patient cohorts will provide greater power to identify these shared molecular origins. We aim to discover gene variants that cause, predispose, or modify onset and progression of inherited and sporadic FTD/ALS, and validate and study our discoveries in new cell and animal models of these disorders. In this presentation, four CIs will present an overview of the goals and progress for each of the primary themes that comprise our multidisciplinary team strategy.

Genetic and epigenetic basis of disease: We continue to build genetic and genomic resources through whole genome sequencing and methylation typing of ALS and FTD patients. Integration with international datasets has led to the identification of new molecules associated with familial and sporadic disease and consideration of the implications for predictive genetic testing for ALS and FTD.

Validation, in vitro studies: We are examining novel, and more established, mechanisms linked to pathogenicity in neuronal cell lines and primary human and mouse neurons including those expressing known and new ALS genes.

Validation, animal models: Using the zebrafish and mouse, together with CRISPR, somatic brain transgenesis and traditional transgenesis techniques, we continue to develop pipelines to assess the pathogenicity of new candidate disease molecules, as well as assessing new transgenic animals as potential preclinical models of FTD and ALS.

Validation and elucidation of molecular origins using iPSCs and molecular profiling: We are reprogramming somatic cells, donated from our patient cohort, into pluripotent stem cells in order to profile the molecular differences between patient and control cells and identify pathogenetic mechanisms

Professor Michael Breakspear

Email: michael.breakspear@qimrberghofer.edu.au

Prospective Imaging Study of Ageing: Genes, Brain & Behaviour

Queensland Institute for Medical Research Berghofer

The Prospective Imaging Study of Ageing (PISA) has been designed to identify those Australians at risk of dementia whilst they are still relatively young. PISA leverages a polygene risk score (PRS) to identify healthy mid-life Australians at high future risk of dementia, and follows them longitudinally with a comprehensive battery of imaging, genetics, neuropsychology, lifestyle and clinical assays. In this talk we will present early progress in each of those domains, highlighting the various logistic, governance, ethics and pragmatic challenges that we have overcome in order to execute the study according to our over-arching vision. We will also highlight the new collaborative links between wet and dry labs, memory clinics, population health, biomedical engineering, psychology and translational imaging that PISA is fostering.

Professor Jürgen Götz

Email: j.goetz@uq.edu.au

From basic pathomechanisms to therapeutic interventions

Clem Jones Centre for Ageing Dementia Research (CJCADR)

Following a concise overview of the research activities at CJCADR, the following will be covered:

(i) What causes proteins such as Tau to accumulate in Alzheimer's disease (AD) brains is only incompletely understood. Jurgen Gotz will outline a new mechanism that involves local Aß-mediated Tau translation in the somatodendritic domain. He will present an update on ultrasound as a new treatment modality for AD.

(ii) Advanced age typically results in decreased neural stem cell numbers and neurogenesis as well as deficits in cognition. Daniel Blackmore will reveal how an optimal period of physical exercise ameliorates these deficits in rodents. The findings lead to a human exercise trial of which an update will be provided.

(ii) Synaptic failure occurs early in AD pathogenesis and is considered to be a major correlate of cognitive impairment. Synaptic depression associated with AD is due to the loss of AMPA-type glutamate receptors and dendritic spines. Victor Anggono will present new data highlighting a novel pathway that mediates Aß-induced loss of AMPA receptors in mammalian central neurons.

(iv) Rodrigo Medeiros discovered that AD promotes defects in fundamental molecular events that limit and resolve inflammation, and demonstrated that this has a major role in AD pathogenesis. He will present animal and human studies aimed at elucidating the underlying molecular mechanisms linking inflammation to Aß and tau pathology as well as cognitive decline.

Associate Professor Amy Brodtmann

Email: amy.brodtmann@florey.edu.au

Vascular mechanisms of neurodegeneration: drivers and determinants of dementia

Florey Institute of Neuroscience and Mental Health

The evidence is compelling: vascular burden is the greatest determinant of late life cognition. The volume of evidence linking vascular risk and dementia is conclusive. All late-onset dementia syndromes, especially Alzheimer's disease, are driven or exacerbated by vascular brain burden. We aim to examine how vascular burden causes dementia. Understanding the mechanisms means that we can prevent and treat the global epidemic of dementia. An update on animal and human projects will be presented, with results per project:

Canvas: post-stroke brain atrophy and cognitive decline

Professor Henry Brodaty

Email: h.brodaty@unsw.edu.au

Maintain your Brain

Megan Heffernan (UNSW), Maria Fiatarone Singh (USyd), Michael Venezueala (USyd)

University of New South Wales

The internet based intervention targets modifiable risk factors for dementia in general and AD in particular, namely physical inactivity, cognitive inactivity, depression, and being overweight or obese, diabetes (type 2), as well as advice regarding high blood pressure and smoking. Our aim is to determine the efficacy and cost-effectiveness of a multi-modal targeted intervention delivered and monitored on the internet to reduce the rate of cognitive decline in non-demented community dwelling persons aged 55-75 years and in the long-term to delay the onset of dementia.

Professor Rob Sanson-Fisher

Email: rob.sanson-fisher@newcastle.edu.au

The ACcoRD Program

School of Medicine and Public Health, The University of Newcastle

The Australian Community of Practice in Research in Dementia (ACcORD) is a national, multidisciplinary research team dedicated to developing, implementing and evaluating strategies to improve the wellbeing and quality of care provided to people living with dementia and their care partners. Studies underway include: the development of acceptable and robust measures for assessing the unmet needs of people living with dementia and their care partners; the views of consumers, nurses, general practitioners and geriatricians regarding the acceptability and feasibility of the NHMRC guidelines for dementia care; medico-legal impediments to providing high-quality person-centred care; and the application of strong research methodology to test the effectiveness of strategies to improve important outcomes for people with dementia and their care partners.

Cognitive Decline Partnership Centre

Professor Susan Kurrle

Email: susan.kurrle@sydney.edu.au **Presentation Type:** Oral_CDPC

A collaborative research model to improve care for people living with dementia

The University of Sydney

The NHMRC Partnership Centre Dealing with Dementia and Related Functional Decline in Older People (CDPC) brings together clinicians, consumers, researchers and industry to translate research into improved care for people and carers living with dementia and associated functional decline. Professor Kurrle will outline how the CDPC is working towards achieving its vision and program of research; and how the CDPC is progressing towards bridging knowledge gaps to inform policy and practice.

Ms Louise Heuzenroeder

Email: louise.heuzenroeder@bigpond.com **Presentation Type:** Oral_CDPC

Consumer involvement in development of Clinical Practice Guidelines and Principles of Care for People with Dementia and associated Consumer Companion Guide

The University of Sydney

Consumer involvement in development of Clinical Practice Guidelines and Principles of Care for People with Dementia demonstrates how a successful partnership between consumers, researchers, clinicians and industry may improve the lives of people with dementia and their carers. This overview of consumer involvement in this CDPC project will describe how consumers were major contributors to these guidelines and the associated Consumer Companion Guide.

Dr Kate Laver

Email: kate.laver@flinders.edu.au **Presentation Type:** Oral_CDPC **Theme:** Intervention and Treatment

What do members of the public believe regarding efficacy of treatments for dementia? A systematic review:

Flinders University

NHMRC-ARC Dementia Fellow and CDPC researcher Dr Kate Laver, will present data from a systematic review determining current knowledge and attitudes to availability or efficacy of treatments for dementia. Do people think they should seek professional help for memory problems, believe that effective treatments exist? And how many people believe there is already an effective cure for dementia?

Dr Morag Taylor

Email: m.taylor@neura.edu.au **Presentation Type:** Oral_CDPC **Theme:** Living with Dementia

Slow gait speed is associated with executive function decline in older people with mild to moderate dementia:

Morag E. Taylor, 1,2,3 Danielle A. Lasschuit, 3,4 Stephen R. Lord,1,5 Kim Delbaere,1,5 Susan E Kurrle, 2 A. Stefanie Mikolaizak, 6 Tasha Kvelde 1 and Jacqueline C.T. Close 1,3

1. Falls, Balance and Injury Research Centre, Neuroscience Research Australia, UNSW, Sydney, NSW, Australia.
2. Cognitive Decline Partnership Centre, Sydney Medical School, The University of Sydney, Sydney, NSW, Australia.
3. Prince of Wales Clinical School, Medicine, UNSW, Sydney, NSW, Australia.
4. Department of Geriatric Medicine, Prince of Wales Hospital, South East Sydney Local Health District, Sydney, NSW, Australia.
5. School of Public Health and Community Medicine, Medicine, UNSW, Sydney, NSW, Australia.
6. Department of Clinical Gerontology, Robert-Bosch-Hospital, Stuttgart, Germany.

NHMRC-ARC Dementia Fellow and CDPC researcher Dr Morag Taylor, examined changes in neuropsychological, physical and functional performance over one year in older people with dementia living in community or low-level care. The data presented will demonstrate a significant decline in the performance areas over one year and that baseline gait speed is associated with decline in executive function suggesting shared pathways/pathology between gait and cognition

Dr Suzanne Dyer

Email: suzanne.dyer@sa.gov.au **Presentation Type:** Oral_CDPC

The effects of different built environments in residential care on consumer-reported outcomes and healthcare resource use:

Flinders University

This CDPC supported study examined the impact of design of residential aged care on consumer-reported outcomes. The study included 541 residents residing in care for 12 months or longer across facilities using different models of care. Differences in consumer rated quality of care, quality of life, ED presentations and hospitalisations will be reported in this presentation.

Ms Tracy Comans

Email: t.comans@griffith.edu.au **Presentation Type:** Oral_CDPC

Demonstrating value based health care is an essential element of evaluating new and existing services:

Griffith University

The health economics sub-unit of the CDPC provides advice and support for economic evaluation of projects. This presentation will give an overview of how this support has assisted researchers, and present preliminary findings from a CDPC project measuring the quality of life of people living with dementia and developing a better economic model to evaluate dementia programs.

Dementia Centre for Research Collaboration (DCRC)

The Dementia Collaborative Research Centres (DCRC) were established in 2006 under the Government's Dementia Initiative, funded by the Department of Health and Ageing after a competitive tender process. The three centres ('hubs') based at UNSW, ANU and QUT have many collaborative partners around Australia, working in partnership with consumers and service providers, Dementia Training Australia and Dementia Support Australia in order to progress prevention, assessment, care and translation of knowledge into everyday practice, as well as building the next generation of dementia researchers.

An overview of the DCRC Program will be provided, and three researchers funded by the DCRC in its recent grant round will present outcomes from their projects.

Dr Matt Paradise

Email: m.paradise@unsw.edu.au **Presentation Type:** Oral - DCRC

An MRI index of cerebrovascular disease burden: development and validation

Dr Matt Paradise, Ass. Prof Wei Wen, Dr Laughlin Dawes, Dr John Crawford, Prof Perminder Sachdev
University of New South Wales

Cerebrovascular disease (CVD) has an increasingly recognised role in the development of cognitive impairment and both Vascular (VaD) and Alzheimer's dementia. Diagnosing VaD requires determining whether a patient's cognitive deficits can be explained by the current CVD burden. However, CVD is markedly pleomorphic and its full extent has been difficult to determine as traditional markers of CVD such as white matter hyperintensities (WMH) are inconsistently associated with clinical outcomes. Recent advances in MRI technology permit the visualisation of multiple indicators of vascular pathology, including large and small infarcts, lacunes, dilated perivascular spaces, WMH, diffusivity, microbleeds, and cerebral blood flow. Most investigators have studied these pathologies in isolation but we aim to use data from two longitudinal studies of ageing at CHeBA (UNSW) to develop a composite measure of CVD MRI burden, with different weights assigned to different pathologies. The Sydney Memory and Ageing Study (MAS) and Older Australian Twins Study (OATS), have multimodal MRI data – T1- weighted, FLAIR, DTI, rs-fMRI, SWI, and ASL – in the same individuals to allow development of a composite measure. We will use contemporaneous neuropsychological data in MAS to develop the MRI CVD Index and test it in the independent OATS cohort. This project is ongoing but pilot data supports our approach. A multiple regression analysis was performed on 310 participants in the MAS, with global cognition as the dependent variables and individual CVD markers as the independent variables. Results showed that Peak Skeletonised Mean Diffusivity (PSMD), a measure of variability of white matter integrity across the whole brain had the strongest association with global cognition (standardised ß = -0.45, $p<0.001$). When all markers were considered together, compared to PSMD alone, the overall model improved (change in R square = 0.024, $p=0.04$), supporting the value of a composite index.

Dr Maree Farrow

Email: Maree.Farrow@utas.edu.au **Presentation Type:** Oral - DCRC

Memory performance is associated with exposure to risk factors

Maree Farrow 1, Shannon Klekociuk 1, David Ward 1, James Vickers 1, Kathryn Ellis 2, Kaarin Anstey 3

1. Wicking Dementia Research and Education Centre, University of Tasmania
2. Academic Unit for Psychiatry of Old Age, University of Melbourne
3. Centre for Research on Ageing, Health and Wellbeing, Australian National University

Previous research found performance on a paired-associate delayed-recall memory task was associated with age, education and histories of cerebrovascular and Parkinson's diseases in adults aged 50 and over completing an online dementia risk assessment. This study investigated relationships between performance on the same memory task and risk factors measured by the Australian National University Alzheimer's disease risk index (ANU-ADRI) in participants of the University of Tasmania's Preventing Dementia Massive Open Online Course.

714 participants aged 50 and older (mean age = 59.08, SD = 6.40) completed the study. The majority were female (88.4%) and well educated (mean years of education = 16.78, SD = 3.97). Memory scores were weakly but significantly correlated with age ($rS(712) = -0.11$, $p < 0.01$), education ($rS(712) = 0.08$, $p < 0.05$), and the ANU-ADRI total risk ($rS(712) = -0.15$, $p < 0.001$).

9.7% of participants reported symptoms above the cut off suggestive of depression, and this was associated with worse memory performance ($p < 0.01$). 50.4% of participants engaged in protective levels of cognitive activity and this was associated with better memory performance ($p < 0.05$). These findings support previous research suggesting exposure to dementia risk factors is related to an individual's level of functioning prior to the onset of any cognitive disorder.

Professor Marita McCabe

Email: marita.mccabe@acu.edu.au **Presentation Type:** Oral - DCRC

How effective is consumer directed care in residential care

Marita McCabe, Elizabeth Beattie, Gery Karantzas, David Mellor, Kerrie Sanders, Lucy Busija, Kathryn von Treuer, Belinda Goodenough, Michelle Bennett

Deakin University

Introduction: Australia is striving toward a model of care that is both centered on and directed by the consumer. Consumer Directed Care (CDC) is expected to be mandated for Residential Aged Care Facilities (RACFs) in the near future. The aim of this study was to implement and evaluate our Resident at the Center of Care (RCC) staff training program in RACFs. This paper presents information on the facilitators and barriers that we found in relation to the implementation of CDC, as well as the outcomes for residents and staff.

Method: Staff and residents were recruited to participate in the study from six RACFs in Queensland and Victoria. Facilities were randomly allocated into intervention and control conditions. Data were gathered from staff after they had completed the program on the facilitators and barriers to implementing CDC. In addition, resident and staff quality of life (QoL) was evaluated at baseline and three months' follow-up.

Results: The major facilitators were staff supporting each other, respect and clear processes. The major barriers were the culture of the RACF, resources to implement CDC and communication between other staff and residents. Staff felt pressured, confused and that there was too much change. Residents in the intervention conditions demonstrated improved QoL compared to the control condition. Senior staff, but not junior staff, in the intervention conditions also demonstrated improved QoL.

Conclusions: The implementation of CDC into RACFs is not just a matter of educating staff on CDC and how to obtain resident choices. There is a need for significant changes in the organisational structure of the facility, staff empowerment, time management and communication. This is a process that will take some time to achieve, but the results of our study demonstrate that it is possible to implement CDC in RACFs and improve the wellbeing of both residents and staff.

Professor Kate Stevens

Email: kj.stevens@westernsydney.edu.au **Presentation Type:** Oral - DCRC

Time-Travelling with Technology (TTT): Google Liquid Galaxy and Reminiscence Therapy

Kate Stevens, Deborah Parker, Andrew Leahy, Janice Stokes, Karen Watson, and Daniel Piepers

Western Sydney University

Reminiscence Therapy (RT) provides an opportunity for people with dementia to talk about memories. Photographs, for example, may elicit recall of life experiences, promoting communication and helping sustain relationships. An experiment investigated whether coupling RT and immersive technology is feasible and beneficial. We hypothesized that if a sense of envelopment and continuity with personally meaningful "landmarks" enriches RT then an experimental group experiencing a full immersive, dynamic experience will show reduced behavioural problems from pre- to post-intervention compared with a control (no envelopment, continuity) condition. Five large immersive displays with participants and facilitator "travelling through" pre-loaded Google Earth and Streetview landmarks formed the 6-week group intervention. Amount of immersion (3 displays) and dynamism were controlled in the comparison condition with landmarks instead presented as static, large 'postcard-like' images. The range and mean of MMSE scores from both

groups prior to the experiment were similar and the MMSE used as a covariate. Two experiments have been completed with data from the first analysed. Results from Experiment 1 (N=24) showed a significant decrease in mean scores on the Neuropsychiatric Inventory from pre- to post-intervention in the experimental but not in the control condition. There was no significant difference in Quality of Life scale scores from pre- to post-intervention in either condition. Visual and verbal engagement of participants during sessions showed modest differences in engagement between the groups. It appears that RT combined with immersive technology is feasible and can enhance RT. Experiment 2 is currently being analysed and will increase the statistical power and reliability of results.

Dr Cindy Jones

Email: c.jones@griffith.edu.au **Presentation Type:** Oral - DCRC

Sexualities & Dementia: Improve Knowledge, attitudes & practices in aged care via interactive live webinars

Dr. Cindy Jones 1,2 Prof. Wendy Moyle 1,2 Assoc. Prof. Belinda Goodenough 3

1. Optimising Health Outcomes - Menzies Health Institute (Griffith University, Queensland)
2. School of Nursing & Midwifery (Griffith University, Queensland)
3. Dementia Training Australia (University of Wollongong, New South Wales)

Sexualities, older persons, and dementia is a challenging topic combination for workforce education. Aged care workers and health professionals need training to improve their knowledge and skills towards appropriate responses to the expression of sexuality by older people, including those with dementia. This sequential mixed-methods study evaluated the utility, quality and effectiveness of six, once a week 1.5 hour interactive live webinars focused on the expression of sexuality by people with dementia living in residential aged care facilities.

Average attendance rates of the 104 participants was 75.2%. Most participants were female (95.9%) with a mean age of 42.3 years and an undergraduate qualification (71.9%). Results demonstrated significant improvements in participants' knowledge ($p<.000$) and attitudes ($p<.000$) assessed following the webinars. Not only were the webinars positively received, but practice change was also reported from newly gained knowledge or skills. This study demonstrates the acceptability and effectiveness of interactive live webinars in workforce education for a topic considered ethically challenging for some dementia care philosophies. It is recommended that webinar formats be considered in the suite of education delivery options that may offer equity of access for rural and remote areas of Australia.

Presentation Abstracts

Dr. Scott Ayton

Email: scott.ayton@florey.edu.au **Presentation Type:** Oral **Theme:** Assessment and Diagnosis

Cerebral quantitative susceptibility mapping predicts β-amyloid-related cognitive decline

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The large variance in cognitive deterioration in subjects who test positive for ß-amyloid (Aß) by PET indicates that convergent pathologies, such as iron accumulation, might combine with Aß to accelerate Alzheimer's disease progression. Indeed, we recently found that elevated CSF ferritin (reporting brain-iron) predicted cognitive decline and risk of developing AD in a 7-year prospective study (Ayton et al JAMA Neurology, 2016; Ayton et al Nature Communications, 2015). Here, we applied Quantitative Susceptibility Mapping (QSM), a relatively new MRI method sensitive to tissue iron, to assess the relationship between iron, Aß load, and cognitive decline in subjects who underwent baseline QSM-MRI and Aß-PET from the Australian Imaging, Biomarkers and Lifestyle study (AIBL). Cognitive function data were collected every 18 months for up to 6-years from 100 volunteers classified as cognitively normal (n=64) or diagnosed with mild cognitive impairment (n=17) or Alzheimer's disease (n=19). Among participants with amyloid pathology (n=45), higher hippocampal QSM levels predicted accelerated deterioration in composite cognition tests for episodic memory (P= 9.2 x 10-7), executive function (P=0.004), and attention (P=0.012). Deteriorating performance in a composite of language tests was predicted by higher QSM levels in temporal lobe (P=0.036) and frontal lobe (P=0.006). These findings indicate that iron might combine with Aß to accelerate clinical progression and that QSM could be used in combination with Aß-PET to stratify individuals at risk of decline. Therefore, lowering brain iron with a drug such as deferiprone could slow disease progression, which we will test in a clinical trial beginning in 2017.

Dr Samantha Barton

Email: samantha.barton@ed.ac.uk **Presentation Type:** Oral **Theme:** Intervention and Treatment

Using patient iPS-derived oligodendrocytes harbouring a C9ORF72 mutation to identify disease causing mechanisms in ALS-FTD

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Hexanucleotide repeat expansions (HRE) in the C9ORF72 gene remain the most common genetic abnormality in frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS). Whilst neuronal loss is the hallmark pathology associated with ALS-FTD, accumulating evidence from experimental and pathological studies implicate a role for non-neuronal cells in disease causation. More specifically, MRI and DTI in patients with ALS-FTD has shown altered myelination suggesting a role for oligodendrocytes (the myelin producing cell) in disease progression. Whether this myelination impairment is a result of neuronal death or is intrinsic to the diseased oligodendrocyte remains unknown. Given the importance of oligodendrocytes to not only myelinate neurons but also to provide metabolic support, this remains an important gap in dementia research. Thus, the aim of this project was to determine the role of oligodendrocytes harbouring

a C9ORF72 mutation in ALS-FTD disease using patient-derived induced pluripotent stem cells (iPSC). We have three cell lines derived from patients carrying a C9ORF72 HRE as well as isogenic controls to these mutants (genetically identical to the mutant patient lines but with the C9ORF72 HRE removed via CRISPR-Cas9 genome editing), and also have two unrelated control lines. We have successfully generated oligodendrocytes from all eight lines. Thus, using these patient lines we are in the process of characterising the morphological and functional differences in C9ORF72 patient-derived oligodendrocytes compared to controls, with the aim of elucidating the role of a C9ORF72 mutation in oligodendrocytes in ALS-FTD pathology.

Dr Belinda Brown

Email: B.Brown@murdoch.edu.au **Presentation Type:** Oral **Theme:** Intervention and Treatment

Update on the Intense Physical Activity and Cognition (IPAC) Study

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Inconsistent results from previous studies of exercise and cognitive function suggest that rigorously designed randomised controlled trials are urgently needed. The Intense Physical Activity and Cognition (IPAC) study will assess the impact of a 6 month high-intensity exercise intervention on cognitive function and biomarkers of dementia risk, compared with a 6 month moderate-intensity exercise intervention and control group (no study-related exercise).

Cognitively healthy men and women aged between 60 and 80 years are randomised into either a high-intensity exercise, moderate-intensity exercise or control group. Individuals randomised to an exercise intervention undertake six months of cycle-based exercise twice a week, at 50 minutes per session. All participants undergo comprehensive neuropsychological testing, blood sampling, brain magnetic resonance imaging, and fitness testing at baseline, 6 months (post-intervention) and 18 months (12m post-intervention). In addition, at 3 months (mid-intervention), fitness is assessed.

To date, we have completed 70 baseline assessments (target: n = 105), and 5 post-intervention assessments. Our attrition rate is currently 5%, with personal reasons and illness unrelated to the intervention cited as the factors contributing to withdrawal. Preliminary analysis of our baseline and 3 month fitness data (n = 21) has revealed greater increases in VO2max (fitness) in the high-intensity group (23%), compared with the moderate-intensity group (13%; HI vs MI, Cohen's d = 0.4) and control group (3%; HI vs control; Cohen's d = 0.8); suggesting our intervention groups are achieving desired exercise intensities. We expect to complete baseline assessments by the end of October 2017 and post-intervention analyses and publication is anticipated by mid-2018. Long-term effects of the intervention (i.e. utilising 18 month data) will be evaluated and published by mid-2019.

Dr Emma Louise Burrows

Email: emma.burrows@florey.edu.au **Presentation Type:** Oral **Theme:** Intervention and Treatment

Progressive Behavioural Flexibility Impairments in the APP/PS1 mouse model of Alzheimer's disease as measured by translatable touchscreen technology

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Cognitive decline is a core feature of Alzheimer's disease (AD) and there is no cure or treatment. Genetic mouse models are major tools to investigate mechanisms underlying cognitive decline however, to date, assessment of cognition in mice has been unrelated to the clinic. Recently developed touchscreen technology facilitates the assessment of cognitive domains, directly relevant to impairments described in AD patients. We examined mice containing familial mutations in amyloid precursor protein (APP), and presenilin-1 (PS1) using a touchscreen task assessing behavioural flexibility, a component of executive function. Mice were initially trained to discriminate between two visual stimuli projected onto a touch-sensitive computer screen and associate one with a reward. To assess behavioural inflexibility, the rewarded stimulus was reversed. No differences in visual discrimination or in time to complete reversal learning were seen in 12-month old APP/PS1 animals. During reversal however, APP/PS1 mice required significantly more correction-learning trials, indicative of a subtle impairment in behavioural flexibility. Compared to WT littermates, 24-month old APP/

PS1 mice were impaired in both visual discrimination and reversal and required significantly more correction-trials to acquire the new reward-contingency. Given the nature of cognitive assessment, impaired vision may influence deficits in APP/PS1 mice. Clinical analysis of retinal health was assessed with functional (electroretinography) and structural (optical coherence tomography) assays at time-points coinciding with subtle and severe impairments. This is the first report of behavioural flexibility deficits in APP/PS1 mice and the approach of utilising clinical modes of assessment has great potential to facilitate translation from pre-clinical models to the clinic.

Dr Shantel Duffy

Email: shantel.duffy@sydney.edu.au **Presentation Type:** Oral **Theme:** Prevention

The longitudinal relationship between anterior cingulate glutathione and executive functioning in individuals at-risk for dementia: A magnetic resonance spectroscopy study

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Background: Oxidative stress is characterised by an in imbalance in the redox state of cells and has been implicated in pathogenesis of neurodegenerative disease. Our prior work has shown that glutathione (GSH), the brain's major antioxidant and a marker of oxidative stress, in the anterior cingulate cortex (ACC) is associated with executive functioning in individuals with Mild Cognitive Impairment (MCI). This study aimed to extend our prior work and examine the longitudinal relationship between ACC GSH and executive functioning in this cohort.

Methods: Twenty-eight older adults meeting criteria for MCI were recruited from the Healthy Brain Ageing Clinic, University of Sydney. All participants underwent comprehensive psychiatric, medical and neuropsychological assessment at baseline and after >2-years (mean=3.3 years). Magnetic resonance spectroscopy in the ACC was completed within 2-weeks of both assessment time-points. Absolute GSH concentration was calculated using the calibration curve derived from our previously published phantom data. Executive functioning was assessed via the Trail Making Test-Part B (TMT-B).

Results: Overall, greater baseline ACC GSH concentration was associated with a decline in TMT-B performance longitudinally (r=-0.41, p=0.029). Furthermore, change in GSH between assessments correlated with an improvement in executive functioning (r=0.39, p=0.045). These correlations remained significant when controlling for age and time between assessments.

Conclusion: This study demonstrates a significant relationship between ACC GSH and executive functioning longitudinally. Importantly, higher baseline GSH was associated with poorer executive functioning, however, an increase in ACC GSH over time was associated with improved performance longitudinally. These findings may suggest a compensatory up-regulation of GSH production in response to oxidative insult as a result of neurodegenerative pathology. Further research examining GSH in other brain regions and continued longitudinal tracking of participants and their clinical trajectory is now warranted.

Mr Shaun Frost

Email: shaun.frost@csiro.au **Presentation Type:** Oral **Theme:** Diagnosis/Assessment

Eye imaging for early detection of alzheimer's disease

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Objectives: We are testing multiple modalities of eye imaging for early detection and monitoring of Alzheimer's disease (AD). Retinal amyloid-beta plaques are imaged in-vivo using oral dosing with curcumin. The retinal microvasculature is also imaged to investigate the vascular component of AD, and the thickness of nerve cell layers in the retina is imaged using optical coherence tomography to evaluate inflammation and atrophy. Additionally, central cholinergic depletion in AD may extend to the anterior eye and present as altered pupil light response.

Methods: Retinal Amyloid-beta imaging involves two visits by volunteers for retinal imaging. Between appointments, volunteers take a proprietary Curcumin supplement. Curcumin binds to Amyloid-beta with high affinity and has fluorescence properties that enable Amyloid-beta plaques to be imaged in the retina using a scanning laser ophthalmoscope. The retinal vasculature is imagined using colour retinal photography and retinal inflammation/atrophy is evaluated using optical coherence tomography. Pupil flash response is measured using a pupilometer. Quantitative analysis of ocular data is performed using automated computer assisted techniques.

Results: Significantly more retinal Amyloid-beta was found in the AD group (n=22) compared to the healthy control (HC) group (n=137) (p=0.0054), and an index of retinal Amyloid-beta correlated with brain Amyloid-beta burden from positron emission tomography (PET) imaging (R=0.28, p=0.000065). Longitudinal follow-up imaging demonstrated an increase in retinal plaques over 3 months for PET-positive participants.

Constriction phase pupil response parameters were significantly reduced in AD compared to HC (maximum acceleration p < 0 05, maximum velocity p < 0 0005, average velocity p < 0 005, and constriction amplitude p < 0 00005). The PET-positive HC subgroup had reduced pupil response cross-sectionally, and also a greater decline longitudinally, compared to the PET-negative subgroup, suggesting changes to pupil response in preclinical AD.

Conclusions: The results suggest that ocular changes may occur in the preclinical phase of AD. Hence, eye testing has a potential as an adjunct for noninvasive, cost-effective screening for preclinical AD. Ocular testing is a potential initial screen for AD that could be delivered as part of regular eye checks. Micrometer-level imaging resolution could also allow accurate monitoring of individual retinal plaques within AD therapeutic trials.

Dr Julia Gilmartin-Thomas

Email: julia.gilmartin-thomas@monash.edu **Presentation Type:** Oral **Theme:** Care

Qualitative and quantitative impact of a virtual dementia experience on medical and pharmacy students' knowledge, attitudes and self-reported behaviour toward people with dementia

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Aim: Quantitatively and qualitatively evaluate the impact of a virtual dementia experience on medical and pharmacy students' knowledge, attitudes and self-reported behaviour toward people with dementia.

Methods: Medical (3rd year) and pharmacy (4th year) university students participated in a non-randomised controlled study (Sept-Oct'16). In addition to standard curriculum, the intervention arm experienced cognitive/perceptual difficulties of dementia via a 1.5 hour virtual simulation, along with facilitator-guided reflection and discussion. The control arm participated in standard curriculum only. All students were invited to complete the 20-item Dementia Attitudes Scale pre/post-intervention (O'Connor M et al. Int J Alzheimers Dis. 2010). The intervention arm were invited to participate in a focus group. Results: Paired pre/post questionnaire responses were received from 64 medical and 214 pharmacy students. The intervention arm (n=80) showed statistically significant improvements in knowledge, attitudes and self-reported behaviour toward people with dementia, compared to the control arm. Participants (n=49) from the 10 focus groups described the utility of the intervention for their future healthcare roles.

Conclusion: This study showed that a virtual dementia experience had a positive impact on medical and pharmacy students' knowledge, attitudes and self-reported behaviour toward people with dementia.

Dr Simon James

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Iron, Copper, and Zinc concentration in Aß plaques in the APP/PS1 mouse model of Alzheimer's disease correlates with metal levels in the surrounding neuropil

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The metal ions of iron, copper, and zinc have long been associated with the aggregation of ß-amyloid (Aß) plaques in Alzheimer's disease; an interaction that has been suggested to promote increased oxidative stress and neuronal dysfunction. Using X-ray fluorescence microscopy, we examined the metal load of plaques in the hippo-campus of APP/PS1 mice to assess how the anatomical location of Aß plaques was influenced by the metal content of surrounding tissue. Immunohistochemical staining of Aß plaques colocalized with areas of increased X-ray scattering power in unstained tissue sections, allowing direct X-ray based-assessment of plaque metal levels in sections subjected to minimal chemical fixation. We identified and mapped 48 individual plaques in four subregions of the hippocampus from four biological replicates. Iron, Cu, and Zn areal concentrations (ng cm-2) were increased in plaques compared to the surrounding neuropil. However, this elevation in metal load reflected the local metal makeup of the surrounding neuropil, where different brain regions are enriched for different metal ions. After correcting for tissue density, only Zn levels remained elevated in plaques. This study suggests that the in vivo binding of Zn to plaques is not simply due to increased protein deposition.

Dr Fiona Kumfor

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Why do patients with frontotemporal dementia misinterpret social cues? The importance of context

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The importance of assessing social cognition to characterise dementia syndromes is increasingly recognised. Emotion recognition is impaired in both behavioural-variant frontotemporal dementia (bvFTD) and semantic dementia (SD), yet how these impairments manifest in day-to-day life differs. Importantly, most studies have investigated emotion recognition of isolated, context-free faces. Here, we aimed to determine how contextual information (i.e., body language) influences emotion recognition. Thirty-one frontotemporal dementia patients (19 bvFTD; 12 SD) and 20 healthy age- and education-matched controls were assessed on three tasks which varied contextual cues: (i) Face alone; (ii) Context alone; (iii) Face embedded in context. Neuroimaging analyses were employed to examine neural correlates of task performance. Our results demonstrated that both bvFTD and SD performed worse than controls in recognising emotions from Face alone and Context alone, but performance differed when faces were presented in context. While both bvFTD and SD performed similarly to controls on congruent items, bvFTD performed worse than both controls ($p < .001$) and SD ($p = .049$) for incongruent items. Neuroimaging analyses revealed that abnormal contextual influence was associated with lower integrity of the right parahippocampal gyrus/amygdala and left precentral gyrus. Together, these results indicate that bvFTD patients are over-reliant on external contextual information, whereas in SD contextual influence is mediated in part, by the facial expression. The profile in bvFTD is reminiscent of the "environmental dependency syndrome" described in frontal lesion patients. Clinically, these results offer new potential for therapeutic intervention of social impairments in dementia.

Dr Yen Ying Lim

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BDNF Val66Met increases rate of memory decline, hippocampal volume loss and tau accumulation in autosomal dominant Alzheimer's disease

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Background: The brain-derived neurotrophic factor (BDNF) Val66Met polymorphism (rs6265) is implicated in synaptic excitation and neuronal integrity. In autosomal dominant Alzheimer's disease (ADAD), mutation carriers (MC) who also carry the Met66 allele show worse memory and higher levels of cerebrospinal fluid (CSF) tau, but equivalent amyloid levels compared to MC Val66 homozygotes at baseline. The aim of this study was to determine the extent to which the BDNF Val66Met polymorphism affects changes in memory, brain volume, tau and Aß in ADAD prospectively.

Methods: Prospective neuropsychological, biomarker and neuroimaging data collected from the Dominantly Inherited Alzheimer Network (DIAN) over ~2 years were analyzed in 81 preclinical mutation carriers (MC), all with a clinical dementia rating (CDR) score of 0 and estimated to be 11 years prior to clinical symptom onset, and 78 matched mutation non-carriers (NC). BDNF genotype was obtained for MCs (58 Val66 homozygotes, 23 Met66 carriers).

Findings: Compared to MC Val66 homozygotes, MC Met66 carriers showed greater decline in episodic memory ($p<.001$), loss of hippocampal volume ($p=.005$), and increase of CSF tau ($p<.001$). Cortical Aß accumulation was equivalent between MC Val66 homozygotes and MC Met66 carriers ($p=.427$). Compared to NCs, MC Val66 homozygotes showed greater increase in cortical Aß accumulation ($p<.001$) but equivalent rates of change in episodic memory decline ($p=.700$), loss of hippocampal volume ($p=.215$), and accumulation of CSF tau ($p=.266$).

Interpretation: ADAD is associated with pathologically increased rates of Aß and tau accumulation, loss of hippocampal volume and decline in episodic memory. The results of the current study show that for MCs who also carry the BDNF Met66 allele, decline in episodic memory, loss of hippocampal volume and increase in CSF tau is substantially greater than for MCs who are Val66 homozygotes, despite equivalent rates of Aß accumulation. This is consistent with findings in preclinical sporadic AD, where amyloid positive Met66 carriers also show faster deterioration in episodic memory and hippocampal volume, but not Aß accumulation, when compared to Aß+ Val66 homozygotes. Together, these data suggest that the BDNF Val66Met polymorphism modifies the contributions to the neurodegenerative process in ADAD.

Dr Erin McAllum

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Metalloproteomic changes in Dementia with Lewy bodies

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Biologically-relevant metals have been implicated in neurodegeneration, stretching back nearly 100 years to when iron was first identified to be abnormally distributed in the Parkinson's disease brain. Metals have subsequently been associated with multiple neurodegenerative diseases, yet most studies have focussed primarily on measuring changes in metal levels and not the relationship between metals and the biochemical factors that determine their neurological function. Thus, understanding the relationship between metals and their protein ligands is essential to elucidate how metal imbalances participate in neuropathology. Chromatographic separation of proteins prior to metal analysis, offers a relatively simple and effective means of assessing metal-protein binding of soluble proteins, allowing identification of discrete changes that may be masked by measurement of total metal levels. We combined chromatography and element-specific detection to profile soluble metalloproteins in dementia with Lewy bodies, the second most common form of dementia. In the disease-affected entorhinal cortex and anterior cingulate cortex, metal levels were not universally altered in dementia with Lewy bodies compared with controls; rather, changes were associated with specific copper-binding metalloproteins. No changes were observed in unaffected brain regions. Identification of these metalloproteins will allow investigation of how their altered binding of metals may contribute to disease, potentially leading to targeted therapies correcting aberrant metalloprotein function.

Dr Loren Mowszowski

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Detecting subtle functional decline in prodromal dementia

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There is increasing recognition of mild functional decline even in those 'at risk' of dementia; however this is infrequently assessed and difficult to capture with gross measures. As such, we aimed to examine the utility of a brief, clinically-relevant self-report tool for functional change. In this study, 229 older adults completed the Healthy Brain Ageing Functional Assessment Questionnaire (HBA-FAQ) in addition to comprehensive neuropsychological, medical and mood assessments. On clinical consensus, participants were categorized as healthy, subjective memory complaints (SMC), Mild Cognitive Impairment (MCI), or dementia. Using one-way ANOVA with planned contrasts, we compared the utility of the HBA-FAQ to that of the clinician-rated Instrumental Activities of Daily Living (IADL) scale (n=138), a widely used measure of gross functional decline for older adults. A subset (n=37) also completed longitudinal cognitive assessment. The HBA-FAQ differentiated between healthy and all clinical groups ($t(28.31)=9.46$, $p<0.05$), as well as between those with SMC/MCI and dementia ($t(38.45)=-2.04$, $p<0.05$); but there were no differences between SMC and MCI groups ($t(100.78)=0.54$, $p>0.05$). By contrast, the clinician-rated IADL scale only differentiated between healthy and clinical groups ($t(15.96)=-2.13$, $p<0.05$) and could not detect early functional change in prodromal groups ($t(15.24)=1.70$, $p>0.05$). At longitudinal follow-up, the baseline HBA-FAQ total score was predictive of poorer memory ($r=-0.364$, $p<0.05$). Compared to a widely used clinician-rated IADL scale for older adults, the self-report HBA-FAQ is better able to detect subtle functional change even in those with SMC and MCI, and importantly is predictive of long-term cognitive performance. This suggests promising clinical utility for this instrument, which now requires further psychometric evaluation.

Dr Kathryn Munro

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Effects of BACE inhibition on synaptic connectivity

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Overview: Inhibition of BACE1 (ß-secretase) is a promising treatment for Alzheimer's disease which aims to decrease production of the amyloid-ß peptide. BACE inhibitors also affect the functions of multiple proteins which are not associated with Alzheimer's disease pathology including the Seizure-related gene 6 (Sez6) family of proteins, Sez6, Sez6-like (Sez6L) and Sez6-like 2. Sez6 is required for the normal development of dendrites and excitatory synapses. In this study, we are assessing whether long-term BACE inhibition compromises synapse function in mice, focusing on the altered activity of Sez6 family proteins. RESULTS: Sez6, in addition to its involvement in neurodevelopment, plays an ongoing role in excitatory synapse function in the adult mouse brain. Sez6L, which was recently validated as a BACE1 substrate in vivo, is localised widely within the cortex and hippocampus. Preliminary analysis of Sez6L KO mice indicates deficits in motor function. Mice lacking all Sez6 family members (TKO mice) do not perform as well as wild-type (WT) mice in context fear conditioning and the Morris Water Maze, have significant deficits in motor function, and have fewer mature spine types in the cortex. CONCLUSION: Sez6 family proteins are BACE1 substrates that play an important role in synapse formation, maintenance and behaviour. We are currently investigating the effect of chronic BACE inhibition in TKO and WT mice.

Dr Kylie Radford

Email: k.radford@neura.edu.au **Presentation Type:** Oral **Theme:** Prevention

Life course social and biomedical factors associated with dementia in Aboriginal Australians

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Background: The number and proportion of older Aboriginal and Torres Strait Islander peoples is increasing rapidly. Recent studies have shown dementia prevalence is three times higher across remote, regional and urban Aboriginal communities; dementia incidence is also high and onset occurs at an earlier age.

Methods: We examined potential risk factors for high dementia rates in a cross-sectional study of the total population aged 60 years and older from five NSW regional and urban Aboriginal communities (n=336). Both proximal (standard biomedical factors and mid-life social factors) and early life factors, including childhood trauma and education, were measured.

Results: As expected, a number of standard biomedical risk factors (e.g. head trauma, stroke) were associated with late-life dementia in Aboriginal Australians aged 60 to 92 years; childhood trauma was independently associated with all-cause dementia and Alzheimer's dementia, as well as being partially mediated by an association with proximal biomedical factors. Opportunity for skilled employment (linked to education) was also significantly associated with dementia in multivariate models.

Conclusions: A life course approach to understanding dementia risk and prevention in Aboriginal Australians is critical and greater focus on the social determinants of health likely needed to reduce the rates of premature cognitive decline.

Dr Sarah Rea

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An ALS-FTLD associated mutation of SQSTM1/p62 attenuates oxidative stress signalling and autophagy

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Background: In recent years, the genes implicated in ALS-FTLD pathogenesis have expanded to include SQSTM1, which encodes the autophagy receptor and signalling scaffold protein SQSTM1/p62. Knowledge of the different mechanisms underlying pathogenesis in these familial cases is incomplete. A missense mutation affecting the LC3 interacting region (LIR) of SQSTM1/p62 (p.L341V) impacts on incorporation of the protein into acidic autophagic vesicles. Further, two mutations affecting the Keap1 interacting region (KIR, residues 347-352) of SQSTM1/p62 (p.P348L and p.G351A) impede activation of the oxidative stress transcription factor Nrf2, due to reduced ability to bind to the Nrf2 regulatory protein Keap1.

Objectives: Our objective was to define the molecular basis of the pathogenic effects of an ALS-associated missense mutation (p.R110C) affecting the N-terminal PB1 domain of SQSTM1/p62, as mutations affecting this region of the protein have not yet been investigated.

Methods: For Luciferase reporter assays, NSC34 cells were transiently transfected with expression vectors for wild type or p.R110C FLAG-tagged SQSTM1/p62 (or p.P348L control) along with a luciferase reporter for the NQO1, Nrf2 responsive gene and a renilla reporter. Cells were treated with Luperox 24h post transfection, or left untreated and dual luciferase readings obtained. For co-immunoprecipitations, NSC34s were transfected with FLAG-tagged expression constructs. 48h post-transfection cells were lysed in RIPA buffer and FLAG-SQSTM1/p62 immunopurified with anti-FLAG. After washing co-bound endogenous Keap1 was detected by western blot. The effect of mutation status on Ser403 phosphorylation was determined by western blot.

Results: Although located outside of the KIR, the p.R110C-SQSTM1/p62 mutation was associated with decreased activation of Nrf2, compared to wild type protein. In these assays p.R110C and p.P348L expression activated Nrf2 ~2-fold compared with control cells, whereas wild type activated Nrf2 3-fold. These results were observed in cells treated with Luperox, and untreated cells. In the case of both variants reduced Nrf2 activation correlated with reduced Keap1

binding in immunoprecipitation experiments. We also observe that p.R110C mutant also exhibited reduced TBK1-mediated phosphorylation of SQSTM1/p62 at Ser403, a modification that is important for SQSTM1/p62 mediated autophagy.

Discussion and Conclusions; The p.R110C variant lies outside of the region (KIR) required for Keap1 interaction, instead affecting the PB1 domain which mediates SQSTM1/p62 oligomerisation. We also find that p.R110C led to a reduction in phosphorylation of Ser403. Thus, we hypothesise that this variant may result in subtle changes to signalling complex formation, with downstream detrimental effects on the oxidative stress response and potentially autophagy.

Dr Edwin Tan

Email: edwin.tan@monash.edu **Presentation Type:** Oral **Theme:** Intervention and Treatment

Acetylcholinesterase inhibitors and risk of stroke and death in people with dementia

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Background/Objective: Cardiovascular disease is a major cause of death worldwide, including in people with dementia. Previously, we found an association between acetylcholinesterase inhibitor (AChEI) use and reduced risk of myocardial infarction and death (Nordström et al 2013). In the present study, we investigate whether a similar association exists between AChEI use and risk of ischaemic stroke and death in people with dementia.

Methods: This was a cohort study based on 44288 people diagnosed with dementia who were registered in the Swedish Dementia Registry (SveDem) from 2007 – 2014. Data on AChEI use was linked to diagnosed ischaemic strokes and death using national registers. Propensity-score matched competing risk regression models were used to compute hazard ratios (HRs) and 95% confidence intervals (CIs) for the association between time-dependent AChEI use and risk of stroke and death.

Results: During a mean follow-up period of 941 (range 1 – 3470) days, 2084 people had a stroke and 11276 died. In comparison with matched controls, people who used AChEIs had a lower risk of stroke (HR: 0.87, 95%-CI: 0.77 – 0.98) and all-cause death (HR: 0.77, 95%-CI: 0.73 – 0.81). After considering death as a competing risk, high doses of AChEI remained significantly associated with reduced stroke risk (Subdistribution HR: 0.78, 95%-CI: 0.66 – 0.93). Subgroup analyses in those with Alzheimer's Disease produced similar findings.

Conclusions: The use of AChEIs in people with dementia may be associated with reduced risk of ischaemic stroke and death. These results call for a closer examination of the cardiovascular effects of AChEIs.

Dr Nawaf Yassi

Email: nawaf.yassi@mh.org.au **Presentation Type:** Oral **Theme:** Assessment and Diagnosis

Cortical Cerebral Microinfarcts on 3T MRI in Alzheimer's Disease

Nawaf Yassi, Saima Hilal, Yen Ying Lim, Simon Salinas, Hugo Kuijf, Ying Xia, Christopher Chen, Olivier Salvado, Christopher Rowe, Patricia Desmond and Colin Masters

Royal Melbourne Hospital

The prevalence of cortical cerebral microinfarcts (CMI) on neuropathological studies of Alzheimer's disease (AD) is reported at approximately 40%, and they are associated with cognitive impairment. Recent studies have validated the detection of CMI in vivo using both 7T and 3T MRI. We aimed to investigate the prevalence of CMI in patients with AD, mild cognitive impairment (MCI) and healthy controls (HC) from the Australian Imaging, Biomarkers and Lifestyle Study of Ageing (AIBL), and to examine their association with vascular risk factors.

Poster Abstracts

Dr Alaa Abdul-Ridha

Poster: No. 1

Email: alaa.abdul@florey.edu **Theme:** Intervention and Treatment

Targeting GPCRs for the treatment of Alzheimer's Diseases

Alaa Abdul-Ridha and Daniel James Scott

Florey Institute of Neuroscience and Mental Health

Alzheimer's disease (AD) is a devastating, multifactorial neurodegenerative disease clinically featured by cognitive impairment and progressive memory loss. The AD brain is characterised by accumulation amyloid-beta (Aß) plaques and neurofibrillary tangles (NFTs) of tau proteins. Current AD treatments are inadequate and do not prevent or slow down the progression of the disease and fundamentally new treatment approaches are required. Much of the research has focussed on amyloid and tau proteins which have not been very successful to date. The current project aims to develop novel drug candidates for the treatment and prevention of AD and other neurodegenerative disorders by targeting G protein-coupled receptors (GPCRs). GPCRs comprise the largest family of cell-surface receptors and play critical roles in brain neurotransmitter systems that are disrupted in AD. GPCRs also affect the major hallmarks of AD pathology, regulating the formation Aß plaques and NFTs. Currently, there are no approved GPCR targeting drugs for AD and other dementia causing conditions. Amongst the numerous GPCRs implicated in AD, the α1A- and α1B-adrenoceptors are emerging as important therapeutic targets. While these receptors are targeted clinically by non-selective α1-AR blockers in cardiovascular disease, their role in the cardiovascular and central nervous systems remains poorly understood due to the lack of subtype selective ligands. We have identified several subtype selective compounds from a trail fragment screen which are currently being characterised and have a therapeutic potential for AD.

Dr Sophie Andrews

Poster: No. 2

Email: sophie.andrews@monash.edu **Theme:** Prevention

High-intensity interval exercise enhances neuroplasticity in people gene-positive for Huntington's disease and healthy adults

Sophie C. Andrews, James P. Coxon, Dylan Curtin & Julie C. Stout

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Background: Similar to findings in other neurodegenerative diseases, there is evidence that exercise may delay symptom onset in Huntington's disease (HD). Research using HD mouse-models indicates that this benefit may be via exercise-induced changes to neuroplasticity, however, this has not yet been examined in people gene-positive for HD. One way to measure changes to neuroplasticity in humans is via changes to cortical inhibition and facilitation using Transcranial Magnetic Stimulation (TMS). The aims of the current study were to determine 1) whether a single session of exercise increases neuroplasticity responses to theta-burst stimulation in people gene-positive for HD using TMS, and 2) the optimal exercise intensity (high- versus moderate-intensity) required.

Methods: To date 19 healthy adults and 8 HD gene-positive individuals have completed the study. Participants attended three sessions, at each they undertook 20 mins of either high-intensity interval cycling, moderate steady-state cycling, or rest. TMS was applied to the motor cortex pre and post exercise, and post theta-burst stimulation, to measure changes to short-interval cortical inhibition (SICI) and intracortical facilitation (ICF), as markers of neuroplasticity.

Results: In the healthy control group, two-way repeated-measures ANOVAs revealed a significant main effect of exercise intensity for both SICI and ICF, and an exercise*time interaction for ICF, where a larger neuroplasticity response was seen following high-intensity exercise compared to rest, and moderate-intensity exercise showed an intermediate effect. A similar trend was seen in the HD group, but this was not significant, likely due to the small sample size.

Conclusions: These findings indicate that high-intensity interval exercise, and to a lesser extent moderate-intensity exercise, enhances neuroplasticity in healthy adults. This same effect is likely to also be seen in people gene-positive for HD. If confirmed with a larger sample of HD participants, high-intensity interval exercise could be an effective intervention to enhance neuroplasticity and slow disease progression in HD.

Dr Victor Anggono

Poster: No. 3

Email: v.anggono@uq.edu.au **Theme:** Intervention and Treatment

Glua1 ubiquitination mediates amyloid-beta-induced loss of surface ampa receptors

Anggono V

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AMPA-type glutamate receptors (AMPARs) mediate fast excitatory neurotransmission in the mammalian central nervous system. Excessive levels of amyloid-beta (Aß) levels disrupt excitatory synaptic transmission by promoting the removal of synaptic AMPARs, dendritic spine loss and synaptic depression. Earlier work from our laboratory has shown that the ubiquitination of GluA1 subunit regulates the intracellular sorting of AMPARs toward late endosomes for degradation. Here, I will present data demonstrating that the same ubiquitin signalling pathway mediates Aß-induced loss of surface AMPARs. We found that acute exposure of neurons to soluble Aß oligomers induces AMPAR ubiquitination concomitant with the removal of AMPARs from the plasma membrane. Importantly, expression of ubiquitin-deficient GluA1 mutants fully rescues the adverse effects of Aß on AMPAR surface expression. Furthermore, we identified a cross-talk between GluA1 phosphorylation and ubiquitination in this process, particularly on the phosphorylation of Ser-845 on the GluA1 subunit, which is crucial for AMPAR recycling and is known to be dephosphorylated in the presence of Aß. Our data showed that the GluA1 ubiquitin-deficient mutant enhances GluA1 phosphorylation on Ser-845 and conversely, the GluA1 S845D phospho-mimetic mutant reduces the binding with Nedd4-1, and hence the ubiquitination of AMPARs. Importantly, the GluA1 S845D mutant also prevents Aß-induced removal of surface AMPARs. Altogether, these findings demonstrate the importance of dynamic cross-modulation of GluA1 ubiquitination and phosphorylation, a process that is perturbed by Aß, in regulating membrane sorting decisions that determine the number of AMPARs on the cell surface.

Dr Amee Baird

Poster: No. 4

Email: amee.baird@mq.edu.au **Theme:** Living with Dementia

A comparison of autobiographical memory cues in people with different types dementia

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Background and Aim: Previous research documenting the preservation of 'music evoked autobiographical memories' (MEAMs) in people with dementia (PWD) has been limited to Alzheimer's Dementia (AD). Furthermore, there has been no comparison of music with other stimuli, precluding any examination of whether music is a more effective cue for autobiographical memories. We explored MEAMs compared with photo (PEAMS) and object (OEAMs) evoked autobiographical memories in people with various types of dementia.

Methods: 12 PWD, including 9 AD, 1 vascular dementia, 1 vascular/AD, 1 probable behavioural variant frontotemporal dementia (bv-FTD), 2 with mild cognitive impairment (MCI), and 8 aged matched healthy controls reported memories following exposure to 16 songs (number one in Australian music charts) and 16 photos (of famous events), 2 from each decade 1930 - 2010. A subset of 5 PWD also reported memories in response to 16 objects (iconic household objects).

Results: MEAMs were more frequent than PEAMs in the majority of PWD and MCI (9/14; 32.6% versus 22.3%). There was no difference between PWD and healthy controls in the mean frequency of MEAMs ($p > .05$). There was no significant relationship between severity of dementia (mini Addenbrooke's Cognitive Examination score) and frequency of memories evoked by music, photos or objects ($p > .05$). In the 5 PWD who completed the OEAM task, the majority (4/5, including the person with bv-FTD) showed more OEAMS than MEAMS or PEAMs (mean frequency 54% OEAMS versus 34% MEAMs and 19% PEAMs), and the mean frequency of MEAMs and OEAMs was in keeping with healthy controls. The person with bv-FTD had no MEAMs and relatively fewer PEAMs, but his OEAMs were in keeping with other PWD and healthy controls.

Conclusions: This is the first study to compare autobiographical memories evoked by music with other stimuli, specifically photos and objects, in people with different types of dementia. Our findings indicate that preservation of music, photo and object evoked memories is not related to the severity of dementia, but may be dependent on the type of dementia. Further, preliminary results suggest that objects may be more efficient than music or photos at evoking autobiographical memories in PWD.

Dr Julie Bajic Smith

Poster: No. 5

Email: jbajicsmith@hammond.com.au **Theme:** Living with Dementia

Understanding the factors influencing health professionals' use of supported decision-making in the context of Dementia care

Dr. Julie Bajic-Smith, Dr. Craig Sinclair,

Hammond Care, University of Western Australia, CDPC

Do we all make the best decisions for our current circumstance, physical and emotional wellbeing and the future? Human rights-based approaches have led to growing recognition of respecting a person's will and preference, and supporting decision-making capacity. Emerging research recognizes that even 'autonomous' decision-making is influenced by the person's environment and social relationships. Individuals with dementia, however, face unique challenges, with changes in their environments, social networks and decision-making capacities. The changes can be sudden or slow, making it more difficult to determine when and what type of decision-making capacity is impaired.

Our study examines the experiences of health and legal professionals in facilitating decision-making among people with dementia, and the factors relating to use of supported decision-making in the context of dementia care. Practitioners in medical, allied health, nursing, legal and aged care were selected based on their roles and experience in supporting individuals with dementia in community and residential settings. Semi-structured interviews using an Interpretative Phenomenological Analysis (IPA) approach focus on detailed cases, and explore factors influencing the use of supported decision-making.

The cases described by health professionals have illustrated broad support for the importance of supporting the decision-making of people living with dementia, along with a range of complexities in practice. These findings will contribute to broader recommendations relating to the use of supported decision-making among people with dementia. The interviews will also assist in the development of a factorial survey method to investigate healthcare professionals' attitudes to, and self-reported use of, supported decision-making approaches, in vignette scenarios.

Miss Jenalle Baker

Poster: No. 6

Email: jenalle.baker@florey.edu.au **Theme:** Assessment and Diagnosis

Learning in preclinical Alzheimer's disease: Repeated administration of the International Shopping List Test

Florey Institute of Neuroscience and Mental Health

Objective: Recent meta-analyses suggest episodic memory impairment associated with preclinical Alzheimer's disease (AD) equates to performance on neuropsychological measures approximately 0.15-0.24 standard deviations below that of cognitively healthy older adults. This estimate, however, obscures important information regarding the nature of the dysfunction in episodic memory in this early phase of the disease. The study aimed to investigate the nature and extent of impairment in verbal learning and memory that could be detected at a single assessment if consideration to acquisition of information as well as recall, was given. The second aim was to understand how verbal learning and memory deteriorates in preclinical AD.

Method: Participants were recruited from the Australian Imaging, Biomarkers, and Lifestyle, Rate of Change sub-study (AIBL-ROCS). Three groups were included: amyloid-negative healthy older adults (controls; n = 50); amyloid-positive healthy older adults (preclinical AD; n = 25); and amyloid-positive individuals diagnosed with Mild Cognitive Impairment (MCI; n = 22). A verbal list learning task, the International Shopping List Test (ISLT), was administered multiple times over an 18-month period, in addition to the standard AIBL neuropsychological battery.

Results: At baseline, there was no significant difference between the preclinical AD and control groups in rate of acquisition of words, or total and delayed recall. The preclinical AD group showed a significantly greater change over the 18 months on the total score of the ISLT, compared to the control group, with the magnitude of this difference moderate (Cohen's d = -0.55[-1.04, -0.07]. The control group significantly improved their performance over time. The preclinical AD group did not.

Conclusions: While no significant dysfunction in rate of acquisition associated with preclinical AD was seen at baseline, individuals with pathology suggestive of preclinical AD do show a significant separation of performance compared to those without pathology, over an 18-month period on the ISLT. Interestingly, this may stem from a lack of learning, or practice effects, over time.

Miss Jenalle Baker

Poster: No. 7

Email: jenalle.baker@florey.edu.au **Theme:** Assessment and Diagnosis

The ORCA experiment: Using online repeated cognitive assessment to identify amyloid-related learning impairments in preclinical Alzheimer's disease

Florey Institute of Neuroscience and Mental Health

Objective: Elevated levels of beta-amyloid (Aß+) in otherwise cognitively healthy older adults increases risk for cognitive decline and progression to a clinical diagnosis of Mild Cognitive Impairment or Alzheimer's disease (AD), and is therefore considered to be a preclinical phase of AD. Longitudinal studies consistently report that Aß+ is associated with decline in episodic memory in the preclinical stages of AD, while Aß-related memory impairment has been less consistently found. Assessment over several days may increase the likelihood of detecting learning and memory dysfunction in individuals with preclinical AD compared to those without, effectively replicating longitudinal findings over a much shorter period.

Method: The current study developed the Online Repeated Cognitive Assessment (ORCA) to elicit learning of Mandarin character-English word associations over a series of days, using an implicit learning paradigm. Healthy participants aged 18-40 were recruited for the pilot phase to complete ORCA under either a three-trial single-day (n = 10), five-trial five-day (n = 13), or ten-trial five-day (n = 10) condition.

Results: Participants learnt the correct associations in all three conditions. Average accuracy after three sessions reached 62%, whereas learning was more reliably seen when completed over five consecutive days (approximately 80% accuracy).

Conclusions: ORCA is now ready to be used in the preclinical population, where it is expected that compared to cognitively healthy older adults, those with preclinical AD will have slower learning rates and reduced accuracy by day five. This would greatly decrease the time and cost of identifying at risk individuals.

Ms Megan Barker

Poster: No. 8

Email: megan.barker@uqconnect.edu.au **Theme:** Assessment and Diagnosis

Spontaneous speech patterns in progressive supranuclear palsy

Megan S. Barker & Gail A. Robinson

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Reductions in spontaneous speech output have been documented in patients with the neurodegenerative condition of progressive supranuclear palsy (PSP). Severely reduced spontaneous speech is the hallmark of dynamic aphasia, a language disorder that has been documented in the context of PSP. Recently, an impairment in the "executive" attentional process of energization accounted for the paucity of spontaneous speech in a patient with PSP and dynamic aphasia. Energization is the process of initiating and sustaining a response over time, in the absence of an external cue. This study aimed to investigate spontaneous speech patterns in patients with PSP without dynamic aphasia, and the role of energization. Patients with PSP (n = 6) and healthy older adults (n = 29) were assessed on cognitive baseline tests of attention, language and executive function, alongside narrative tasks for spontaneous speech and an experimental energization task. PSP patients were reduced on some cognitive baselines (e.g., executive function and attention), which is consistent with known deficits in PSP. The spontaneous speech output of the subjects with PSP showed a clear pattern whereby speech rate decreased significantly after the initial time period, indicative of an energization deficit. On the experimental energization task, the PSP patients showed a similar pattern such that responding slowed significantly after the initial time period, but then continued to fluctuate. Overall, executive attentional mechanisms like energization appear to play a key role in spontaneous speech production. Understanding how these underlying processes operate in healthy and pathological ageing, such as in PSP, has theoretical and clinical implications.

Ms Catherine Bateman

Poster: No. 9

Email: catherine.bateman@health.nsw.gov.au **Theme**: Care

Three way benefits: Dementia and Delirium Care with Volunteers Program

Catherine Bateman 1,2 Katrina Anderson 1,2,3 Annaliese Blair 1,2,3,

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2. NHMRC Cognitive Decline Partnership Centre
3. Australian National University

In 2009 a dementia and delirium care hospital volunteer program was established and piloted at a rural New South Wales (NSW) hospital in partnership with Alzheimer's NSW. The program aimed to address the emotional vulnerability, risks and adverse events experienced by patients with cognitive impairment. Volunteers provided person centred emotional support and practical assistance with eating and drinking. The outcomes demonstrated high acceptance by staff and volunteers with perceptions of improved care, safety and nutrition.

In 2015 grant funding was secured to implement and further evaluate the outcomes of the program in another seven rural acute facilities. This mixed method, non-randomised, controlled intervention study measured patient (n=290), family carers (n=85), staff and volunteer outcomes. A medical record audit compared patient outcomes and adverse events and interviews were conducted with family carers. Preliminary patient outcomes show a reduction in behavioural incidents (p=.010), reduced readmission rates (p=.038) and reduction in the use of one to one specials (p=.000). Of the families interviewed 92% of rated the program as helping "a lot" and 98% of staff agree that the program is supportive in their care of patients. Families indicated a sense of relief that someone was able to sit with the patient and in particular assist with their eating and drinking. 'For me, knowing someone was there … I can't even tell you what a benefit that was'.

Associate Professor Sally Bennett

Poster: No. 10

Email: sally.bennett@uq.edu.au **Theme**: Care

Translating research into practice: Occupational therapy for people with dementia and their carers.

S Bennett 1, L Clemson 2, K Laver 3, Liddle J 1

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Background: An ever-increasing number of randomised controlled trials have demonstrated the benefits of occupational therapy for people with dementia and their carers. In addition, the recent Clinical Practice Guidelines and Principles of Care for People with Dementia specifically highlighted occupational therapy interventions and related interventions such as training carers in the use of pleasant and meaningful activities, amongst the priorities for research translation. However to enable research translation it is first necessary to understand the nature of the gap between current occupational therapy practice and the evidence. We therefore sought to understand Australian occupational therapists' current practice with people with dementia and their carers, and to compare it with existing research evidence and guideline recommendations.

Methods: A cross-sectional online survey was undertaken with Australian occupational therapists who work with people with dementia and their carers within any practice setting. The questionnaire asked about current practice patterns, knowledge and confidence for supporting people with behavioural and psychological symptoms of dementia and their carers, awareness and enactment of existing evidence and guideline recommendations, and barriers and enablers to research translation.

Results: Results of this survey will be presented and compared with existing evidence. A program of research that has been funded by the NHMRC Boosting Dementia Research Grants Scheme to address critical research-practice gaps will also be described.

Dr. Prashant Bharadwaj

Poster: No. 11

Email: p.bharadwaj@ecu.edu.au **Theme:** Intervention and Treatment

IU1, a selective inhibitor of deubiquitinating enzyme USP14 inhibits Aß toxicity in neuronal cells

Bharadwaj P 1,2, Hone E 1, Martins R 1, 3, 4

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3. School of Biomedical Science, Macquarie University, Sydney NSW, Australia
4. School of Psychiatry and Clinical Neurosciences, The University of Western Australia, Nedlands WA, Australia

Autophagy is a vital intracellular catabolic pathway for misfolded proteins and an attractive therapeutic target for neurodegenerative diseases including Alzheimer's disease (AD). We have previously shown that enhancing autophagy reduced Aß accumulation and toxicity in cells and improved cognition in an AD mouse model. A wide range of small molecules targeting multiple cell functions have now been developed to modulate autophagy. Assessing the neuroprotective effects of modulators against Aß toxicity would further our understanding of their protective mechanisms and aid development of novel treatments for AD. Therefore, the main aim of this project is to identify potent autophagy modulators that protect against Aß induced neuronal cell death.

In this study, we used the MC65 cell line to model Aß accumulation and toxicity. MC65 is a well-established human CNS derived cell line that generates Aß by γ-secretase cleavage from a stably transfected C99 fragment of the amyloid precursor protein (APP). Using this cell line as a platform, we screened an autophagy compound library containing 156 small molecules for inhibition of Aß toxicity. We observed inhibition of Aß induced cell death by the ion channel blockers carbamazepine, omeprazole and IU1, a selective inhibitor of deubiquitinating enzyme USP14. Overall, IU1 was identified as the most potent compound showing a marked 40% increase in cell survival in MC65 cells producing Aß. Recent studies show that IU1 regulates autophagy and degradation of prion aggregates in cells. This suggest that its protective effect in MC65 cells is possibly through the upregulation of Aß protein clearance. Our findings demonstrate a novel role for IU1 in reducing Aß induced toxicity. Further investigation of its protective effects will be essential in determining its therapeutic potential in AD.

Dr. Prashant Bharadwaj

Poster: No. 12

Email: p.bharadwaj@ecu.edu.au **Theme:** Intervention and Treatment

AMPK activator PRKAG2 is elevated in AD and is associated with increased autophagy and Aß accumulation in the brain

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Previous studies of AD brain shows a marked up-regulation of lysosomal activity, including extensive involvement of various acid hydrolases such as cathepsins B and D with Aß protein deposits. In addition, The AD brain also shows abnormal activation of nutrient sensing kinase AMP-activated protein kinase (AMPK), which is an important regulator of autophagy. AMPK is a heterotrimeric protein complex composed of a 3 subunits including a noncatalytic regulatory gamma subunit PRKAG2. Recent findings show that PRKAG2 has an important role in regulating stress induced autophagy by AMPK and polymorphisms in PRKAG2 are associated with cognitive impairment and metabolic dysfunction in old age. The main aim of this study was to determine the expression levels of PRKAG2 and whether it correlates with increased autophagy and Aß levels in the AD brain.

Gene and protein expression analysis of PRKAG2 was conducted in post-mortem brain tissues of patients with AD, FTD (Frontotemporal dementia), LBD (Lewy body dementia) and in healthy controls. Autophagy markers LC3B-I, BECLIN1 and ULK3 were significantly elevated in the AD brain as compared to healthy control and other dementias showing the abnormal activation of autophagy. Gene transcription and protein levels of PRKAG2 was significantly increased in hippocampus and frontal cortex in AD. More importantly, PRKAG2 protein levels were associated with increased Aß accumulation and BECLIN1 in all brains. In summary, our findings suggest that increased PRKAG2 may be an important contributing factor to lysosomal dysfunction and Aß accumulation in AD brain.

Dr Surabhi Bhatia

Poster: No. 13

Email: surabhi.bhatia@sydney.edu.au **Theme:** Intervention and Treatment

Lipid alterations in frontotemporal dementia, a distinct profile from Alzheimer's disease

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Lipid dysregulation has been identified as a common factor in various neurodegenerative disorders including Alzheimer's disease, Parkinson's Disease and Huntington's disease. Frontotemporal Dementia (FTD) is the third most common form of dementia and lipid alteration in FTD brain has not been studied previously. Hence, we performed a nontargeted lipidomics analysis of the superior frontal region of post mortem human brain tissue from control (n=11), FTD (n=10) and AD (n=7) cases using high resolution mass spectrophotometry. The levels of individual lipid species across 19 subclasses were analysed and we found that there are differential changes in lipid subclasses in FTD and AD. When compared to controls, overall, AD cases had a greater number of changes than FTD. Sphingolipids were the most affected class in FTD while glycerolipids were most affected in AD. Ceramide levels were significantly increased both in FTD and AD. Interestingly, the levels of significantly altered phosphatidylcholine lipid species depict a contrary trend in FTD and AD. In conclusion, this is the first study to analyse the lipid changes in FTD post-mortem brain and provides information about differential lipid alterations in FTD and AD that suggest the cellular structures targeted by these dementia syndromes differs significantly.

Ms Annaliese Blair

Poster: No. 14

Email: Annaliese.Blair@health.nsw.gov.au **Theme**: Care

Improving residential dementia care through staff: Two systematic reviews of the evidence

Annaliese Blair 1,2,3, Katrina Anderson 1,2,3, Mike Bird 2,4, Sarah Macpherson 1,2,3

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4. Bangor University, Wales

Common sense suggests and research indicates relationships between staff in residential dementia care and the quality of life for residents, with poor care increasing unnecessary resident suffering. Two systematic literature reviews were conducted to assist with gaining a coherent picture of which (adjustable) aspects of residential care staff experience, practice, belief, or deployment it would be profitable to address (Review 1-Predictor) and which interventions with staff have a sustained impact on quality of care and consequent resident quality of life (Review 2-Interventions).

Review 1- Predictor: From published peer-reviewed literature from the last 20 years, 34 studies were included, only 3 of which were longitudinal and comprehensive. There is collective evidence that: Where staff treat and interact empathically and humanely in care, there is a relationship with better affect for residents, delayed functional dependence and better food intake; and where staff are more skilled and educated there are better outcomes for residents, such as less use of sedating medications.

Review 2- Interventions: Only 44 studies met the inclusion criteria; a quarter of these failed to measure effects on residents and half failed to measure longer term outcomes. However, there are high quality interventions that improve the way staff interact with residents, including during personal care, with effects maintained post intervention. However, in some areas, like reducing physical restraint, unlimited empathy is not enough; staff also need to know about dangers of restraint. Interventions with staff aimed at improving resident mood have produced vastly different results – so it is impossible to say whether they are worthwhile. Further longitudinal studies on appropriate targets for staff intervention are required.

Dr Gabriela Bodea

Poster: No. 15

Email: gabriela.bodea@mater.uq.edu.au **Theme:** Intervention and Treatment

Investigating LINE-1 mobile DNA involvement in Parkinson's disease aetiology

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Abstract. Parkinson's disease (PD) is a complex neurodegenerative condition, characterized by both motor and non-motor symptoms. About one-quarter of affected individuals, experience PD associated dementia. The main hallmark of PD is the selective degeneration of dopaminergic (DA) neurons, which control voluntary movement. Despite recent advances, current PD treatments only ameliorate symptoms but do not prevent neuronal loss and cannot cure the disease. PD aetiology is multifactorial, with genetic and environmental factors interacting via as yet unclearmechanisms to induce PD pathology. Recent studies have proposed that environmental and genetic factors may trigger hyperactivation of DNA mobile elements. These elements can alter the genome by insertional mutagenesis, recombination and deletion, potentially contributing to the susceptibility and pathophysiology of neurological disorders. Long interspersed element-1 (LINE-1) is the only active and autonomous mobile element in the human genome, and accounts for about 17% of human DNA. L1 is active in neurons and can 'jump' from one place in the genome to another by first copying itself into RNA and then reversing the process, thus potentially altering the activity of genes were they relocate. Our preliminary data show that L1 mRNA is present in murine DA neurons throughout life. Furthermore, L1-encoded ORF1p protein, necessary for L1 mobility, is abundantly expressed in DA neurons of aged mice. To establish the core parameters of L1 mobilisation in PD, we are currently assessing changes in L1 expression and activity in a neurotoxin mouse model of PD. We will further test whether L1 driven mutations are likely to alter DA neuronal phenotype, and whether chemical modulation of L1 activity could ameliorate PD phenotype.

Dr Nicholas Bradfield

Poster: No. 16

Email: nib@neuro.org.au **Theme:** Assessment and Diagnosis

Baseline amnestic severity in mild cognitive impairment predicts incident Alzheimer's disease dementia at 3 years

Dr Nicholas I. Bradfield 1, Prof David Ames 2,3,4 and the AIBL investigators 5

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Mild cognitive impairment (MCI) has varying definitions that are inconsistently applied. Baseline severity of memory impairment in MCI has not been shown to predict incident dementia due to Alzheimer's disease (DDAD) in a clinically useful heuristic. As part of the Australian Imaging, Biomarkers and Lifestyle Flagship Study of Ageing, 725 non-demented individuals were recruited and followed up at 36 months. Participants were classified according to Petersen criteria and Winblad criteria at baseline and also stratified into grade 1 or 2 severity based on degree of memory impairment at baseline. Incident diagnosis of DDAD was established by expert panel consensus. At 36 months, 54 (7.4%) participants developed DDAD. Subjects with amnestic MCI according to Petersen criteria were more likely to develop DDAD (PPV 25.5%; 95% CI 19.8-32.4) than healthy controls (PPV 1.2%; 95% CI 0.5-2.6). Winblad criteria were also useful, with multiple domain amnestic MCI being most accurate at predicting AD dementia (PPV 53.1%; 95% CI 39.1-66.1). Finally, grade 2 memory impairment was useful for predicting the development of DDAD in amnestic MCI single domain (PPV 27.3%; 95% CI 17.1-40.6) and in amnestic MCI multiple domain (PPV 69.8%; 95% CI 51.9-83.0). Memory impairment, impairment in multiple cognitive domains and severity of memory impairment are all associated with greater risk of progressing from MCI to DDAD. Classification of MCI should be expanded to include amnestic severity, as this provides important prognostic information.

Miss Olivia Brancatisano

Poster: No. 17

Email: olivia.brancatisano@hdr.mq.edu **Theme:** Living with Dementia

Reminiscence with music produces more smiles than reminiscence with photos in people with Alzheimer's Dementia.

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Background and Aims: Despite memory impairment in Alzheimer's Dementia (AD), music evoked autobiographical memories (MEAMs) may be preserved. Studies in healthy populations have found that songs evoking positive emotions are more likely to elicit MEAMs, but this has not yet been explored in AD, and music has not been compared with other stimuli (e.g. photos). We compared positive emotions (smiles) elicited by songs and photos in people with AD.

Methods: 8 participants with AD reported personal memories following 16 famous songs (longest duration at number one in Australian music charts) and 16 famous photos (headline events from news sources) from 1930-2010. Facial expressions were analysed by two independent raters using a coding system to detect the presence of smiles.

Results: Only 2/8 participants experienced more smiles during the photo task than in the music task. In the remaining participants (6/8), there were significantly more smiles during the music task ($p < 0.05$), with 56.3% of songs and 26.4% of photos triggering smiles. There was a very strong positive association between smiles and the presence of MEAMs ($\chi2=26.02$, $p<0.001$, $\phi = .43$) and a strong positive association between smiles and the presence of PEAMs ($\chi2=14.10$, $p < 0.001$, $\phi = .32$).

Conclusion: Findings suggest that music is more effective than photos at eliciting positive facial expressions. Further, the presence of autobiographical memories evoked by music or photos is positively associated with smiles.

Associate Professor Amy Brodtmann

Poster: No. 18

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Vascular mechanisms of neurodegeneration: drivers and determinants of dementia

A/Professor Amy Brodtmann; Dr Sheila Patel: Dr Vanessa Brait and Dr Jess Nithianantharajah (CI):

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The evidence is compelling: vascular burden is the greatest determinant of late life cognition. The volume of evidence linking vascular risk and dementia is conclusive. All late-onset dementia syndromes, especially Alzheimer's disease, are driven or exacerbated by vascular brain burden. We aim to examine how vascular burden causes dementia. Understanding the mechanisms means that we can prevent and treat the global epidemic of dementia. An update on animal and human projects will be presented, with results per project:

Vascular mechanisms of neurodegeneration: drivers and determinants of dementia
There are 3 major streams to this DRTG: post-stroke animal network degeneration with imaging, cognitive testing and histology; human network degeneration in models of vascular disease using cognitive testing, and advanced MRI; and exploring mechanisms for trial development.

Post-stroke animal network degeneration
Our post-stroke animal models are examining the trajectory and site of brain volume changes after stroke, and their correlation with cognitive and functional outcomes, in an attempt to identify factors that exacerbate and protect against degeneration. There are 2 cohorts of both mice and Long-Evans rats, allocated to serial MRI and cognitive training and testing (7 weeks prior to stroke and then serial testing) to examine for post-stroke cognitive decline. All cohorts have histological analysis and ex-vivo brain imaging following sacrifice.

Update and early findings: In a preliminary investigation of remote brain atrophy following middle cerebral artery occlusion (MCAO) in mice, we found significant atrophy in the ipsilateral cortex at 4, 12, 24, 36 and 48 weeks post-stroke compared with sham-operated mice. We also found significant atrophy in the ipsilateral hippocampus at all time-points, but only when the hippocampus was directly affected by the infarct. Cognitive impairments were seen early post-stroke and persisted over time. Our preliminary findings suggest no overt changes in volume in the contralateral cortex or hippocampus post-MCAO.

Human network degeneration in models of vascular disease

Canvas: The Cognition And Neocortical Volume After Stroke study is a longitudinal study correlating cognitive performance and brain volume changes in the five years after ischaemic stroke. Sixty-month testing was facilitated by the DRTG. We expect all participants to have completed their five-year review sessions by mid-2020 at the finish of DRTG funding. Two participants have died and donated their brains to the Victorian Brain Bank Network.

Update and major findings:

- 80 of 135 stroke participants and 25 of 40 healthy controls have completed three-year review sessions 13 stroke participants and 2 controls have completed five-year review sessions
- Stroke patients have smaller hippocampi and total brain volume around time of stroke suggesting both vascular risk factors and stroke ictus contribute to vascular brain burden and cognitive impairment (Werden, et al. Neurology, 2017)
- Attention networks are impaired after stroke with evidence that increased physical activity is associated with better attention performance (Veldsman, et al., NNR, 2016)
- Brain atrophy occurs across major hubs in the default mode network in the first 3 months after stroke, suggesting network-driven effect (Veldsman, et al., JNNP, 2017)
- Amyloid PET imaging on 23 participants has yielded 6 positive scans – around expected for age – and recruitment continues

D2: In the Diabetes and Dementia study, we are examining whether people with type II diabetes mellitus (T2DM) and left ventricular hypertrophy (LVH) have increased rates of brain atrophy and cognitive decline compared to people with T2DM but without LVH. Participants complete a neuropsychological assessment, MRI scan and a range of cardiovascular investigations at two time-points over two years.

Update and early findings

- Forty-five participants have completed their baseline assessments.
- brain volumes in 20 T2DM patients and 38 healthy participants in the CANVAS study were compared, revealing reduced volumes in the caudate ($p=0.015$), putamen ($p<0.001$), brainstem ($p=0.007$), amygdala ($p<0.001$), and nucleus accumbens ($p<0.001$), smaller total brain volume ($p=0.036$) and cortical thickness ($p<0.001$) in the T2DM group.

Theme: Our report of the association between increasing daily physical activity levels and improved performance on cognitive testing contributed to the development of the Post-Ischaemic Stroke Cardiovascular Exercise Study (PISCES). We have recruited 8 participants for this pilot study. The ASPREE-AF study, the final study in the DRTG, will commence in 2018, following completion of the ASPREE 5 year follow-up. Here we will examine effects of incident AF on brain volume and cognition in group of subjects with cognitive testing preceding clinical AF diagnosis, in around 200 participants ASPREE participants who develop AF during 5-year study.

Ms Deborah Brooks

Poster: No. 19

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Preparing carers of community-dwelling people with dementia for natural disasters: The Carer Ready Guide

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Australia regularly experiences natural disasters such as floods, bush fires and cyclones. People with dementia are especially vulnerable and rely heavily on their carers and emergency services to keep them safe. There is a lack of resources that may assist those with dementia living at home to better prepare for and respond to natural disasters. This project aimed to develop an evidence-based guide that supports the disaster preparedness of this vulnerable population. Existing evidence/knowledge concerning the emergency preparedness of community-dwelling people with dementia was synthesized via a systematic literature review. Findings were incorporated into the draft guide which was reviewed by an expert panel of carers of people with dementia and emergency services workers (n=13) using a structured communication method. There was a high level of consensus on the content validity (relevance, likely effectiveness and appropriateness) of the draft guide. Suggestions for improved content, language and formatting of the guide were

incorporated into the final version. An implementation plan outlining strategies to accomplish widespread awareness of the Carer Ready Guide and successfully adopt it into the community has been developed based on the awareness, agreement, adoption, adherence knowledge translation model.

Dr Jamie Bryant

Poster: No. 20

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Planning ahead for future care: A randomised controlled trial to examine the effectiveness of interventions to increase the completion of Advance Personal Planning Instruments

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Advance Personal Planning (APP) is the process whereby a patient, together with healthcare providers, family, and important others, discuss and document their preferences if they become incapable of participating in health and financial decision making in the future. If sensitively approached and handled, APP can have significant benefits for the person with dementia and their family. However, less than half of patients with dementia have an advance care plan. A web-based resource, Start2Talk, has been developed by Alzheimer's Australia to support both persons with dementia and their carers to engage in APP, however usage is low. It is timely to examine whether promoting the use of Start2Talk can increase rates of APP. A three-arm randomised controlled trial will be conducted. Individuals with dementia and their carers will be recruited through participating geriatricians and randomly allocated as a dyad to receive: (i) usual care, (ii) a tailored geriatrician-based intervention consisting of a letter from the geriatrician outlining the benefits of APP and available tools and resources to support APP (including Start2Talk), SMS prompts to encourage use of Start2Talk, and a follow-up telephone call to problem solve any issues with APP; or (iii) an invitation to attend group-based shared skill-building workshops that aim to provide a core set of evidence-based skills and techniques to manage dementia-related challenges. The workshops will be facilitated by an individual with expert knowledge of APP and a component of the workshops will include discussion of the importance of APP, and tools and resources available to assist with APP, including Start2Talk. Rates of completion of APP instruments (advance directive, Enduring Power of Attorney, Enduring Guardian, and a Will) will be compared between intervention and control groups at 3 and 6 months post-recruitment. This trial will provide evidence about the effectiveness of two different methods of increasing rates of APP for individuals with dementia.

Dr Sam Buckberry

Poster: No. 21

Email: sam.buckberry@uwa.edu.au **Theme:** Assessment and Diagnosis

Profiling the genome regulatory landscape of Alzheimer's Disease at single cell resolution

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The University of Western Australia The Harry Perkins Institute of Medical Research

Epigenomic approaches are offering new insights into the role of epigenetics in neurodegenerative disorders, with recent studies revealing differences in gene expression and DNA methylation in AD affected brains. Although these approaches have identified disruption of genome regulatory processes that may play a role in AD, previous work has been performed using whole tissue biopsies. However, the extensive cellular diversity in brain tissue is likely a major confounding factor in understanding cellular changes that may be highly distinct between different brain cell types.

Our initial objective was to profile the epigenome during ageing and the progression of AD in pure populations of neurons, which was until recently the most feasible method of avoiding the pitfalls of bulk tissue molecular profiling. However, in the last 12 months the landscape of what is possible in genomics has changed drastically, with the emergence of high throughput single nuclei genomic techniques, which are ideally suited to investigation of human brain. With single cell gene expression and DNA methylation profiling now possible, overcoming the confounding effect of cell type heterogeneity in these investigations will be critical for understanding how the brain is changing in ageing and AD.

We are currently working towards obtaining single cell gene expression profiles of thousands of cells in healthy and AD affected brains to identify the brain cell types that exhibit the greatest differences in gene regulation. To date, we have optimized isolation of high quality and purity nuclei and genomic library preparation techniques on archival frozen human brain, an essential prerequisite for high quality data production at the single cell level. More recently,

we obtained our first brain single-cell gene expression dataset allowing us to begin identifying molecular markers of distinct cell subpopulations. Given the vast amounts of data we will obtain from thousands of individual cells from each brain sample, and the complex analytics required, I have also been concurrently developing computational methods and algorithms for integrative analysis of these gene expression, DNA methylation, and chromatin accessibility datasets. The methods employed in this project are at the absolute cutting-edge of molecular profiling. We anticipate our results will allow us to define subpopulations of neuronal and glial cells in individual samples, identify which cell populations show abnormal gene regulation in AD, and identify distinct neuronal and glial cellular subtypes in AD affected brains.

Dr Rachel Buckley

Poster: No. 22

Email: rachel.buckley@unimelb.edu.au **Theme:** Diagnosis/Assessment

Cognitive reserve relates to greater functional connectivity, independent of amyloid, in clinically-normal older adults

Rachel F Buckley, Aaron P Schultz, Kate V Papp, Molly R LaPoint, Jenny S Rabin, Trey Hedden, Keith A Johnson, Reisa A Sperling, Dorene M Rentz, Jasmeer Chhatwal

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Background: We recently found that higher baseline resting-state functional connectivity MRI (rs-fcMRI) in cognitive networks predicted less longitudinal cognitive decline in clinically-normal older adults. This finding was observed across varying levels of global amyloid burden, suggesting connectivity may reflect a neural reserve mechanism underlying resilience to cognitive decline. The objective of the current study was to investigate relationships between cognitive reserve (CR) and functional connectivity, and whether an interaction existed between CR proxies and functional connectivity to predict cognitive maintenance in clinically-normal older adults.

Methods: 250 clinically-normal older adults (61–90 years, Clinical Dementia Rating=0) underwent baseline Ab imaging with Pittsburgh compound-B (PiB)-PET, and resting-state-fcMRI. Seven networks were chosen for analysis, including four cognitive networks (default, salience, dorsal attention, and frontoparietal control) and three non-cognitive networks (motor, extrastriate and primary visual). Additionally, longitudinal cognitive performance was measured yearly over 5 years. The CR composite combined proxies of education, occupational attainment, cognitive activity and AMNART verbal IQ. Linear regressions examined the relationships between whole-network rs-fcMRI and CR, after accounting for age, sex and Ab burden. Linear mixed models examined baseline rs-fcMRI and CR to predict longitudinal cognitive performance.

Results: Greater rs-fcMRI across cognitive and non-cognitive whole-networks was associated with greater cognitive reserve after accounting for Ab and covariates, bs=0.13-0.24, p=.002-.04 (Fig 1A). Among examined whole-networks, default, dorsal attention and control exhibited the strongest relationships with cognitive reserve. While connectivity and cognitive reserve relationships were consistent and statistically significant across analyses, these associations were relatively weak. When we investigated the combined influence of CR and functional connectivity at baseline to predict cognitive change, we found subtle, yet significant, interactive relationships between high functional connectivity and cognitive reserve to predict better cognitive outcomes in clinically normal older adults. This was particularly salient when considering AMNART verbal IQ in isolation (see Fig 1B).

Conclusions: Greater functional connectivity in cognitive networks was associated with greater cognitive reserve, independent of Ab burden. These results support the hypothesis that these connectivity measurements reflect neural reserve capacity. Coupled with prior findings that higher connectivity predicts less cognitive decline over time, these results suggest higher connectivity in individuals with higher cognitive reserve may partly underlie their resilience to AD-related cognitive decline.

Dr Emma Louise Burrows

Poster: No. 23

Email: emma.burrows@florey.edu.au **Theme:** Intervention and Treatment

Absence of task learning in the APP/PS1 mouse model of Alzheimer's disease as measured by translatable touchscreen technology

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Cognitive dysfunction appears as a core feature of Alzheimer's disease (AD). Over 300 therapeutics have been identified based on their ability to ameliorate cognitive deficits in mouse models, however all have failed to translate in clinical trials. One reason for this may be that traditional testing of animal behaviour differs greatly from clinical practice. Touchscreen testing in rodents enables assessment of cognitive domains that are directly relevant to patient impairments. We aimed to characterise cognitive changes in the APP/PS1 mouse model of AD, expressing familial mutations in the amyloid precursor protein (APP) and presenilin-1 (PS1) genes. Touchscreen technology, in which mice were trained to nose-poke stimuli on a touch-sensitive computer screen, was used to assess clinically-relevant cognitive tests to APP/PS1 and wild-type (WT) mice. Mice were assessed for deficits in attention using the 5-choice serial reaction task (5-CSRT). 9 month old APP/PS1 mice showed no impairment in the 5-CSRT, in training or across probes assessing multiple modalities of attention. When mice were reassessed for attentional impairment at 12 months of age, WT animal performance significantly improved. This task-learning effect was absent in APP/PS1 mice. These results indicate that APP/PS1 mice may be resistant to cognitive training after 12 months of age. This work is the first characterisation of the APP/PS1 mouse model of AD utilising translational touchscreen technology and is an essential step to enhance drug translation from preclinical studies to the clinic.

Ms Esa Chen

Poster: No. 24

Email: esa.chen@monash.edu **Theme:** Care

Development and validation of the Medication Regimen Simplification Guide in Residential Aged CarE (MRS GRACE)

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Background: Residents of aged care facilities (ACFs) use increasingly complex medication regimens with many medications, formulations, administration times and dosing instructions. Over half of ACF residents have diagnosed dementia. Reducing unnecessary medication regimen complexity may benefit residents and staff administering medications. There are currently no tools available to guide medication regimen simplification.

Method: A purposively selected multidisciplinary expert panel used modified nominal group technique to identify and prioritise factors that determine whether a medication regimen can be simplified. The five prioritised factors were formulated as questions, pilot-tested and refined by panel members. The final tool was validated by two clinical pharmacists who independently applied the tool to a random sample of 50 residents. Inter-rater agreement was calculated using Cohen's kappa.

Results: The Medication Regimen Simplification Guide for Residential Aged Care (MRS GRACE) comprised five questions: 1) Is there a resident related factor that precludes simplification?, 2) Is there a regulatory or safety imperative that precludes simplification?, 3) Is simplification likely to result in any clinically significant drug-drug, drug-food, or drug-time interactions?, 4) Is there an alternative formulation that can support less complex dosing?, and 5) Is simplification likely to result in any unintended consequences for the resident or facility?. Two independent pharmacists used the tool with moderate agreement: opportunities to simplify 29/50 and 30/50 residents, respectively, were identified (unweighted Cohen's kappa 0.38, 95% CI 0.120-0.640). Changing an administration time comprised 75% of the two pharmacists' recommendations (n=45/60 and 34/46 recommendations).

Conclusion: MRS GRACE is a promising new tool to guide medication regimen simplification for residents of ACFs.

Dr Zhaolin Chen

Poster: No. 25

Email: zhaolin.chen@monash.edu **Theme:** Assessment and Diagnosis

Quantitative simultaneous MR-PET imaging of the brain for application to ageing and dementia research

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Hybrid Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) enables simultaneous acquisition of images from the two modalities. Simultaneous MR-PET imaging opens new opportunities for novel multidimensional imaging and investigations of of the mechanisms of the brain ageing, neurodegenerative diseases and dementia. For example, one can use aS simultaneous dynamic 18F-fluorodeoxyglucose (FDG) PET and functional MR imagingl protocol tocan investigate metabolic efficiency of the brain and its relationship with functional cognitive impairments in ageing and dementia. The idea of a fullyThe first fully integrated MR-PET system scanner was constructed started a couple of decade ago following advances in PET detector hardware. , and since then researchers have spent great effort to physically integrate the two modalities in a robust and efficient manner. After the success in hardware integration, much of Recent efforts haves now been directed towards software developments to implement and validate brain imaging applications fusion of the two, in particular focusing onusing quantitative PET imagingscanning. There are several technical challenges for quantitative PET assessment inimages of the brain includeing temporal stability of the scanner, subject motion correction, and PET attenuation correction, and joint MR and PET image reconstruction. Currently much research is undertaken to address these challenges. WHere, we will report our recent work towards enabling quantitative PET imaging results including: (i). We develop a protocol of methods with temporal stability measurements, (ii) improved multi-MR sequence motion correction and (iii) PET attenuation correction estimated using MR images for PET imaging. Specifically,T the temporal stability measurements include phantom testing of both dynamic PET and fMRI and for identification of temporal signal characteristics. TheA fully automated MR based motion correction method is developed for removesing motion related PET image artefacts, especially important in during long dynamic scans. The Improvedoptimised PET attenuation correction method hais introduced forbeen validated for quantitative PET imaging. We believe theseIn conclusion, we have implemented and validated simultaneous MR-PET brain imaging methods are essential elements for true accurate PET quantitative PET imaging applications in brain ageing and dementia research.fication in the simultaneous system.

Dr Lesley Cheng

Poster: No. 26

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Brain enriched miRNA exosomal biomarkers associated with Alzheimer's disease are detected in serum exosomes

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Several blood-based tests have been explored to detect Alzheimer's disease (AD) however, evidence is required to determine whether blood sampling is an appropriate specimen to diagnose brain diseases. Exosomes are small extracellular membrane vesicles packaged with RNA and protein cargo. Previously we isolated serum exosomes from AD patients which displayed an abnormal composition of 16 specific microRNA (miRNA) biomarkers compared to controls. To provide evidence that our serum exosomal miRNA biomarkers are suitable for the detection of a brain condition, we also profiled exosomes isolated from post-mortem human AD (n = 8) and control (n = 8) brain tissues using Next-generation sequencing. Brain derived exosomes (BDEs) were found to contain a unique profile of small RNA, including miRNA, compared to whole tissue. Furthermore, all 16 serum biomarkers, identified in our previous study, were detected in BDEs. This work has identified a highly specific panel of miRNA that is both present in the brain and blood of AD patients. The miRNA candidates can be used to develop a blood-based diagnostic test highly relevant to a brain disease, equivalent to non-invasive brain biopsy.

Miss Xin Yi Choo

Poster: No. 27

Email: xychoo@student.unimelb.edu.au **Theme:** Intervention and Treatment

Limiting Neuroinflammation through Delivery of Novel Copper Complexes

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Altered biometal homeostasis has been implicated in several neurodegenerative diseases, including Alzheimer's disease (AD). Meta-analysis of biometal levels in human AD demonstrated copper (Cu) deficiency in important regions of the AD brain, such as the neocortex. Thus targeted Cu delivery using organic ligands is a potential strategy to restore biometal homeostasis. The Cu complex, CuII(gtsm), has been shown to reduce Aß load and tau phosphorylation, and improved cognitive performance in the APPswe/PS1δE9 mouse model of AD. However, due to its toxicity in vitro, unraveling its mechanism of action is challenging. We are currently studying novel derivatives of neuroprotective Cu-complexes, differing in the ligand backbone to facilitate subtle but important variations in lipophilicity, cellular uptake, subcellular localisation and metal release. We demonstrate that specifically designed thiosemicarbazone-pyrdylhydrazone Cu complexes (CuTSPH), which are able to increase copper content in multiple brain cell types, reduce cytokine release in an in vitro model of neuroinflammation. We aimed to identify compounds of improved efficacy compared to our prototype compounds. By quantitative real-time polymerase chain reaction (qRT-PCR), anti-inflammatory properties of both prototype and novel Cu-complexes were associated with increased intracellular Cu content and increase in microglial expression of methallothionein 1 (Mt1). Demonstrated by ELISA and qRT-PCR, a novel amyloid-targeting Cu-complex, CuL1, reduced expression and secretion of damaging factors from astrocytes and microglia including pro-inflammatory chemokines MCP-1 and TNFα. CuL1 also mediated changes in expression of AD risk variant genes including Trem2 and Cd33 in TNFα- and IFNγ-stimulated murine microglia. Oral delivery of CuL1 delivered L1 into the brain and altered the proportion of Aß phagocytosing microglia as shown by flow cytometry analysis (FACS) of acutely isolated microglia. Understanding of how Cu-complexes mediate anti-inflammatory actions through regulating cellular metal content will provide valuable insight into pathogenic and protective mechanisms in neurodegeneration and may aid in development of novel therapeutics for neurodegeneration.

Professor Lindy Clemson

Poster: No. 28

Email: lindy.clemson@sydney.edu.au **Theme**: Care

COPE: Implementing an evidence-based program in Australia: A summary of the planning and implementation phase

Professor Lindy Clemson and Dr Kate Laver

On behalf of the Investigator team University of Sydney, Flinders University, Cognitive Decline Partnership Centre

Consumers want a stronger focus on restorative care to maximise independence and support to help carers support people with dementia to remain at home. There is strong evidence to suggest that dyadic interventions improve outcomes for both the person with dementia and the carer. However, these programs are not widely available in the community as translation of evidence-based programs into clinical practice has been limited.

The Care of People with Dementia in their Environments (COPE) program is an innovative intervention developed in the US and found to be effective in a randomised controlled trial (RCT). It involves occupational therapists (OTs) and nurses conducting comprehensive assessment, stress reduction for the carer, identification of key challenges and difficulties, problem solving (training the carer in how to apply strategies) and activity prescription.

The COPE (Australia) project is examining: (1) to what extent the COPE intervention can be translated into existing services, (2) the costs associated with delivery; and, (3) when implemented into existing services, whether COPE is as effective as initially demonstrated.

To date we have: adapted COPE to the Australian context and recruited and trained 40 OTs and 15 nurses from 12

partner organisations. We've completed a case note audit to describe current practice and conducted interviews with health professionals and management to gain an understanding of how organisational context and the current policy environment contribute to the adoption of innovation.

Dr Sean Coakley

Poster: No. 29

Email: s.coakley@uq.edu.au **Theme:** Intervention and Treatment

Discovering and studying novel molecules that regulate axonal degeneration.

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Maintenance of neuronal integrity is essential for the preservation of correct neuronal function. The disproportionate length of the axon, and its highly specialized function, makes it extremely vulnerable to damage and maintenance defects that can result in axonal degeneration. Axonal degeneration is an active process and a key early pathological hallmark of several neurodegenerative diseases including Alzheimer's disease; it often precedes the death of the neuronal cell body and is a critical determinant of disease development and progression. However, a full understanding of the molecular mechanisms and genetic causes of axonal degeneration are lacking. Using the powerful genetic tools available in C. elegans, and focusing on a specific subset of sensory neurons, we have isolated a novel mutant strain with enhanced axonal degeneration. Using classical genetic mapping, combined with deep sequencing, we have identified the mutated gene that causes this phenotype. This conserved molecule functions non cell-autonomously in the epidermis of the animal, in which the axon is embedded, to protect it from spontaneous axonal degeneration. The characterization of this conserved molecule, and its previously unknown functional role in protecting the axon from degenerating will be crucial in expanding the role that non-neuronal tissue plays in protecting the nervous system.

Dr Timothy Couttas

Poster: No. 30

Email: t.couttas@centenary.org.au **Theme:** Assessment and Diagnosis

Ceramides, associated with insulin resistance, increase with age in the human hippocampus

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Alzheimer's disease (AD), the most common form of dementia, affects 1 in 10 Australians over the age of 65. Age is the major risk factor associated with AD, and with an increase in life expectancy, and an ageing population, the number of individuals affected by AD will continue to increase. The major genetic risk factor for AD is the ε4 allele of the APOE gene, encoding the major lipid transport protein of the brain, apolipoprotein E (ApoE). Ceramides, which belong to a group of lipids termed sphingolipids, have been shown to be altered in human brains affected by AD. Ceramides with different carbon chain lengths have different physiological functions. C16:0 ceramide is a metabolic sensor that drives the development of insulin resistance in liver and adipose tissue. Very long chain ceramides such as C24:1 are major constituents of myelin and are protective in the context of insulin resistance.

We investigated how age and APOE genotype influence levels of important signalling lipids in post mortem human brain tissue (n = 81), obtained from neurologically normal subjects aged 65 years or older. Lipids were quantified using liquid chromatography-tandem mass spectrometry. Levels of C16:0 ceramide increased with age significantly according to Spearman correlation analysis ($r = 0.3019$, $p = 0.0065$). Gender separation revealed C16:0 ceramide in males ($r = 0.4492$, $p = 0.0012$), not females ($r = 0.08025$, $p = 0.6624$) showed strong correlation with age. No significant association was observed between APOE genotype and hippocampal ceramides. Recent findings have demonstrated that AD progression is associated with a decline in cerebral glucose utilisation, potentially caused by a loss of insulin receptors at synaptic membranes of the cerebral cortex and hippocampus. Increasing levels of C16:0 ceramide with age may promote an insulin-resistant phenotype in the brain, making a significant contribution to AD pathogenesis.

Ms Amanda Cross

Poster: No. 31

Email: amanda.cross@monash.edu **Theme:** Intervention and Treatment

Potentially inappropriate medication and mortality in people attending memory clinics

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7. Department of Epidemiology & Preventive Medicine, Faculty of Medicine, Nursing & Health Sciences, Monash University, Melbourne;
8. Pharmacy Department, Austin Health, Heidelberg.

Aim: To examine whether use of medications considered potentially inappropriate for older people with cognitive impairment (PIMcog) was associated with mortality in people attending Australian memory clinics.

Methods: Cross-sectional and longitudinal analyses of data from the Prospective Research In MEmory clinics (PRIME) study. PIMcog was defined as any medication considered potentially inappropriate for an older person with cognitive impairment according to the Beers criteria or Screening Tool of Older Peoples Prescriptions (STOPP).

Results: Of the 964 participants, 360 (37.3%) used a PIMcog at some point during the study, the most common being anticholinergics and sedatives. Using time-dependent Cox proportional hazards regression, adjusted for relevant covariates, PIMcog use was significantly associated with all-cause mortality over a three year follow-up period (adjusted hazard ratio: 1.42, 95% confidence interval: 1.12-1.80).

Professor Maria Crotty

Poster: No. 32

Email: maria.crotty@sa.gov.au **Theme**: Care

New evidence that design and organisation impacts of Australian aged care residents' quality of life and their use of healthcare.

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3. Institute for Choice Business School, UniSA

Objective: To examine the consequences on resident reported outcomes of living in domestic cluster models in comparison to typical Australian models of residential aged care.

Design: A cross-sectional study with 12-month retrospective linked health service usage data

Setting: 17 residential care facilities in 4 Australian states providing either domestic clusters or typical Australian models of residential aged care.

Participants: Those residing in care for 12 months or longer, not in immediate palliative care, including those with cognitive impairment, having a family member willing to participate on their behalf. 901 residents were eligible and 541 consented (24% self-consent, 76% proxy).

Main outcome measures: Quality of life (EQ-5D-5L), hospitalisations. Statistical adjustments to control for baseline socio-demographic and clinical characteristics of participants were made

Results: All residents in a cluster model of care had either a dementia diagnosis or a PAS-Cog of five or more indicative of cognitive impairment in comparison to 79% of those in traditional facilities. After adjustments, individuals residing in cluster models of care had better quality of life (EQ-5D-5L difference 0.107, 95%CI 0.028,0.186), lower hospitalisation rates (rate ratio [RaR] = 0.318, 95% CI: 0.128-0.786) and lower Emergency Department presentation rates (RaR = 0.273, 95%CI: 0.142-0.526), in comparison to those residing in usual Australian aged care facility models.

Conclusions: This analysis suggests the built environment and associated models of care have significant effects on health and quality of life outcomes for people with and without dementia. More information is needed on financial, attitudinal and regulatory barriers to expansion of cluster housing models in Australian residential aged care

Associate Professor Joanne Curry

Poster: No. 33

Email: jcurry7@csc.com **Theme:** Living with Dementia

Understanding the Journey Better: An exploration of the current "state of play" of the health care journey experienced by people living with cognitive decline and their carers

DXC Technology

Around the world, dementia reated illnesses are on the increase. Dementia is a bigger killer than cancer and is second only to heart disease in Australia (Australian Bureau of Statistics, 2016). In Australia, the prediction is that by 2050 more than one million people will be living with dementia. This is a 375% increase since 2011 (Deloitte Access Economics, 2011). The increased numbers of people living with a dementia-related illness will have a significant impact upon the care services that are needed in the future as people living with dementia become increasingly dependent on others for help (Australian Bureau of Statistics, 2012). Whilst care pathways for people living with dementia have been in existence for some time, and guidelines have been developed to improve care significantly (NHMRC partnership centre for dealing with cognitive and related functional decline in older people, 2016), to date little research has focussed on the impact of these interventions on the real life experiences of people living with dementia and their carers from a personal perspective. Research has real impact if we understand what people want. This research asked consumers, people who live with the diagnosis of dementia and their carers, what they want, so that researchers, policymakers and healthcare managers can allocate their efforts appropriately.

Dr Nadeeka Dissanayaka

Poster: No. 34

Email: n.dissanayaka@uq.edu.au **Theme:** Intervention and Treatment

Anxiety in patients with cognitive impairment and Parkinson's disease

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Dementia is observed in 80% of patients with Parkinson's disease (PD) at advanced stage. PD patients experience cognitive deficits as early as the time of their diagnosis, while mild cognitive impairment (MCI) is detected in 45%. Anxiety is common in PD and the average prevalence is 31%. A recent study demonstrated that anxiety is 3 times more common in PD patients with MCI compared to those without MCI.1 The present descriptive study further examines the link between anxiety and cognitive impairment in PD. Fifty PD patients (n=50) were assessed for MCI using standardized criteria for PD and were examined for anxiety according to the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) criteria. Twenty-six patients (52%) screened positive for MCI and 36% were diagnosed with an anxiety disorder. Anxiety was observed in 18% of PD patients with MCI. Deficits in attention (58%) and memory (28%) were common in PD patients with anxiety disorder. Thus attentional and memory impairment may impact anxiety treatment including response to cognitive behavioral therapy. Research is required to develop targeted interventions with innovative technologies such as virtual reality, which can bypass some of the cognitive demands of conventional psychotherapy, to successfully treat anxiety in patients with cognitive impairment.

Dr Nadeeka Dissanayaka

Poster: No. 35

Email: n.dissanayaka@uq.edu.au **Theme:** Intervention and Treatment

Variations in mental health assessment and psychotropic prescribing practices in Residential Aged Care

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Depressive symptoms are frequently cited. Despite the introduction of mandatory depression screening in Australian Resintial Age Care (RAC) facilities, consistency of use remains an issue. The high use of psychotropic drugs (44-79%) also raises questions as to the appropriateness of pharmacological mental health management practices in RAC and specifically patients with dementia.

A care plan analysis performed in 779 residents across twelve RAC homes (57% with dementia) revealed that the Cornell Scale for Depression (CSD) completion was highly variable (43%-98%), and impacted upon by severe cognitive impairment. Of those residents with a completed CSD, two thirds (61%) displayed depressive symptoms with suicide-related ideation disturbance reported in 11% of residents, double that typically observed in the general community. Analysis of psychotropic treatments revealed that overall half of residents (48%) were prescribed a psychotropic medication. Treatment for depression made up two thirds of all prescriptions (62%). Whilst anxiety (27%), sleep problems (25%) agitation (14%), psychosis (11%) and behaviours (7%), were also frequently cited as reasons for pharmacological intervention. Residents with dementia were more likely to be prescribed with antidepressants (OR 1.50, 95%CI 1.09-2.09, p=0.014) and antipsychotics (OR 1.89, 95%CI 1.23-2.87, p=0.004).

Variation in the completion of the CSD still lingers despite its implementation as a component of the Australian Aged Care Funding Instrument in 2008. Depressive symptoms are extremely high, as well as suicide-related ideation disturbance. Treatment with antidepressants is prevalent, as well as pharmacological treatments for other mental health disorders.

Dr Carol Dobson-Stone

Poster: No. 36

Email: carol.dobson-stone@sydney.edu.au **Theme:** Assessment and Diagnosis

High-throughput cellular assays for assessment of dementia-related phenotypes

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2. School of Medical Sciences, University of New South Wales, Sydney

Recent advances in sequencing technology make it a simple prospect to sequence the entire genome of any given individual with an inherited dementia. What is significantly less straightforward is how to filter this huge amount of data to find the causative variant(s). Even after bioinformatic filtering steps, next-generation sequencing projects often identify dozens of candidate disease variants, which require functional validation. Traditional cellular assays testing the effect of gene variants on pathological pathways are time consuming and examine only one or a few variants at a time. A main aim of my fellowship is to develop an efficient and systematic way to screen multiple variants at once in vitro. Our lab has established several cellular assays of dementia-relevant phenotypes based on common pathological pathways, e.g., mislocalisation of TDP-43 in frontotemporal dementia and increased g-secretase activity in Alzheimers disease. Using microtitre plate cell line cultures and automated fluorescence detection imaging systems, we will adapt these and other assays into a higher-throughput format that can assess dozens of variants simultaneously, thus reducing the time needed to filter variants. We expect to determine pathogenicity for currently ambiguous variants in known disease genes, and identify novel genes with variants that show a significant effect on a pathogenic pathway leading to disease, thus addressing a critical bottleneck in dementia genetics research.

Dr Angela D'Rozario

Poster: No. 37

Email: angela.drozario@sydney.edu.au **Theme:** Prevention

Clinical, polysomnographic and neurophysiological correlates of sleep-dependent memory with ageing

D'Rozario, A.L. Grummitt, L. Cross, N.E. Bartlett, D.J. Grunstein, R.R. Naismith, S.L.

The University of Sydney

Sleep spindles and slow waves are important NREM sleep brain oscillations which play a role in learning and memory. Changes in sleep neurophysiology and the presence of obstructive sleep apnoea (OSA) may underlie the decline in sleep-dependent memory consolidation (SDMC) with aging. This study examined clinical, polysomnography and sleep EEG correlates of sleep-dependent memory consolidation (SDMC) in older adults.

Thirty-two participants (16 male, age 62±13, ESS 7±3, AHI 22±25,) underwent overnight polysomnography in the sleep laboratory. The sample was comprised of three groups: 8 had a diagnosis of mild cognitive impairment (MCI), 15 had OSA and 9 were controls. A 32 word-pair task was administered 1-2 hours before bed. Following an 8-h sleep opportunity participant's declarative memory consolidation was assessed 1-h after waking during a morning recall phase. Power spectral analysis was performed on all-night EEG data, and slow wave activity in NREM sleep and spindle density (events p/min) in stage N2 sleep were calculated.

Overnight % retention recall was not significantly different between patients with MCI or OSA and healthy sleepers. Within the entire sample (n=29), higher % memory retention recall was significantly associated with increased overall spindle density at frontal and central brain regions. Clinical and polysomnography variables were not significantly associated with overnight changes in memory scores.

Spindle characteristics were the most strongly associated component of SDMC in this sample of older adults exhibiting cognitive decline and sleep disturbance. These preliminary results highlight the potential of sleep interventions to target memory deficits observed in aging and dementia.

Dr Xin Du

Poster: No. 38

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Investigating the synergistic role of brain-derived neurotrophic factor (BDNF) and estradiol on parvalbumin-mediated cognitive function: relevance to dementia

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Epidemiological evidence suggest women are at higher risk of developing dementia. As the female sex hormone estrogen is neuroprotective, it is proposed that declining estrogen level at menopause increases the risk of women developing dementia. A mediator of estrogen's beneficial effect is brain-derived neurotrophic factor (BDNF), a neurotrophin found to be significantly reduced in patient blood and brain. Both BDNF and estrogen affect the growth, development and function of parvalbumin (PV) interneurons, a GABAergic interneuron that is vital in mediating cognitive performance. PV loss has been found in the brains of dementia patients, particularly in the hippocampus. However, the mechanism between estrogen, BDNF and PV function in relation to cognition is unclear. To examine this, we used a transgenic mouse model (PV-cre/TrkB-fl) where the BDNF receptor TrkB is knocked out of ~50% of PV neurons via the cre-lox system and submitted mice to a battery of behavioural paradigms in adulthood. Both wild-type and PV-cre/TrkB-fl mice of both sexes exhibited no alterations to baseline locomotor activity level or anxiety as measured by the elevated-plus maze. For cognition, the mice performed equally well in the novel object recognition task and the cheeseboard maze, testing in turn recognition memory and spatial/reference memory. In the Y-maze, a test of hippocampal-dependent short-term working memory, disruption of BDNF signalling in PV cells caused a memory deficit in male mice. In female mice, the PV-cre/TrkB-fl mice did not display a deficit. However this finding is qualified by the fact that female wild-type control mice did not perform the Y-maze. Pending molecular analyses, our novel model already shows a subtle cognitive phenotype with possible sex-dimorphism that invite further examination of PV neuron health in conjunction with risk factors such as ageing, metabolic abnormalities, and stress.

Dr Suzanne Dyer

Poster: No. 39

Email: suzanne.dyer@sa.gov.au **Theme:** Care

Outdoor access and quality of life in residents of Australian care facilities

Suzanne M Dyer 1,2, Emmanuel Gnanamanickam 1,2, Enwu Liu 1,2, Rachel Milte 1,2,3, Maria Crotty 1,2

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2. NHMRC Cognitive Decline Partnership Centre
3. University of South Australia

Introduction: Quality of life is reduced in residents of long-term care facilities. Outdoor living is highly valued by most Australians and we examined its relationship with quality of life in this frail group.

Methods: INSPIRED is a cross-sectional study of 541 participants residing 12 months or longer in 17 care facilities from 4 Australian states. Data were collected on participant and facility characteristics, quality of life (ED5D-5L) and outdoor access. The association between outdoor use and quality of life was examined using multi-level regression models, adjusting for individual and facility level characteristics.

Results: Participants had a mean age of 85 (SD 8.5) years, 75% were female and 84% had a medical diagnosis of dementia or a Psychogeriatric Assessment Scale - Cognitive Impairment score of ≥5, indicating cognitive impairment. After adjustment for potential confounders, living in a facility with independent access to the outdoors was not

significantly associated with a better quality of life (EQ5D-5L ß=-0.059, 95%CI -0.155 to 0.037, P=0.23). Going outdoors one or more times per day was significantly associated with a better quality of life (EQ5D-5L ß=0.16, 95%CI 0.088 to 0.232, P<0.001), however going outdoors multiple times per week but not daily was not (EQ5D-5L ß=0.048, 95%CI -0.011 to 0.108, P=0.1134).

Conclusion and implications: The provision of outdoor and garden areas that residents can access in care facilities is not sufficient to impact on their quality of life. Staffing structures to enable residents to venture outdoors frequently are required to maximise the quality of life impact of providing outdoor areas within care facilities.

Dr Elizabeth Evans

Poster: No. 40

Email: lizevans@unsw.edu.au **Theme:** Assessment and Diagnosis

Dementia Screeners for People with Intellectual Disability

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There is a need for cost-effective screening for dementia in people with intellectual disability (ID). However, most dementia screening tools for people with ID have been validated only amongst people with Down syndrome. Further, consensus regarding the best tool is lacking. The current study examined the effectiveness of two low-cost dementia screeners in a sample of individuals with ID of any cause.

Methods: The Adaptive Behaviour Dementia Questionnaire (ABDQ) and the Dementia Screening Questionnaire for Individuals with Intellectual Disabilities (DSQIID) were administered as part of a larger survey completed by carers of people with ID over the age of 40 years in Australia. Participants were classified as having normal or non-normal cognitive status by clinician case consensus using all available data for each participant. Sensitivity and ROC analyses compared each screener against case consensus classifications.

Results: Data were available for 69 people with ID. Neither of the screeners demonstrated adequate sensitivity to detect non-normal cognition using the recommended cut-off scores. ROC analyses indicated that the DSQIID was the most effective at discriminating normal from non-normal cognition, but that a lower cut-off score would be more appropriate for this sample.

Conclusion: Compared with the ABDQ, the DSQIID had greater diagnostic utility in this sample when considering all possible cut-off scores. However, it is unlikely that any single cut-off would be suitable for all people with ID. Further research is needed to determine appropriate thresholds for people with different pre-existing levels of ID.

Associate Professor Lis Evered

Poster: No. 41

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Lis Evered NHMRC Dementia Research Development Fellowship # 1102462

The University of Melbourne

Cognitive decline is the leading cause of morbidity in Australia for individuals aged 65y or more. It is symptomatic in up to 30% of individuals as either mild cognitive impairment (MCI, 20%) or dementia (10%), and in around 15% of older individuals as postoperative cognitive decline (POCD) 3 months following anaesthesia and surgery. To date there have been no prospective studies investigating any overlap or common pathophysiology between MCI/dementia and POCD. This work utilises anaesthesia and surgery as a stressor for precipitating cognitive decline in order to define the sub-type(s) of dementia observed as perioperative cognitive disorders and to define the profile of healthy ageing versus cognitive decliners; both leading to early diagnosis and updated clinical diagnostic criteria.

Dr Elaine Fielding

Poster: No. 42

Email: elaine.fielding@qut.edu.au **Theme**: Care

What is a "Good Day Out" for People with Dementia? Perceptions of Family Carers and Managers and Staff of Day Respite Centres

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An understudied care setting for people with dementia is day respite. Government-funded day respite centres (DRC) provide opportunities for socialisation and activities to people with dementia and respite to family carers.

This presentation fills a knowledge gap about what constitutes a "good day out" from three perspectives: DRC managers, DRC staff and family carers of people with dementia. Recruitment occurred via a nationally representative set of DRCs. Carers were also recruited through online newsletters and social media. From a goal of 40 DRCs, 37 participated. Managers (n=37), staff (n=28) and carers (n=43) responded to both closed- and open-ended questions on online or phone surveys.

All the responding DRCs were either non-profit or government/community organisations. While the majority (87%) of managers had received dementia-specific training, only 50% of the responding staff members had. Managers named financial constraints and inadequate physical space as their biggest challenges to providing good dementia care. Individual staff members expressed a need for more dementia-specific training and activities. While carers were mostly satisfied with DRCs, they wanted more communication between staff and carers and were concerned that at times the person living with dementia did not enjoy going.

Mr Peter Fransquet

Poster: No. 43

Email: peter.fransquet@monash.edu **Theme:** Assessment and Diagnosis

Blood DNA methylation as a potential biomarker of dementia: a systematic review.

Peter D. Fransquet 1,2, Paul Lacaze 1, Richard Saffery 2, John McNeil 1, Robyn Woods 1, Joanne Ryan 1,2,3

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Dementia is a significant public health issue. Prevalence rates are increasing but many individuals remain undiagnosed. Accurate and timely diagnosis is key for optimal targeting of interventions, thus driving the search for a diagnostic biomarker. A non-invasive easily measurable peripheral biomarker would have greatest utility in population-wide screening. Epigenetics, including DNA methylation, is implicated in dementia, however it's unclear whether epigenetic changes can be detected in peripheral tissue. Here we systematically review the evidence for an association between dementia and peripheral DNA methylation. Forty-eight publications were identified, all investigating peripheral blood, and 67% reporting significant associations. Ninety percent were published in the last 6 years and Alzheimer's disease was the most frequent cause of dementia examined (75%). Almost all studies were small case-control, with little attempt to replicate findings. We emphasise the need for future longitudinal studies on large well-characterised populations, measuring epigenetic patterns in asymptomatic individuals. A biomarker detectable in the preclinical stages of the disease will have the greatest utility in future intervention and treatment trials.

Dr Sandra Garrido

Poster: No. 44

Email: s.garrido@westernsydney.edu.au **Theme:** Living with Dementia

The Effect of Music on Mood in People with Dementia

MARCS Institute for Brain, Behaviour & Development, Western Sydney University

Personalized music playlists are increasingly utilized in health-care to reduce the severity of symptoms in people with dementia. However, there is little understanding of how features of the music and individual symptoms and personality interact to influence the affective responses of people with dementia to music. A factorial experiment was conducted to investigate the influence of tempo, mode and lyrics on 99 people with dementia. Both the tempo and the mode of the

music were found to have a significant impact on the affective outcomes of listening to dementia. Severity of cognitive decline as well as a personal history of depression and anxiety also influenced response to the music.

Ms Caroline Gibson

Poster: No. 45

Email: kazgibson@gmail.com **Theme:** Care

Improving dementia care in primary practice – a nurse-enhanced model of care.

Ms Caroline Gibson, Practice Nurse, PA / Prof Mark Yates

The Memory Health Support Service, Ballarat Community Health (BCH).

Aim: Literature and best-practice dementia care guidelines identify gaps between evidence-based and actual practice in primary care that potentially could be addressed by better utilisation of the Practice Nurse (PN). The aim project was to develop and test a nurse-enhanced model of dementia care, the Memory Health Support Service (MHSS).

Methods: A collaborative quality improvement approach was taken and an iterative Plan-Do-Study-Act methodology used to develop, implement, and evaluate the nurse – enhanced model of dementia care.

Results: The nurse-enhanced model of dementia care in primary practice was developed. 97 MHSS nurse consults were completed. All consults utilised chronic disease management MBS item numbers. Data is being collected on patient outcomes; this requires a longer timeframe. All BCH GPs and PNs reported that the MHSS provides an option to support patients with a cognitive impairment and are likely to refer patients to the service; and to recommend the service to patients and colleagues.

Conclusions; The Practice Nurse role can be enhanced to deliver best-practice dementia care utilising the current MBS. This model of care addresses some of the gaps in dementia care in primary practice and increases the capacity of primary care to meet the health needs of people with dementia and their carers.

Dr Yifat Glikmann-Johnston

Poster: No. 46

Email: yifat.glikmann-johnston@monash.edu **Theme:** Assessment and Diagnosis

'Real-life' hippocampal-dependent spatial memory impairments in Huntington's disease

Yifat Glikmann-Johnston*, Anna M. Carmichael*, Emily-Clare Mercieca*, and Julie C. Stout*

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Background: Cognitive assessment research in Huntington's disease (HD) has primarily focused on cognitive domains related to the primary pathology of HD within the striato-frontal brain circuit (e.g., executive functions). The HD animal model literature recently reported spatial memory impairments, which were linked to hippocampal changes. Analogous spatial memory tasks in HD participants (e.g., virtual Morris Water Maze) produced similar impairments seen in HD animals, however, these tasks do not translate well to the range of functions involved in day to-day spatial cognition. The present study used an ecologically valid task to examine 'real-life' hippocampal-dependent spatial memory in HD participants.

Method: We studied early HD, premanifest HD, and matched controls with an ecologically valid virtual environment, which demanded spatial memory function on three levels: navigation, object-location, and plan drawing. Performance was compared to a common experimental test, Paired Associates Learning from the Cambridge Neuropsychological Automated Test Battery.

Results: Performance of HD participants on all spatial memory variables was significantly worse relative to the comparison group. Premanifest HD performed better than early HD, but overall showed impaired function.

Conclusion: Aligned with studies in HD animal models, 'real-life' spatial memory is impaired in people with HD prior to clinical diagnosis. This alignment has important implications for testing treatments for HD. From the standpoint of neurodegeneration, the dependence of our spatial memory measures on hippocampal function extends the attention of cognitive assessment research in HD beyond the striato-frontal circuit.

Dr Emmanuel Gnanamanickam

Poster: No. 47

Email: emmanuel.gnanamanickam@flinders.edu.au **Theme**: Care

Home-like model of residential care is associated with better consumer rated quality of care

Emmanuel Gnanamanickam 1,2, Suzanne Dyer 1,2, Rachel Milte 1,2,3, Enwu Liu 1,2, Maria Crotty 1,2

1. Flinders University
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3. University of South Australia

Models for the provision of residential aged care are changing, with increasing emphasis on person-centred care and providing care in a more homelike environment.

Methods: Data were collected from 5.4.1. individuals who had lived for at least 1.2. months in one of 1.7. care facilities across Australia. Consumer rated quality of care was measured using the consumer choice index (CCI-6.D), a 6. dimension instrument to evaluate quality of care received by people living with dementia in residential care, from a consumer perspective. The CCI-6.D measures quality of care on a scale of 0 to 1. with higher scores indicating better quality of care. Analyses used multi-level regression models and adjusted for individual and facility level characteristics.

Results: Four (1.2.0 participants) of the 1.7. facilities provided the homelike model of care. Overall the mean age of participants was 8.6. years with 7.5.% females and with 3.7. comorbid disease groups. 8.4.% had a medical diagnosis of dementia or were cognitively impaired. Living in a facility providing homelike model of care was significantly associated with better consumer rated quality of care (Mean Δ: 0.1.3.8., 9.5.% CI 0.07.3.-0.2.03. P<0.0001.) after adjusting for potential confounding factors. Additionally, the homelike model of care was also significantly associated with higher proxy (family) ratings of quality of care (Mean Δ: 0.09.4., 9.5.% CI 0.02.8.-0.1.6.0 P<0.01.).

Homelike model of residential care is associated with better consumer and proxy rated quality of care for people with dementia. Changes to the way aged care is provided to better align with a 'homelike' model of care can better meet consumer preferences.

Methods: Data were collected from 541 individuals who had lived for at least 12 months in one of 17 care facilities across Australia. Consumer rated quality of care was measured using the consumer choice index (CCI-6D), a 6 dimension instrument to evaluate quality of care received by people living with dementia in residential care, from a consumer perspective. The CCI-6D measures quality of care on a scale of 0 to 1 with higher scores indicating better quality of care. Analyses used multi-level regression models and adjusted for individual and facility level characteristics.

Results: Four (120 participants) of the 17 facilities provided the homelike model of care. Overall the mean age of participants was 86 years with 75% females and with 3.7 comorbid disease groups. 84% had a medical diagnosis of dementia or were cognitively impaired. Living in a facility providing homelike model of care was significantly associated with better consumer rated quality of care (Mean Δ: 0.138, 95% CI 0.073-0.203 P<0.0001) after adjusting for potential confounding factors. Additionally, the homelike model of care was also significantly associated with higher proxy (family) ratings of quality of care (Mean Δ: 0.094, 95% CI 0.028-0.160 P<0.01).

Homelike model of residential care is associated with better consumer and proxy rated quality of care for people with dementia. Changes to the way aged care is provided to better align with a 'homelike' model of care can better meet consumer preferences.

Dr Danijela Gnjidic

Poster: No. 48

Email: danijela.gnjidic@sydney.edu.au **Theme**: Care

Optimising pharmaceutical care for people with dementia in acute care settings

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Improving medical care for people with dementia in the acute care setting is a major public health need and of immense importance to consumers, community and stakeholders. In Australia, one in four people living with dementia are admitted to hospital every year. The majority of inpatients with dementia experience significant adverse outcomes including functional disability, hospital re-admission and mortality, and is associated with an immense cost for the health system. Importantly, evidence suggests that some hospital admissions and their complications are avoidable, with up to 30% of admissions among older adults attributed to inappropriate prescribing.

The ultimate aim of this research program is to establish a multi-centre linkage cohort study with pilot knowledge translation activities to improve quality of medical care in people with dementia admitted to acute care settings by providing reliable evidence on the patterns and prevalence of appropriate medicine use. This project will leverage on the existing available data in Australia, national and international collaborations, to establish the first cohort study of older inpatients with dementia in Australia to provide systemic evidence on:

1) Extent and variation in inappropriate prescribing among older people with dementia across hospitals;
2) Relationship of inappropriate prescribing with clinical outcomes;
3) Generate modified medication management resources considering input from caregivers and stakeholders, which may provide evidence for guideline care of people with dementia.

Dr Mitchell Goldsworthy

Poster: No. 49

Email: mitchell.goldsworthy@adelaide.edu.au **Theme:** Prevention

TMS-EEG indices of cortical effective connectivity and physical activity in older adults

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2. Alliance for Research in Exercise, Nutrition and Activity (ARENA), Sansom Institute for Health Research, School of Health Sciences, University of South Australia, SA.
3. Cognitive Ageing and Impairment Neurosciences (CAIN), School of Psychology and Social Work, University of South Australia, SA.

Engaging in regular physical activity is protective against late-life cognitive decline, however, the underlying neural mechanisms are not fully understood. The recent combination of transcranial magnetic stimulation (TMS) with electroencephalography (EEG) has made it possible to measure how activation of a targeted cortical area propagates to the rest of the brain (i.e. effective connectivity). Here, we used TMS-EEG to investigate the association between cortical effective connectivity and physical activity levels in older adults without dementia. 7-days of objectively measured 24-h activity data were captured using GENEActiv wrist-worn tri-axial accelerometers in 14 older adults (age range 56-82 years). TMS was applied to the left lateral prefrontal cortex, and EEG was recorded using 62 channels. The brain-wide response to left prefrontal TMS was determined using the global mean field amplitude (GMFA) area under the curve for two temporal windows: early (20-40 ms; reflecting the local response to TMS), and late (100-300 ms; reflecting propagation of TMS-evoked activity to connected brain regions). We found that time spent in light physical activity was positively associated with GMFA area for the late, but not early temporal window. No relationships were observed for sedentary behaviour or time spent in moderate-to-vigorous physical activity. These findings suggest that engagement in light physical activity promotes cortical effective connectivity in older adults. TMS-EEG is a novel approach that may provide new insights into how physical activity protects against dementia.

Dr Xanthe Golenko

Poster: No. 50

Email: x.golenko@griffith.edu.au **Theme**: Care

A call for age friendly communities: Examining the potential of intergenerational care programs in the Australian setting

Dr Katrina Radford, Dr Nerina Vecchio, Professor Janna Anneke Fitzgerald (Presenting Author), & Dr Xanthe Golenko (Corresponding Author)

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Intergenerational care programs provide care and social support for older adults and children in the same setting. The psychological benefits are well documented in the literature; however, little is known about the business case behind creating an intergenerational care program in Australia. This presentation will address this gap by presenting a summary of research to date that focuses on the sustainability of these models in terms of legislation, workforce, educational programs and funding models that would underpin a program in Australia. This is important to address because creating an intergenerational care program is likely to improve the inclusivity of older adults and improve childhood outcomes, such as reduced delinquency. Some of the findings that will be discussed include that intergenerational programs do fit the current legislative framework in Australia, however some considered thought is needed to match the workforce and building requirements. In addition, there is an opportunity to develop a new educational framework designed specifically to offer meaningful reciprocal interactions between older adults and children, and create new career paths connecting child care and aged care certifications between the two workforces. Furthermore, there is an established demand for intergenerational care among the Australian community. Thus, sustainable business models can exist for intergenerational care. This will provide consumers with a wider range of formal care options that better suit the diverse care needs of Australians.

Dr Leonardo Gollo

Poster: No. 51

Email: leonardo.gollo@qimr.edu.au **Theme:** Assessment and Diagnosis

Fragility of structural hubs in the human connectome: A framework to study evolution, neuropsychiatric disorders, and neurodegeneration

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Neurodegeneration in dementia is often studied in isolation, without regard to the broader context of brain structure and function. In this study, we employed computational methods to understand the impact of structural perturbations, as occur early in dementia, on the nature of the connectome – that is, the wiring diagram of the brain. To achieve this, we studied random variants of the connectome that introduce subtle perturbations to network topology while preserving the geometrical embedding of the brain. We first show that the presence of hubs widely distributed throughout cortical regions confers a wiring cost that the human brain minimizes. Although slight perturbations of brain networks reduce the wiring length of inter-hub connections, these perturbations quickly disconnect inter-hemispheric links to prefrontal hubs and yield daughter networks that substantially differ from one another. If the variation in structure is permitted to accumulate, strong peripheral connections progressively connect to central nodes and hubs shift toward the middle of the brain. Progressive randomization of brain networks also leads to a topologically unstable intermediate regime consistent with a phase transition in complex systems. Intriguingly, the fragility of hubs to disconnections shows a significant association with the acceleration of grey matter loss in early adulthood life that occurs in schizophrenia. Together with effects on wiring cost, we suggest that fragile prefrontal hub connections and topological instabilities act as evolutionary influences on complex brain networks whose set point may be perturbed in neurodegenerative and neuropsychiatric disorders. These findings form a basis for understanding the pattern of preferential cortical thinning in dementia, which we are now testing.

Dr Mojtaba Golzan

Poster: No. 52

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The association between retinal vascular changes and neocortical beta amyloid scores in the elderly: results of a two-year follow-up study

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2. Department of Clinical Medicine, Macquarie University, NSW
3. Australian e-Health Research Centre, CSIRO Health and Biosecurity, QLD

Introduction: The eye offers a natural window to the brain to investigate a series of physiological parameters that may be associated with Alzheimer's disease (AD). Using non-invasive retinal imaging, we studied the association between dynamic vascular changes and neocortical beta amyloid scores in an elderly cohort over two years.

Methods: 45 participants (79±5 yrs, 12 male) with subjective memory complaints but cognitively healthy (neuropsychological assessment) were recruited. All participants had a baseline and one year follow up Florbetaben positron emission tomography (PET) scan and retinal imaging. PET scans were analysed to measure cerebral amyloid levels based on the standardised uptake value ratio (SUVR). Retinal venous and arterial pulse (RVP & RAP) amplitudes were extracted from retinal videos using custom written algorithm.

Results: The mean neocortical beta amyloid (Aß) SUVR in the first and follow up year were 1.34±0.29 and 1.32±0.26, respectively. The mean RAP and RVP in the first and follow up year were 4.4±1.2, 5.7±1 um and 4.9±1.1, 5±0.8 um, respectively. There were no significant difference in SUVR from baseline to follow up ($p>0.05$). We observed a significant increase in RAP ($p<0.05$) and a significant decrease in RVP ($p<0.001$) values over two years.

Discussion: We did not observe a significant difference in amyloid scores over two years but we found a significant change in retinal vascular indices. This may be suggestive of a retinal pathophysiological manifestation that precedes cerebral amyloid deposition. However, further follow up is required to confirm cerebral amyloid exacerbation with progressive retinal vascular changes.

Dr Mark Greenough

Poster: No. 53

Email: magree@unimelb.edu.au **Theme:** Intervention and Treatment

Presenilin plays a key role in metalloproteostasis

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Australia Presenilin (PS) is the catalytic component of γ-secretase, a multiprotein aspartyl protease, that modulates the function of numerous type-1 transmembrane proteins via regulated intramembrane proteolysis. Presenilin has also been implicated in autophagy, a process thatdelivers proteins and cytoplasmic debris to lysosomes for degradation and amino acid recycling. Previously, we demonstrated that presenilin is required for normal cellular copper transport and to maintain the activity of superoxide dismutase 1 (SOD1), an antioxidant enzyme that requires copper for its activity. Perturbed copper and iron homeostasis is a feature of several neurodegenerative diseases including Alzheimer's disease (AD). Ferroptosis is a newly identified oxidative cell death mechanism that is distinct from other cell death pathways such as apoptosis.

It is triggered by iron-dependent lipid peroxidation and can be induced in cell culture using small molecule inhibitors that target cellular antioxidant defence systems. Compounds known to inhibit ferroptosis include liproxstatin-1, ferrostatin-1 and deferiprone. Importantly, the iron chelator deferiprone is about to go into a human trial to test whether it can slow Alzheimer's disease progression. In the current study, we are investigating a potential link with presenilin function and ferroptosis using a murine presenilin knockout cell culture model as well as cultured fibroblasts from patients harbouring presenilin mutations that cause familial Alzheimer's disease (FAD).

Dr Alexandra Grubman

Poster: No. 54

Email: alexandra.grubman@monash.edu **Theme:** Intervention and Treatment

Profiling phagocytic microglia in Alzheimer's disease model mice

Alexandra Grubman 1, 2 ,*, Xin Yi Choo 1, 3,*, Guizhi Sun 1,2, Zehra Abay 1,2, Jonathan Chan 1,2, Nathan Croft 4, Christian Nefzger 1,2, Fernando Rossello 1,2, Sarah Williams 1,2, Paul McMenamin 1, Siew Yeen Chai 5, Ryan Lister 6, Anthony Purcell 4, Jose

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Microglia are specialist immune sentinel cells in the brain parenchyma that besides removing cellular and extracellular debris, also mediate a plethora of effects regulating synaptic plasticity, maturation and removal, thus their function is vital to normal physiological processes and to pathological processes in the brain. The phenotypic diversity of microglia is progressively becoming recognised, including their rapid and potentially reversible ability to adopt distinct and dynamic phenotypes in ageing and disease, as well as upon removal from their native environment. Although a multi-systems level link between microglia and Alzheimer's disease (AD) has now been conclusively established, the role of microglia in AD remains highly controversial. For instance does their potential toxicity to neurons in a chronically inflamed environment and their tendency in AD to aberrantly overprune synapses outweigh their protective amyloid clearance function, and how is this regulated on a spatio-temporal scale during AD progression? Our work sought to address these questions by exploring the molecular and functional changes occurring in different subtypes of microglia from healthy and 5xFAD AD model mice. We determined that microglia that were not in direct contact with amyloid plaques in vivo were highly molecularly similar to healthy microglia, even in animals with advanced plaque pathology. On the contrary, we found several hundred differentially expressed genes between amyloid-containing and healthy microglia.These genes were involved, among other functions, in phagolysosome and antigen presentation pathways, which were also confirmed by single cell RNA-Seq. Functional analyses are ongoing to determine whether this microglial subset arises as a direct response to amyloid exposure as well as the functional outcome of these microglia in AD.

Dr Vivek Gupta

Poster: No. 55

Email: vivek.gupta@mq.edu.au **Theme:** Intervention and Treatment

Alzheimer's disease associated pathways identified in human glaucoma retinal and vitreous proteome

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Both glaucoma and Alzheimer's disease (AD) are neurodegenerative and chronic disorders. We have previously demonstrated that AD is associated with ocular deficits including retinal thinning and reduced electrophysiological response. However, the molecular basis for this link remains obscure. This study was designed to evaluate the association between glaucoma and AD by investigating glaucoma-associated protein changes in the retina and vitreous humour. The multiplexed Tandem Mass Tag based proteomics was carried out on retinal tissue and vitreous humour fluid collected from glaucoma patients and age-matched controls followed by functional pathway and protein network interaction analysis. About 5000 proteins were quantified from retinal tissue and vitreous fluid of glaucoma and control eyes. Of the differentially regulated proteins, 122 were found linked with AD pathophysiology. Pathway analyses of differentially regulated proteins indicate defects in mitochondrial oxidative phosphorylation machinery. The classical complement pathway associated proteins were activated in the glaucoma samples suggesting an innate inflammatory response. Majority of the common differentially regulated proteins in both tissues were members of functional protein networks associated with AD neuropathology. Identification of previously reported and novel pathways in glaucoma that overlap with AD promises to provide renewed understanding of the aetiology and pathogenesis of age related neurodegenerative diseases.

Dr Veer Bala Gupta

Poster: No. 56

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Longitudinal effect of Clusterin levels on cortical atrophy in Australian imaging biomarkers lifestyle study of ageing

Veer Bala Gupta* , Shen K, Pedrini S, Hone E, Vincent D, Bush A, Rowe C, Villemagne V, Ames D, Masters C, Salvado O, Martins R, and the AIBL Research Group

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Clusterin is associated with Alzheimer's disease (AD) pathogenesis, and higher level of clusterin correlates with faster cognitive decline in AD. In this study, we investigate the effect of clusterin levels on atrophy as measured by cortical thickness on Magnetic Resonance Imaging (MRI) data. The data of 87 (35 M) healthy subjects aged 68.8 (SD 5.9) years old from AIBL was used in this study. Clusterin levels of each subject was measured at baseline, with 18 months and 36 months follow-ups. We used a linear mixed effects model to model temporal reduction of cortical thickness, with respect to age, gender, APOE ε4 allele status, baseline clusterin level, and amyloid status. Clusterin levels are negatively associated with cortical thickness (p=0.026) at baseline. However, the significant interaction between time-point and clusterin levels (p=0.002) indicates that a higher clusterin level was associated with slower decline in cortical thickness. Although the baseline clusterin levels are associated with thinner cortex, during the course of aging, a higher level of clusterin is associated with slower decline in the cortical thickness. This reinforces our earlier work indicating that increase in plasma clusterin levels may occur as a response to the aging/ disease process.

Miss Karra Harrington

Poster: No. 57

Email: karra.harrington@florey.edu.au **Theme:** Assessment and Diagnosis

Cognitive ageing in the context of preclinical Alzheimer's disease

KD Harrington, YY Lim, D Ames, S Rainey-Smith, O Salvado, VL Villemagne, CC Rowe, CL Masters, P Maruff

AIBL Research Group

The phenomenon of cognitive ageing, whereby multiple cognitive abilities decline with increasing age throughout late life, has been well described. However, many studies of normal age-related cognitive changes do not account for the presence of preclinical dementia or other health factors in their samples. Preclinical Alzheimer's disease (AD), as indicated by elevated levels of amyloid-ß (Aß), is highly prevalent (10-30%) and associated with substantial cognitive

decline in cognitively normal older adults. Failure to account for the presence of Aß in normal ageing samples may negatively bias estimates of age-related cognitive decline. The aim of this study was to determine the effect of preclinical AD on estimates of cognitive ageing in individuals aged over 60 years. The effect of increasing age on cognitive composites (verbal memory, verbal fluency, psychomotor speed, fluid intelligence) was estimated from a large robust sample of cognitively normal older adults (n=382) whose Aß status (+/-) had been classified with PET neuroimaging. The extent to which Aß status contributed to age-related cognitive decline was then determined from linear mixed models, and the rates of change in cognition between those with high and low Aß were compared. Over 72 months, age was consistently associated with decline in all four cognitive composites. Aß status significantly contributed to the linear mixed models for verbal memory and fluid intelligence. The Aß+ group showed more rapid decline for verbal memory, as well as worse fluid intelligence in general, compared to the Aß- group.

The results of this study indicate that elevated Aß is associated with substantial decline in verbal memory and impairment in fluid intelligence. Thus, previous studies may have confounded the effect of Aß with age in their estimates of cognitive ageing for these abilities.

Dr Amy Heffernan

Poster: No. 58

Email: amy.heffernan@florey.edu.au **Theme:** Intervention and Treatment

Is iron storage impaired in ageing?

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Iron is involved in many essential biological processes, including cell division, neurotransmission and oxygen transport. Perturbed iron homeostasis, such as the accumulation of brain iron with age, can lead to oxidative stress and neuronal damage underlying neurodegenerative processes such as those observed in Alzheimer's disease. Age is the single biggest risk factor for developing sporadic Alzheimer's, and iron elevation may be a critical factor in both ageing and neurodegeneration. Ferritin is the protein responsible for safe iron storage, and is conserved across taxa, including Caenorhabditis elegans. This microscopic nematode is a widely used animal model of ageing and is easily genetically manipulated. The C. elegans genome is well characterised, and importantly has homology with higher-order species providing an opportunity to study the relationship between neurodegeneration and iron metabolism.

We are developing new analytical methods to assess ferritin levels in aged tissues, iron load in ferritin, and post translational modifications that alter protein function, to better understand the fundamentals of ageing. I will present an optimized protocol for purification and absolute quantitation of ferritin from cell lysate using stable isotope-labelled peptide standards, and high-resolution tandem mass spectrometry. In addition, I will describe complementary genome editing experiments and data mining of ageing C. elegans transcriptomics. Finally, I will discuss how we may transfer our approaches to other animal systems, such as the mouse, to observe changes in iron homeostasis in ageing animals. When conserved across taxa, these changes present a therapeutic target for age-related neurodegenerative diseases in humans.

Ms Amelia Hicks

Poster: No. 59

Email: amelia.hicks@monash.edu **Theme:** Assessment and Diagnosis

Traumatic brain injury and the risk of Neurodegenerative disease: Review of the literature

Amelia Hicks 1, Gershon Spitz 1,2, Jennie Ponsford 1

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Traumatic brain injury (TBI) can be a devastating life-long condition that significantly reduces quality of life. With improvements in critical care and rehabilitation, many individuals survive beyond the acute period; carrying their injury across the lifespan as they develop and grow old. This has led researchers to focus on how the biological aging process may manifest in the context of an already vulnerable and traumatised brain, and how this could affect clinical outcomes for survivors. Foremost within this field of research is the question as to whether a brain injury may increase risk of Alzheimer's disease (AD). Despite many papers on this topic stating that TBI has been confirmed as an important risk factor for AD, findings from observational studies using clinical samples are significantly mixed and are of low methodological quality. This presentation provides a comprehensive review of previous literature, summarising the research findings to date and highlighting the key limitations common to much of this research. This includes a systematic and critical examination of

study design, sample size and power, use of controls and informants, measurement and diagnosis of both TBI and AD, and statistical analyses used. Recommendations are provided for how to improve the quality of research in this area, a critical next step in answering the question of whether a TBI is indeed a risk factor for AD.

Dr Camilla Hoyos

Poster: No. 60

Email: camilla.hoyos@sydney.edu.au **Theme:** Prevention

Arterial stiffness and executive dysfunction in older adults 'at risk' of cognitive decline

Kahala Dixon 1, Haley LaMonica 1, Shantel L Duffy 1,2, Ian B Hickie 1, Craig L Phillips2, Ronald R Grunstein2, Sharon L Naismith 1*, Camilla Hoyos 1,2* (joint last authors).

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2. Centre for Sleep and Chronobiology, Central Clinical School Woolcock Institute of Medical Research, University of Sydney

Background: Cardiovascular disease (CVD) in older people has been linked with cognitive impairment, particularly in the domains of executive function and processing speed. However, prior research examining such relationships in the elderly has largely focused on people with established cardiovascular disease. In this study, older adults without established cardiovascular disease, but at risk for cognitive decline, were investigated to determine whether carotid-femoral pulse wave velocity (PWV), an early marker of vascular integrity and arterial stiffness, relates to subtle changes on neuropsychological measures of executive function and processing speed.

Methods: Individuals with subjective mood and/or cognitive concerns underwent medical, psychiatric, neuropsychological and PWV assessments. Primary outcomes were processing speed as measured by the Trail Making Test Part A, executive functioning as measured by DKEFS (response inhibition) and Trail Making Test Part B (set-shifting). The secondary outcome included of memory, specifically new learning (encoding) and delayed recall (Rey Auditory Visual Learning Test).

Results: In 56 individuals, those with high PWV (≥12.0m/s) had significantly poorer executive function as demonstrated on TMT-B, compared to those with low PWV (<12.0m/s). There was a moderate negative correlation (r=-0.38, p=.004) between PWV and performance. There was no relationship between PWV and tests of processing speed or memory.

Conclusions: Our results confirm that in older adults at-risk for cognitive decline, early markers of CVD are associated with subtle decrements in rapid set-shifting, a component of executive functioning. These findings support efforts for the early detection and management of CVD, as a secondary prevention strategy for cognitive decline in middle-aged and older individuals.

Professor Alison Hutchinson

Poster: No. 61

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Reducing harm, in the acute hospital setting, to people displaying symptoms associated with a neurocognitive disorder

Hutchinson, AM 1 2, Rawson, H 1 2, Richardson, B3, Peel, C2, Tomlinson, E 1, Ockerby, C 1, Bucknall, T 1 4, Chalmers, C5, Campbell, D5 6, O'Connell, B7, Redley, B 1 2

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Background: People displaying behavioural and psychological symptoms (BPS) related to neurocognitive disorders are at high risk of preventable harm during hospitalisation. Tailored interventions can help reduce symptoms and risk of harm. Management in acute hospitals, however, is rarely consistent with best practice recommendations.

Aims: 1. Co-produce a knowledge translation (KT) strategy to promote use of best practice to prevent harm to people displaying BPS. 2. Evaluate acceptability and feasibility of the strategy in two acute hospital settings.

Method: An integrated-KT approach was used to co-produce, implement and examine the acceptability, feasibility and outcomes of the KT strategy (comprising facilitation, education, and a point-of-care decision support tool). A mixed-methods approach was used to collect process and outcome data. We will present findings from the analysis of: naturalistic

observation (n=163 hours), self-report surveys (n=95) and incident data (1-year retrospectively and 1-year prospectively).

Results: Significant increases were found in the number of strategies used to manage BPS (pre: M=1.67, SD=1.44, post: M=4.16, SD=1.67), and nurses' knowledge about neurocognitive disorders. During the intervention, a downward trend in continuous observer hours was observed, as well as in monthly medication error (baseline: M=3 per month; intervention: M=2 per month) and fall (baseline: M=5 per month; intervention: M=4 per month) rates.

Conclusion: The KT strategy was associated with improved use of best practice and reduced harm.

Dr Sharna Jamadar

Poster: No. 62

Email: sharna.jamadar@monash.edu **Theme:** Assessment and Diagnosis

Assessment of brain reserve using simultaneous MR-PET imaging

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The concept of reserve refers to the mind's resilience to damage to the brain. Brain reserve refers to the capacity of the biological substrate to withstand damage, and cognitive reserve refers to the use of cognitive strategies to adapt to changes to the brain. It is well established that brain and cognitive reserve can delay the onset of functional impairments due to ageing, neurodegeneration and possibly dementia, however the neural mechanisms of the protective effect are poorly understood. Ageing is associated with widespread changes in the metabolic efficacy of the brain, which underpins the functional cognitive impairments seen in older age. Changes in brain metabolism may also be associated with amyloid accumulation and cerebral oxidative stress, and be associated with increased risk of Alzheimer's disease. In this study, we develop a novel MR-PET simultaneous acquisition of blood oxygenation level-dependent (BOLD) functional magnetic resonance imaging (fMRI) and [18F]-fluorodeoxyglucose (FDG) functional positron emission tomography (fPET) protocol to study the neural bases of reserve. The protocol includes a dynamic acquisition of the FDG-PET data, offering an effective temporal resolution of 1-min, while simultaneously providing a BOLD-fMRI contrast with temporal resolution of 2 secs. We report preliminary results from a study of older (over 65-yrs) and younger (18-25yrs) adults scanned using BOLD-fMRI/FDG-fPET while performing a cognitive reserve task. Brain reserve measures are quantified using structural MRI (grey matter, white matter, tractography), functional MRI (neural activity) and FDG-PET (glucose metabolism) and are linked to neuropsychological profiles of cognitive reserve. This novel approach is a promising development in the study of metabolic determinants of age-related cognitive decline and the relationship between metabolic factors and the development of neurodegenerative changes and Alzheimer's pathology in the ageing brain.

Professor Yun-hee Jeon

Poster: No. 63

Email: yun-hee.jeon@sydney.edu.au **Theme**: Care

Optimising independence of older persons with Dementia - Interdisciplinary Home-Based Reablement Program (I-HARP)

The University of Sydney

I- HARP is a bio-behavioural-environmental model and integrates proven strategies into a comprehensive, person-centered, interdisciplinary, bundle program. It is delivered over 4 months with a goal to enhance the function of older persons with dementia and other chronic age related conditions, such as pain, incontinence, and polypharmacy. I-HARP consists of 1) 12 home visits of 1.5 hours (5-6 OT, 3-4 RN, plus 2-4 additional options of allied health), tailored to the individual client's needs; 2) up to A$1000 home maintenance and assistive devices; and 3) working in partnership with the carer throughout the process. Out pilot RCT of I-HARP with community dwelling people with amnestic mild cognitive impairment (MCI) and mild to moderate stages of dementia (n=18 client-carer dyads) showed promising results post intervention in terms of goal attainment, improved mobility and independence, no entry to higher care levels, and both self-perceived and observed client's wellbeing and confidence. The intervention group showed improvement in self-care and independence using the Disability Assessment for Dementia (DAD) while the control group had a further decline (giving a clinically meaningful effect size of 0.61; Cohen's d=.36). I-HARP addresses a major gap that exists in ways of providing reablement care for people at early to moderate stages of dementia with multimorbidities where multi and interdisciplinary team efforts would likely have higher impact.

Dr Lisa Kalisch Ellett

Poster: No. 64

Email: lisa.kalisch@unisa.edu.au **Theme:** Intervention and Treatment

Duration of risperidone use for behavioural and psychological symptoms of dementia is decreasing, but is still longer than recommended

Lisa M Kalisch Ellett 1, Nicole L Pratt 1, Mhairi Kerr 1, Michael Woodward 2, Elizabeth E Roughead 1

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Background and aims: In June 2015, use of risperidone for the management of the behavioural and psychological symptoms of dementia (BPSD) was restricted to patients with Alzheimer's dementia for a maximum duration of 12-weeks, due to the risk of serious adverse events. We aimed to determine whether the duration of use of risperidone for BPSD decreased in the aged-care setting following these changes.

Methods: We conducted a retrospective cohort study using Australian Government Department of Veterans' Affairs administrative claims data. Gold card holders living in aged-care from 1 July 2015 to 30 June 2016, and a comparison cohort living in aged-care from 1 July 2012 to 30 June 2013 were included. We identified the number of people in each cohort dispensed risperidone and calculated their duration of use. We calculated the duration of use of other medicines used off-label for BPSD to determine whether there was inappropriate therapeutic shift.

Results: In 2012/13, the median age was 89 years (interquartile range (IQR) 86-91) and the median duration of risperidone use was 336 days (IQR 176-365). In 2015/16, the median age was 91 years (IQR 88-93) while median duration of risperidone use decreased to 240 (IQR 120-365) days. Median duration of use of other medicines decreased or remained unchanged from 2012/13 to 2015/16, suggesting that there was no inappropriate therapeutic shift.

Conclusions: Duration of use of risperidone in aged-care residents has decreased; however, over 75% of patients were dispensed enough risperidone to last longer than the recommended maximum 12-weeks duration.

Dr Christopher Karayiannis

Poster: No. 65

Email: chris.karayiannis@monash.edu **Theme:** Prevention

A twin study of type 2 diabetes and cognition – the role of central aortic haemodynamics and cerebral perfusion

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6. Department of Statistics, Data Science and Epidemiology, Swinburne University of Technology, Melbourne, Australia

Background: The mechanisms underlying the link between Type 2 diabetes (T2D) and dementia are poorly understood. We hypothesized that changes in central arterial haemodynamics and cerebral perfusion may play a role.

Methods: Cross-sectional sample of twins discordant for T2D. Measurements included neuropsychological battery, brain MRI with arterial spin labelling (ASL), and non-invasive 24-hour central BP monitoring. Paired comparisons, voxel-wise comparisons and linear mixed modelling were used to study associations of T2D with cognition, cerebral blood flow (CBF), and central haemodynamics.

Results: There were 23 twin pairs, mean age 63.7 (SD=6.1) years. T2D was independently associated with poorer attentional ability (ß=-0.45, p<0.001) independent of age and sex, but not with memory or speed. T2D was not associated with global or regional reductions in daytime CBF. Aortic reservoir pressure (ß=0.017, 95% CI 0.0021 to 0.032, p=0.026) was associated with better attention independent of age, sex, and T2D. Aortic excess pressure integral was associated with global CBF (ß=-0.78 p=0.04), but other measures of central haemodynamics were not. T2D was associated with reduced nocturnal central systolic BP dipping (ß=-3.79, p=0.027). The magnitude of the negative association between T2D and attention was reduced in the presence of greater central systolic BP dipping (p for interaction=0.015).

Conclusion: The association of T2D with cognitive function was not influenced by daytime cerebral perfusion. Aortic reservoir pressure may be relevant to cognitive function, but independent of T2D. The effect of T2D on cognitive dysfunction is dependent on the degree of nocturnal central BP dipping.

Dr Hannah Keage

Poster: No. 66

Email: hannah.keage@unisa.edu.au **Theme:** Assessment and Diagnosis

Objective cardiometabolic risk burden associates with functional brain activity independently of cognitive function in late-life

Keage, Hannah A.D.; Greaves, Danielle; Tregoweth, Emma; Feuerriegel, Daniel; Smith, Ashleigh

Cognitive Ageing and Impairment Neurosciences, University of South Australia; Alliance for Research in Exercise, Nutrition and Activity, University of South Australia; School of Psychology, University of Melbourne

Cardiometabolic diseases such as obesity, type II diabetes and hypertension, are primary modifiable risk factors for late-life dementia. A current focus of research is understanding the cognitive and biological trajectories of cognitive impairment with a cardiometabolic origin: from no impairment, to Vascular Cognitive Impairment No Dementia (VCIND), a form of Mild Cognitive Impairment, to dementia. This study aimed to investigate cross-sectional associations between cardiometabolic burden, cognitive performance (Addenbrooke's Cognitive Examination/ACE-III) and functional brain activity (event-related potentials/ERPs) during an executive function task. A total of n=77 (56% female) adults between 50 and 80 years of age completed a graded difficulty n-back task – 0, 1 and 2-back – from which ERPs were calculated. Cardiometabolic risk was calculated using standard clinical cut-offs for: hyptertension, obesity (waist:hip), type II diabetes (fasting blood glucose) and high total cholesterol (blood analysis). Mixed-effects modelling showed that the early P1 and N1 components were not associated with cardiometabolic burden; but the later P3 component significantly attenuated as cardiometabolic burden increased, across all difficulty levels. Increasing age and a lower ACE-III score also predicted attenuated P3 responses, with smaller effect sizes than cardiometabolic burden. Findings indicate that cardiometabolic diseases and risk factors are independently associated with functional brain activity during an executive function task, a domain known to be first affected in VCIND. This work extends previous reports of cardiometabolic risk being associated with structural brain changes, and suggests that ERPs may be a sensitive marker of cardiometabolic burden change during intervention trials.

Dr Michelle Kelly

Poster: No.67

Email: Michelle.Kelly@newcastle.edu.au **Theme:** Intervention and Treatment

Management of the Behavioural and Psychological Symptoms of Dementia in the home: A systematic Review

Michelle Kelly 1, Rochelle Watson 2, Jen Engel 2, Elise Mansfield 2, Jamie Bryant 2, Rob Sanson-Fisher 2

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Aims: The behavioural and psychological symptoms of dementia (BPSD) are arguably very challenging for family carers to manage. This systematic review aimed to provide a snapshot of the volume and scope of peer-reviewed papers which report on the management of BPSD in the home across three-time points. Methods: Eligible papers were published in English and reported on the management of BPSD in the home for the years 1994, 2004 and 2014. Electronic databases Medline, PsycInfo and CINAHL, were searched using MeSH headings and keywords. Studies meeting eligibility criteria were coded into categories; 1) data-based papers including descriptive and intervention, and 2) non-data-based papers such as commentaries and reviews.

Results: A total of 153 eligible studies were identified. Of these 93 were descriptive, 27 were intervention and 33 were non-data-based. Over the three-time periods examined there has been a significant increase in both the number of studies published overall, as well as the numbers within each category. Of the intervention studies, only nine randomised trials aimed to reduce the impact of behaviours associated with dementia in the home. Conclusions: While the overall number of studies investigating behaviours associated with dementia in the home increased over the three-time points examined, most studies continued to describe the problem rather than rigorously testing interventions to contribute to knowledge that can guide clinical interventions. Funded by: National Health and Medical Research Council Dementia Research Team Grant (Australian Community Of practice in Research in Dementia' (ACcORD).

Miss Clare Kempnich

Email: clare.kempnich@monash.edu **Theme:** Intervention and Treatment

Poster: No. 68

Feasibility and efficacy of computerized emotion recognition remediation in premanifest and early-symptomatic Huntington's disease

Monash University

Social cognitive deficits, including difficulty in the recognition of negative emotional expressions, emerge before clinical diagnosis in Huntington's disease (HD), and may affect patients' everyday social function. Despite these well-characterized impairments, we are not aware of any available remediation programs to improve emotion recognition in HD. To address emotion recognition deficits we conducted an initial study of the feasibility and efficacy of computerized training of emotion recognition in HD. Twenty-two individuals with premanifest or early symptomatic HD were randomly assigned to either the training or control group. The training group used a self-guided online emotion recognition training program, MicroExpression Training Tool (METT), twice weekly for four weeks. Participants in both the training and control group completed measures of emotion recognition at baseline and post-training time-points. Participants in the training group also completed training adherence measures. Participants in the training group completed seven of the eight sessions on average. Our results showed a significant group by time interaction which suggested that METT training was associated with improved accuracy in emotion recognition for participants in the training group. Our study demonstrates that emotion recognition remediation using the METT is feasible in terms of training adherence. Although our sample size was small, the evidence also suggests METT may be effective in premanifest or early-symptomatic HD, opening up a potential new avenue for social-cognitive intervention. Further study with a larger sample size is needed to replicate these findings, and to characterize the durability and generalisability of these improvements, and their impact on everyday social function in HD.

Associate Professor Anna King

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Theme: Intervention and Treatment,

Poster: No. 69

Maintaining connectivity in neurodegenerative disease

Atkinson RA 1, Leung J 1, Tian N 1, Kirkcaldie M 1, Fair H 1, Bibari O 1, Wilson R2, Vickers JC 1, King AE 1

1. Wicking Dementia Research and Education Centre, University of Tasmania
2. Central Science Laboratory, University of Tasmania

Axonal and synaptic degeneration are key pathological feature of neurodegenerative diseases, although the mechanisms are yet to be determined. Our research goal is to determine the cause of these degeneration pathways in order to target therapeutic protection. In this project, we have investigated the role of TDP-43, a protein implicated in frontotemporal dementia, in regulating the formation and maintenance of neurites in in vitro and in vivo models. Methods: Primary cortical neurons, were derived from transgenic mice expressing human wildtype (WT) TDP-43 as well as from WT mice. To examine the effect of TDP-43 in vivo, AAV2 virus was used to introduce human WT-TDP-43 and TDP-43 with a mutation in the nuclear localization signal (DNLS) into retinal ganglion cells (RGCs) and the effect on axons examined histologically. Results: Over-expression of TDP-43 in cultured neurons resulted in significantly ($p<0.05$) more branching and significantly ($p<0.05$) altered growth cone morphology at 3 days. Label-free quantitative proteomic analysis, followed by functional classification of significantly modulated proteins (t-test, FDR<1%) revealed that actin-binding proteins were among the most down regulated proteins (DAVID enrichment score 4.1). RGC expression of DNLS-TDP-43, but not WT-TDP-43 resulted in a significant ($p<0.05$, $n=10$) loss of visual acuity at 6 weeks post injection. Preliminary studies using electron microscopy suggested that altered TDP-43 induced axonal pathology including swollen axon structures filled with organelles. Conclusion: These data suggest that TDP-43 pathology could result in cytoskeletal changes and neurite dysfunction leading to synaptic disconnection. Targeting the cytoskeleton may be a therapeutic target for FTD.

Professor Glynda Kinsella

Poster: No. 70

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Translating an Evidence-Based Cognitive-Behavioural Intervention for People with Mild Cognitive Impairment into a Community-Based Organisation: Benefits and Challenges

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Background and aims: People with mild cognitive impairment (MCI), a risk factor for dementia, are seeking interventions for maintaining independence. However, current services are limited. This study investigated translation of a research-evaluated intervention (the La Trobe-Caulfield Hospital [LaTCH] Memory Group) into the early intervention services of Alzheimer's Australia Vic.

Method: Over three years, seven Alzheimer's Australia Vic staff trained as facilitators of LaTCH Memory Groups for 161 people with MCI and their families. Twelve clients were interviewed regarding experiences from participating in LaTCH groups. The seven trained staff also reported on gains for clients, change in their own practice after running the groups, and factors that assisted or formed barriers in implementing the program.

Results: Using qualitative analysis ('Most Significant Change' technique), clients and staff highlighted the benefits of shared experience through group participation, which reduced anxiety and increased re-engagement in life activities. Further benefits related to improvement in self-confidence and self-efficacy in managing memory and upskilling in use of compensatory strategies. An additional benefit was that family and social relationships improved. Positive change in staff's own practice related to increased practical knowledge of everyday memory challenges, leading to greater role-satisfaction and self-efficacy. Staff also identified several challenges in running and sustaining the program.

Conclusions: Cognitive-behavioural interventions delivered in a community setting can be effective and increase service access opportunities for older people with memory problems. Preparedness to address the specific challenges in delivering new services within community organisations is necessary to improve the translation and sustaining of these programs.

Dr Amit Lampit

Poster: No. 71

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Design of controls in trials of computerised cognitive training is ineffectual: A meta-analysis in healthy older adults

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Background: Computerised cognitive training (CCT) is an efficacious and safe intervention for cognitive enrichment in older adults. However, as effective masking of the therapeutic effect is challenging and blinding of participants is implausible, it is difficult to quantify the contribution of non-specific effects such as expectancy bias ('placebo effect') or the importance of trial design choices.

Methods: We performed a meta-analysis of control group data from 57 RCTs investigating the cognitive effects of CCT in healthy older adults, encompassing 63 control groups and 2,712 participants. Mixed-effects analyses and meta-regressions were used to determine predictors of control group ('placebo') response. All moderator analyses were powered at >90% to detect a 0.15SD difference between subgroups at the alpha=0.001 threshold.

Results: There were no statistically significant differences between: active control (k=30, g=0.18, 95% CI 0.12 to 0.24) or passive control groups (k=33, g=0.12, 95% CI 0.08 to 0.16); blinded (k=32, g=0.15, 95% CI 0.09 to 0.20) or non-blinded assessors (k=31, 95%, g=0.16, 95% CI 0.10 to 0.21); adherence to intention-to-treat analysis (k=30 g=0.14, 95% CI to 0.10 to 0.18) or non-adherence (k=33, g=0.14, 95% CI 0.07 to 0.20). Across trials, the effect size in the CCT arm explained most of the variance in their respective control arm (ß=0.22, p<0.01, R2=0.86).

Conclusions: Contrary to common practice, supposed 'gold standards' of intervention trial design appear to be ineffectual in CCT studies. Given sham controls are costly and do not seem to add rigour to trials in the field, a shift to head-to-head trials is recommended to better inform clinical and community translation.

Prof Simon Lewis

Poster: No. 72

Email: profsimonlewis@gmail.com **Theme:** Assessment and Diagnosis

Predicting Dementia and Parkinson's in the clinic

Simon Lewis MBBCh BSc FRCP FRACP MD,Professor of Cognitive Neuroscience

Brain & Mind Centre, University of Sydney

Transitioning from healthy brain ageing to a neurodegenerative disease is a relatively slow chronic process that must include a prodromal phase with subtle pre-clinical features that if appreciated would lead to earlier diagnostic certainty and a window for intervention. One of the most exciting areas for predicting neurodegeneration relates to our greater understanding of sleep disturbances. For example, patients who are destined to develop Parkinson's Disease or Lewy Body Dementia (LBD) are likely to experience dream enactment behaviour known as Rapid Eye Movement Sleep Behaviour Disorder (RBD), for several years before their classic diagnostic features emerge. Furthermore, the presence of RBD combined with anosmia, reduced colour vision discrimination and parkinsonism carries a 65% risk of transitioning to a synucleinopathy over the next 3 years. My work is performing detailed phenotyping across patient groups including Idiopathic RBD, Mild Cognitive Impairment (MCI) and Familial LBD and utilises novel investigative techniques including neuropsychological paradigms, functional neuroimaging, neurophysiology, actigraphy, gait analysis, genotyping, chronobiology and polysomnography to explore the neural correlates of specific symptoms. Significantly, my Fellowship has already identified that MCI patients who report RBD have a neuropsychological profile akin to that seen in LBD (J Geriatr Psychiatry Neurol 2017). This suggests that more detailed screening of such patients might allow targeted intervention strategies in at risk cohorts.

Miss Li Li

Poster: No. 73

Email: li.li4@griffithuni.edu.au **Theme:** Living with Dementia

Developing a dementia-specific preference-based measure (AD-5D) in Australia: Valuation study protocol

Centre For Applied Health Economics, School of Medicine, Griffith University,

Introduction: Generic instruments for assessing health-related quality of life may lack sensitivity to detect changes in health specific to certain conditions, such as dementia. The QOL-AD is a widely used and well validated condition specific instrument for assessing health-related quality of life for people living with dementia, but it does not enable the calculation of Quality Adjusted Life Years (QALYs), the basis of cost utility analysis. This study will generate a preference-based scoring algorithm for a health state classification system (the AD-5D) derived from the QOL-AD.

Methods/analysis: Discrete Choice Experiments (DCE) with duration and Best-Worst Scaling (BWS) health state valuation tasks will be administered to a representative sample of 2,000 members of the Australian general population via an online survey and to 250 dementia dyads (250 people with dementia and their carers) via face-to-face interview. A multinomial (conditional) logistic framework will be used to analyse responses and produce the utility algorithm for the AD-5D.

Discussion: This project will develop utility value sets for the new dementia-specific economic analysis tool, the AD-5D, from both a sample of the general population and a sample of dementia dyads using two elicitation techniques: DCE with duration and BWS. The algorithms developed will enable prospective and retrospective economic evaluation of any treatment or intervention targeting people with dementia where the QOL-AD has been administered. Additionally, the administration of the DCETTO and BWS tasks to dementia dyads via interview provides an opportunity to collect in-depth information on the elicitation processes of this population, for which dementia interventions are designed for.

Dr Qiao-Xin Li

Poster: No. 74

Email: q.li@unimelb.edu.au **Theme:** Assessment and Diagnosis

Affirming the clinical application of CSF biomarkers for diagnosis of Alzheimer's disease and Creutzfeldt–Jakob disease based on Australian cohorts

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Differential diagnosis of Alzheimer's disease (AD) and Creutzfeldt–Jakob disease (CJD) is supported by biomarkers in the cerebrospinal fluid (CSF). Amyloidß1-42 (Aß42), Total-tau (T-tau) and phospho-tau (P-tau) proteins, measured by ELISA have been extensively studied and are increasingly used in memory clinics to support the clinical diagnosis of dementia or mild cognitive impairment (MCI) due to AD, as well as in screening of patients for therapeutic trials. T-tau is also widely used to support the diagnosis of CJD. In the absence of international consensus regarding analyte cutoff thresholds, we, as a NATA accredited National Diagnostics Laboratory (NDDL), determined the cut-points of the individual proteins based on an Australian AD cohort defined by positive Aß-amyloid PET imaging (n=120/21/16, Healthy control/MCI/AD), and a definite (neuropathologically verified) sporadic CJD cohort (n=132/123, CJD/non-CJD). Cross-validated accuracy, using all three biomarkers or the ratio of P-tau or T-tau to Aß42 to predict MCI/AD, reached ³92% sensitivity and specificity. To expand our biomarker armamentarium for sporadic CJD, the utility of T-tau in sporadic CJD was also determined, with the sensitivity and specificity of 84% and 82%, respectively at the cutoff of 1072 pg/ml, and 83% accuracy. In parallel studies, 14-3-3 protein was detected by western blot with a dichotomised (positive versus negative) classification of the protein providing a sensitivity and specificity of 89% and 67%, respectively with accuracy of 79%. Of additional benefit CSF T-tau and 14-3-3 protein detection were complementary for supporting the diagnosis of sporadic CJD, with 10 of the 21 CJD cases with either negative 14-3-3 results or technically unsuitable CSF samples revealing a T-tau above the cut-point providing a combined sensitivity of 92%.

Our study offers additional support for the use of CSF biomarkers in the early and accurate detection of AD neuropathology as the explanation for cognitive impairment, as well as enrichment of patient cohorts for treatment trials even at the pre-symptomatic stage, with T-tau also offering utility additional to 14-3-3 protein detection in the evaluation of suspected sporadic CJD.

Dr Yen Ying Lim

Poster: No. 75

Email: yen.lim@florey.edu.au **Theme:** Assessment and Diagnosis

Age increases rate of Aß and δ4 related memory decline in preclinical Alzheimer's disease

Yen Ying Lim, Robert H Pietrzak, Simon M Laws, Victor L Villemagne, Tenielle Porter, Stephanie Rainey-Smith, Christopher Fowler, David Ames, Ralph N Martins, Pierrick Bourgeat, Christopher C Rowe, Colin L Masters and Paul Maruff, on behalf of the *AIBL Research Group*
Florey Institute of Neuroscience and Mental Health

Background: In non-demented adults, both high amyloid (Aß+) and carriage of the apolipoprotein E (APOE) ε4 allele increase risk for cognitive decline and dementia. Further, Aß+ related cognitive decline is increased substantially by the presence of at least one copy of the APOE ε4 allele. Despite advances in Aß biomarkers, age remains the greatest risk factor for dementia, particularly Alzheimer's disease (AD). As APOE ε4 increases risk for Aß+ and older adults are also more likely to be Aß+, it is important to understand the extent to which age influences the effects of ε4 on Aß+ related memory decline. This study aimed to determine the extent to which the APOE ε4 allele influenced Aß related cognitive change in adults aged between 60-74 and 75-90 years old.

Methods: Non-demented adults (n=485) enrolled in the AIBL study underwent Aß neuroimaging and ε4 genotyping. Episodic Memory was assessed at baseline, 18-, 36-, 54- and 72-month follow-ups. Participants were classified as Aß- or Aß+ using PET neuroimaging and into two age groups (<75 and ≥75) according to their age at baseline. Data were analysed using linear mixed model analyses.

Results: In adults aged <75, when compared to the Aß- group, there was a significant rate of memory decline only in Aß+ ε4 carriers (d=1.25). In adults aged ≥75, when compared to the Aß- group, both Aß+ ε4 carriers (d=1.23) and non-carriers (d=0.35) showed significant rates of memory; however, the memory decline in Aß+ ε4 carriers was substantially greater when compared to non-carriers (d=0.82). This faster rate of memory decline in adults aged ≥75 was reflected in a 43% of Aß+ ε4 carriers meeting clinical criteria for dementia at the 72-month assessment, in contrast to just 24% of Aß+ ε4 non-carriers and 10% of Aß- participants.

Conclusions: Previous studies investigating the relationship between ε4 and Aß+ have not accounted for potential non-linear effects of age on memory decline. The rate of Aß+ related memory decline was greatest in adults aged ≥75, particularly in those who were also APOE ε4 carriers. This suggests that the combined effects of Aß+ and ε4 on risk for dementia increases substantially in older adults.

Dr Yen Ying Lim

Poster: 76

Email: yen.lim@florey.edu.au **Theme:** Assessment and Diagnosis

BDNF Val66Met increases rate of memory decline, hippocampal volume loss and tau accumulation in autosomal dominant Alzheimer's disease

Florey Institute of Neuroscience and Mental Health

Background: The brain-derived neurotrophic factor (BDNF) Val66Met polymorphism (rs6265) is implicated in synaptic excitation and neuronal integrity. In autosomal dominant Alzheimer's disease (ADAD), mutation carriers (MC) who also carry the Met66 allele show worse memory and higher levels of cerebrospinal fluid (CSF) tau, but equivalent amyloid levels compared to MC Val66 homozygotes at baseline. The aim of this study was to determine the extent to which the BDNF Val66Met polymorphism affects changes in memory, brain volume, tau and Aß in ADAD prospectively.

Methods: Prospective neuropsychological, biomarker and neuroimaging data collected from the Dominantly Inherited Alzheimer Network (DIAN) over ~2 years were analyzed in 81 preclinical mutation carriers (MC), all with a clinical dementia rating (CDR) score of 0 and estimated to be 11 years prior to clinical symptom onset, and 78 matched mutation non-carriers (NC). BDNF genotype was obtained for MCs (58 Val66 homozygotes, 23 Met66 carriers).

Findings: Compared to MC Val66 homozygotes, MC Met66 carriers showed greater decline in episodic memory (p<.001), loss of hippocampal volume (p=.005), and increase of CSF tau (p<.001). Cortical Aß accumulation was equivalent between MC Val66 homozygotes and MC Met66 carriers (p=.427). Compared to NCs, MC Val66 homozygotes showed greater increase in cortical Aß accumulation (p<.001) but equivalent rates of change in episodic memory decline (p=.700), loss of hippocampal volume (p=.215), and accumulation of CSF tau (p=.266).

Interpretation: ADAD is associated with pathologically increased rates of Aß and tau accumulation, loss of hippocampal volume and decline in episodic memory. The results of the current study show that for MCs who also carry the BDNF Met66 allele, decline in episodic memory, loss of hippocampal volume and increase in CSF tau is substantially greater than for MCs who are Val66 homozygotes, despite equivalent rates of Aß accumulation. This is consistent with findings in preclinical sporadic AD, where amyloid positive Met66 carriers also show faster deterioration in episodic memory and hippocampal volume, but not Aß accumulation, when compared to Aß+ Val66 homozygotes. Together, these data suggest that the BDNF Val66Met polymorphism modifies the contributions to the neurodegenerative process in ADAD.

Dr Xiaoping Lin

Poster: No. 77

Email: x.lin@nari.edu.au **Theme:** Assessment and Diagnosis

Using videoconferencing technology with interpreters in cognitive assessments with people from Culturally and Linguistically Diverse backgrounds: a pilot project

Xiaoping Lin 1,2, Dina LoGiudice 3, Betty Haralambous 1, Andrew Knight 4, Kerry Hwang 1

1. National Ageing Research Institute
2. Monash University
3. Melbourne Health
4. The University of Melbourne

People from Culturally and Linguistically Diverse (CALD) backgrounds account for a large proportion of people with dementia in Australia. There is evidence that this group often presents to health professionals at a much later stage for diagnosis of dementia. One important contributing factor for this later diagnosis is communication gaps in the

assessment and diagnosis process of dementia, which is often caused by a shortage of qualified interpreters. The aim of the pilot project is to explore the feasibility, acceptability, reliability and cost-effectiveness of videoconferencing technology with interpreters (i.e., e-interpreting) in cognitive assessments with people from CALD backgrounds. It builds on findings from an earlier study funded by the Hazel Hawke Research Grant in Dementia Care, which explored the role of interpreters in cognitive assessments and piloted the use of e-interpreting in the home environment. The current study will explore the use of e-interpreting in memory clinics. It will recruit ten patients from the Melbourne Health Cognitive Dementia and Memory Service (CDAMS). Each patient will receive two brief cognitive assessments, one using face-to-face interpreting and the other using e-interpreting. Results from these assessments will be used to evaluate the reliability of e-interpreting. We will also conduct surveys with patients, clinicians, and interpreters involved in the study to collect data on feasibility and acceptability. Finally, cost data associated with face-to-face interpreting and e-interpreting will be collected to assess cost-effectiveness of e-interpreting. Based on the results, a protocol on the use of e-interpreting will be developed. Recruitment for this project has commenced in August 2017 and the presentation will report preliminary data. This pilot project has potential for more timely diagnosis of dementia among people from CALD backgrounds, which will improve health outcome among this group. The project also has the potential to improve cost-effectiveness of the current health system.

Dr Michelle Lupton

Poster: No. 78

Email: michelle.lupton@qimrberghofer.edu.au **Theme:** Assessment and Diagnosis

Genetic Investigations for Prodromal Alzheimer's disease

QIMR Berghofer Medical Research Institute, Brisbane, Queensland, Australia

While the burden of dementia occurs late in life, neuropathology accumulates for decades prior to onset of dementia. Interventions to modify the course of the disease have the greatest potential to avert neuronal death and later disease burden if they are introduced during this crucial window, well before the onset of clear cognitive decline.

I will present preliminary work and outline future plans for my Boosting Dementia Research Leadership Fellowship. Throughout three distinct themes my overall aim is to identify markers and understand pathogenesis in prodromal AD.

I will investigate genetic risk variants for AD using large cohorts with extensive phenotypic data at different life stages before dementia onset. I will investigate both common and rare AD genetic risk factors and test for associations with neuroimaging phenotypes and blood based methylation markers. For the Prospective Imaging Study of Aging (PISA) I am utilizing APOE genotype and polygenic risk scores (PRS) to identify individuals at high and low risk of AD. By levering our extensive in-house cohorts, comprising ~16,000 individuals between the ages of 40 and 70yrs we are generating a genetically enriched cohort for studying the precursors and lifestyle risk factors for AD.

Dr Margaret MacAndrew

Poster: No. 79

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Listening to preferred music with people with severe dementia who wander: A feasibility study

Dr Margaret MacAndrew 1, Dr Elizabeth Beattie 1, Dr Elaine Fielding 1, Dr Kimberly Van Haitsma 2, Dr Ann Kolanowski 2, Dr Gerard Byrne 3, Dr Nancy Pachana 3, Ms Catherine Wyles 1, Mr Adam Novic

1. Queensland University of Technology
2. Penn State University
3. University of Queensland

Using a modified protocol found to be effective in reducing agitation in people with dementia, we trialled the feasibility of using listening to preferred music with people with severe dementia who wander in residential aged care. Ten residents listened to their selection of preferred music for 20 minutes daily for 3 weeks under two conditions: immediately before unique peak activity periods or at randomly selected times. Of the 150 scheduled interventions, 92 were commenced and 60% of these were tolerated for the full 20 minutes. Sessions did not proceed when the participant refused (n=37), was asleep (n=12) or was not available (n=9). The intervention stopped prematurely when headphones were removed (n=20) or the participant walked away from the speaker (n=12). Despite the relatively high number of interventions that did not proceed, those who participated were observed to express more positive (58%) or neutral (32%) mood, with negative mood only recorded during 10% of the observation time. In addition, while not statistically significant,

participants were observed to walk and enter the private space of others less frequently during the intervention period. These findings were consistent with staff and family member's views. Further investigations are needed to explore the high refusal rates as well as generalisation of effects beyond the intervention time.

Dr Sean Macdermott

Poster: No. 80

Email: sean.macdermott@deakin.edu.au **Theme:** Care

National rollout of the Dementia care in hospitals program: Preliminary findings

Dr Sean MacDermott 1, 2, A/Prof Mark Yates 1,2, Ms Meredith Theobald 1, Ms Michelle Morvell 1, A/Prof Jenny Watts 2.

1 Ballarat Health Services
2 Deakin University

The Dementia Care in Hospitals Program (DCHP) is an all-of-hospital cognitive impairment (CI) awareness and communication program supported by cognitive screening of all patients aged 65 years and over, a training program for staff, and use of a bedside alert (the Cognitive Impairment Identifier (CII)). The CII has been endorsed as a national symbol for CI in hospitals by Alzheimer's Australia National.

Over 11,000 patients aged 65+ admitted to four hospitals in different jurisdictions were screened for CI using validated tools. Of these, nearly 40% screened positive for CI. Comparisons revealed that those who screened positive for CI were twice as likely to have one of four hospital-acquired complications (urinary tract infection, pressure injury, pneumonia, and delirium). At two of the four sites implementation of the DCHP was associated with a significant reduction in the levels of hospital-acquired complications. Staff satisfaction was assessed before and after program implementation and showed statistically significant improvements on all metrics measured.

This study provides clear support for the incoming standard requiring screening of all over 65s admitted to hospital. It also provides support for tailored programs of care for those with CI. This project is a good example of both the triumphs and travails of research translation in real-world hospital environments which are in a state of constant change.

Dr Helen Macpherson

Poster: No. 81

Email: helen.macpherson@deakin.edu.au **Theme:** Prevention

Progress update for a multi-faceted exercise and nutrition intervention to enhance cognition in older people at risk of cognitive decline

Helen Macpherson

Institute for Physical Activity and Nutrition, Deakin University, Australia

Rapid population ageing is resulting in an increasing number of older people living with cognitive impairment and dementia. Current pharmacological treatments at best reduce Alzheimer's disease (AD) symptomatology but do not delay dementia onset in those at high risk. The Protein Omega 3 vitamin D Exercise Research (PONDER) study is a randomised, placebo-controlled trial targeting prevention through a novel combination of exercise and dietary supplements in elderly who are at risk of further cognitive decline. Participants are randomised to a 6 month multimodal resistance training and aerobic program, or a stretching and flexibility program conducted twice weekly, in community based gyms. Supplements containing omega 3, vitamin D and protein or placebo are taken daily during this time. Cognition is assessed at baseline, at 6 months after completion of the intervention and at 12 months. Participants are 60 – 85 years of age, with subjective memory complaints, recruited from the South Eastern corridor of Melbourne. To date 617 individuals have expressed interest, 236 people have been screened, 85 have met eligibility criteria and are willing to participate and 53 individuals (15 males, 38 females) have commenced the intervention. Additional study cohorts are scheduled to commence the intervention in October 2017 and March 2018. This presentation will provide an update of study progress and recruitment processes. Challenges and opportunities in the conduct of multi-faceted interventions in community settings will be discussed.

Dr Adam Martin

Poster: No. 82

Email: adam.martin2@unsw.edu.au **Theme:** Assessment and Diagnosis

Establishing neural networks in peptide hydrogels

Dr Adam Martin,* Dr Yazi Ke, Dr Sook Wern Chua, Professor Pall Thordarson, Professor Lars Ittner

University of New South Wales, Sydney, NSW, Australia

Alzheimer's Disease (AD) is the most common form of dementia and is projected to affect over half a million Australians by the year 2020. Currently, there is no known cure and limited therapies available. A major factor in the ineffectuality of current treatments is centred on the difficulty in diagnosing AD, which can take years. By the time clinical and behavioural symptoms are established in patients, the disease is at an advanced state, limiting treatment options. Therefore, a strategy is needed to identify early diagnostic markers of Alzheimer's Disease, either biomarkers or physical changes in the brain. One way to achieve this aim is to design materials which mimic the environment of the brains extracellular matrix (ECM).

The ECM is a fibrous mesh which provides physical and chemical cues for various cellular processes. Hydrogels are composed of cross-linked fibres, and represent an opportunity to mimic the structure of the native ECM. The use of short peptides to form hydrogels allows physical and chemical properties of the gel matrix to be tuned, such as stiffness, chemical environment and mesh size. Here we report peptide hydrogels that support the growth of primary neurons in 2D and 3D systems. Neurons can be cultured for over 40 days on these hydrogels whilst maintaining viability, and show synaptic development and electrical activity. The hydrogel can be controllably disassembled, unlike current 3D gel materials which require mechanical shearing. Such a well-defined, tuneable 3D hydrogel matrix holds significant promise for future applications in early diagnosis for various neurodegenerative diseases.

Dr Melinda Martin-Khan

Poster: No. 83

Email: m.martinkhan@uq.edu.au **Theme:** Assessment and Diagnosis

Cognitive Impairment cannot be managed in isolation: A whole of system approach is required

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Diagnostic screening is required to identify persons with Cognitive Impairment(CI). This screening should be applied to individuals over 70, but it is relevant to many admitted patients. It is difficult to operate systems of assessment and care planning for sub-groups of patients, particularly when the reason for admission is usually not CI. A strategy designed only for patients with CI adds burden to a workforce that is already unable to fully manage clinical care and documentation. A "universal" system that, within it, deals specifically with the issues related to CI is desirable.

The interRAI Acute Care (AC) was pilot tested in 910 adult patients at admission (N=4 hospitals). 24.3% of patients had short term memory problems, common across all age groups. Delirium is a significant issue in AC, with 4.7% of participants having an acute change in mental status. Self-reported poor health was present in 18.7% of the participants. Finally, pain was present in all age groups (66.2%).

The interRAI AC comprising 56 clinical observations and applications pertaining to CI, including accurate diagnostic screeners for delirium and dementia (and suggestions for care planning), is administered to all adult patients at admission. Completion time is less than 15 minutes including data entry.

An electronic nursing assessment system for inpatients reduces nursing admission documentation time, increases identification of patients with cognitive impairment and risk of delirium on admission, supports care planning and increases time for direct clinical care. We will test whether it will also improve the quality of care for patients with dementia in hospital.

Dr Karen Mather

Poster: No. 84

Email: karen.mather@unsw.edu.au **Theme:** Intervention and Treatment

Investigating the Genetic and Epigenetic Factors associated with Alzheimer's Disease (AD)

Mather, KA 1, Thalamuthu A 1, Wen W 1, Armstrong NJ 2, Brodaty H 1,3, Sachdev PS 1

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Background: The Older Australian Twins Study (OATS) and the Sydney Memory and Ageing Study (Sydney MAS) are partners in 2 European consortia investigating the genetics and epigenetics of AD. The EADB consortium focuses on discovering the missing heritability for AD whilst BRIDGET looks at the genetics and epigenetics of endophenotypes of AD.

Methods: EADB– Will use the largest sample to date to run a GWAS meta-analysis for AD (>39K AD, >40K controls). BRIDGET- Will examine DNA methylation in participants with cerebrovascular disease versus controls. A second project will undertake a GWAS examining a neuroimaging phenotype (DWI). Whole genome sequencing (WGS) on AD cases and controls will also be undertaken on our cohorts.

Results: EADB: Australian samples have genotyping data ready for analyses. BRIDGET: Sydney MAS and OATS samples have been sent for methylC sequencing (N=263). Samples have been sent for WGS from Sydney MAS (N=189) and OATS (N=204).

Discussion: DNA methylation and WGS assays will be completed in 2017. Australian researchers have made visits to our European collaborators in 2016/2017, establishing new relationships between other studies investigating AD.

Conclusions: Participation in these consortia has enabled strong relationships to be built between Australia and our European partners and enables Australia to contribute to large genetic and epigenetic studies necessary to unravel the complex aetiology underlying AD.

Mr Brendan McLaren

Poster: No. 85

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Feasibility of Mobile Clinical and Sensor-Based Outcomes in Huntington's Disease

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Large datasets containing rich phenotypic and genetic information are essential for discovering genetic and environmental modifiers of cognitive symptom onset in Huntington's Disease (HD). The aim of our Dementia Collaborative Research Centre project was to determine the feasibility and acceptability of cognitive assessment tools and activity monitoring devices implemented by smartphone to conduct large scale data collection in HD.

We developed an app for iOS and Android smartphones which includes informed consent, prompts through study procedures, three cognitive tasks, questionnaires about sleep and physical activity, and a reminder messaging system. We piloted the app in conjunction with Fitbit One in HD (n = 9; pre-symptomatic = 5, symptomatic = 4) and control (n = 10) participants for 48-hours, followed by phone interviews to ascertain experiences with the app. We also compared groups on cognitive, questionnaire, and activity data.

We found that participants independently completed all aspects of the study. Of 10 possible, the minimum mean confidence rating in using the app was 7.6 and groups did not differ in their confidence levels. Participants with HD had significantly slower reaction time on a visual memory task, and trends for less accurate performance, as well as a trend toward slower performance in a psychomotor speed test. Fitbit data indicated significantly more awakenings and time spent awake in the HD group compared to controls. These findings provide evidence of the feasibility and acceptability of independent app-based assessment in HD, which we will now study in a larger sample.

Dr Rodrigo Medeiros

Poster: No. 86

Email: r.medeiros@uq.edu.au **Theme:** Intervention and Treatment

Targeting inflammation as a biomarker and treatment for Alzheimer's disease.

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The initiation of an inflammatory response is critical to the survival of an organism. However, when inflammation fails to reach resolution (i.e., repair/remodeling), a chronic inflammatory state may occur, and it becomes a major cofactor of many diseases, including Alzheimer's disease (AD). Comprehending the biological basis for altered innate immunity and inflammation in AD is a challenge that has substantial clinical importance, as restoration or preservation of immunological responses is likely to have a great importance to the lengthen of healthier lifespan. The discoveries that resolution of inflammation is a highly coordinated and active process controlled by endogenous pro-resolving and anti-inflammatory mediators, and that inflammatory cells undergo classical and alternative activation, highlight new potential molecular targets to regulate inflammation and treat chronic inflammatory diseases. Here, we will present novel findings from studies in human samples that demonstrate a severe impairment in signaling pathways associated with the regulation of inflammatory resolution. In addition, pre-clinical data will be presented to support the idea that restoring the activity of regulatory anti-inflammatory interleukins or pro-resolving lipid pathways can elicit protective immunity and mitigate AD-like pathology. In the future, it may be possible to generate tools to regenerate and/or replace the endogenous inflammatory resolution pathways to diagnose, prevent and/or treat AD.

Dr Chris Moran

Poster: No. 87

Email: chris.moran@monash.edu **Theme:** Prevention

Type 2 diabetes and longitudinal change in brain cortical thickness

Monash University

Aims: Type 2 Diabetes Mellitus (T2DM) is associated with lower cerebral cortical thickness. The longitudinal association between T2DM and cortical thickness is unknown. We aimed to study whether T2DM was associated with accelerated loss of cortical thickness.

Methods: The sample included 817 people from the Alzheimer's Disease Neuroimaging Initiative (ADNI) with a low burden of cerebrovascular disease who had Magnetic Resonance Imaging (MRI) performed annually for 5 years. We used multi-level modelling to examine the relationship between T2DM and rates of change of cortical thickness adjusting for age, sex and APOE4 status.

Results: There were 124 people with T2DM (mean age 75.5) and 693 in the non-T2DM group (mean age 75.1) at baseline. Baseline presence of Alzheimer's Disease and lower cortical thickness was associated with sample attrition (all $p<0.001$). We found a negative interaction between T2DM and age ($p=0.045$) whereby those with T2DM who were older had lower cortical thickness at each time point than similar aged people without T2DM. However, T2DM was not associated with a greater rate of cortical thinning than those without T2DM.

Conclusions: T2DM was not associated with accelerated cortical thinning in this sample. The detrimental effect of T2DM may occur earlier in life or may be more pronounced in those with a greater burden of cerebrovascular disease.

Dr Moyra Mortby

Poster: No. 88

Email: moyra.mortby@anu.edu.au **Theme:** Care

Evaluating the efficacy of the BPSDplus Program: A protocol for a stepped wedge trial in residential aged care

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4. Australian Catholic University, Melbourne

The BPSDPLUS program (previously BPSD-CARE) has been developed to provide both specialised training to residential aged care staff engaged in the provision of care and also a structured program to help improve early identification and management of behavioural and psychological symptoms of dementia (BPSD). This study aims to evaluate the efficacy of the BPSDPLUS program to reduce BPSD and antipsychotic medication used to manage behaviours, as well as improve quality of life for individuals living with dementia in residential aged care. Secondary aims include the evaluation of the impact of the program on care staff wellbeing.

The efficacy of the BPSDPLUS program will be evaluated using a stepped wedge design over a two-year period in three participating sites of the same residential aged care provider in Canberra, ACT. Approximately 300 residents and care staff will participate across the three sites. Residents must have a diagnosis of dementia (any type), mild cognitive impairment or cognitive impairment as indicated by a MMSE <27. Care staff must be involved in the daily care of residents and will be paired with a resident and complete all assessments and intervention sessions for that resident.

Primary outcome measures include the Neuropsychiatric Inventory Nursing Home and the Quality of Life in Alzheimer's Disease. Secondary outcome measure used to determine the impact of the program on care staff wellbeing include the Strain in Dementia Care Scale, Sense of Competence in Dementia Care Staff, Professional Care Team Burden Scale and the Work and Wellbeing Survey.

This presentation will describe the trial protocol for the BPSDPLUS program and discuss the challenges experienced and adaptations made to the intervention during the design phase of this intervention study.

Professor Sharon L Naismith

Poster: No. 89

Email: sharon.naismith@sydney.edu.au **Theme:** Prevention

Reduced spindles in MCI are linked with nocturnal awakening and subcortical brain volumes

Naismith SL, Lewis SJG, Grunstein R, Duffy S, D'Rozario A

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While emerging evidence links sleep disturbance to dementia, few studies have examined the specific neurophysiological components of sleep that may be linked to cognitive decline. In this study, we aimed to determine a) if sigma power, a marker of sleep spindles is altered in those with Mild Cognitive Impairment (MCI) relative to healthy controls, and b) how sigma power may relate to volumes of key subcortical nuclei. We recruited 60 participants with MCI and 44 controls, all of whom underwent neuropsychological, medical and overnight polysomnographic (PSG) assessment. Power spectral analyses were conducted on the PSG data for the sigma range generally, and for the slow and fast ranges. A subsample (n=35) also underwent neuroimaging from which volumes of the caudate nucleus, hippocampus and thalamus were quantified. Results showed that the MCI group had significantly reduced power in the sigma frequency range particularly within slow spindle ranges. Reduced spindles in the MCI group were associated with greater nocturnal awakenings, but not with neuropsychological functioning. For the neuroimaging subsample, there was a differential relationship between brain integrity and sigma power; for controls, reduced power was associated with having a larger thalamus. For those with MCI, reduced sigma was associated with having a smaller caudate. Overall, these data suggest that sigma power is altered in MCI and is linked with nocturnal awakening and with alterations in subcortical regions linked to spindle formation.

Dr Morgan Newman

Poster: No. 90

Email: morgan.newman@adelaide.edu.au **Theme:** Prevention

Aged vertebrate brains show a conserved failure to respond to hypoxia – a metabolic foundation for alzheimer's disease?

Newman M, Moussavi Nik SH, Lardelli M

University of Adelaide, School of Biological Sciences, Centre for Molecular Pathology

The Alzheimer's disease (AD) brain is hypometabolic showing reduced glucose and oxygen use. Energy is the fundamental determinant of cellular function but are energy metabolism changes the cause instead of just a consequence of AD? Hypoxia is implicated in many phenomena associated with AD such as increased Amyloidß production. Therefore, we tested the effects of hypoxia on two quite distinct models of dominant, early onset fAD-like mutations in the zebrafish's endogenous PSEN1 orthologous gene. Remarkably, we saw that – in a normoxic environment - the brains of young adult mutant fish and older wild type fish show moderate upregulation of hypoxia response genes (thus young fAD-like mutant brains appear prematurely aged by this measure). Nevertheless, under environmental hypoxia, both fish types could raise their hypoxic response further to increase anaerobic glycolysis (lactic acid production) to provide energy. In contrast, older fAD-like mutant brains were unable to make this response to hypoxia. They appeared incapable of upregulating anaerobic glycolysis. This difference in responsiveness of aged

fAD-like mutant brains is apparently due to an inability to stabilise the central regulatory protein HIF1A. Intriguingly, a similar failure to stabilise HIF1A protein was previously observed in aged rat brains (Ndubuizu et al 2009 doi: 10.1152/ajpregu.90829.2008) while human AD brains show significantly reduced HIF1A protein levels (Liu et al. 2008 doi: 10.1016/j.febslet.2007.12.035) suggesting that this is a conserved characteristic of vertebrate brains and may be a fundamental characteristic of AD. We are currently making detailed 'omics analyses of our fAD-like mutants to investigate this remarkable phenomenon.

Dr Morgan Newman

Poster: No. 91

Email: morgan.newman@adelaide.edu.au **Theme:** Prevention

Rna-seq analysis of zebrafish familial alzheimer's disease (fad) mutation-like model brains supports a regulatory "inversion" into an alzheimer's disease-like statE

Hin N 2,*, Newman N 1,*, Pederson S 2, Adelson D 2, Lardelli M 1

University of Adelaide, School of Biological Sciences, Centre for Molecular Pathology1. and Bioinformatics Hub2.*equal first authors

Berchtold et al. 2014 (doi: 10.1016/j.neurobiolaging.2014.03.031) discovered that many genes with relatively increased expression in mild cognitive impairment (MCI) brains show, contrarily, decreased expression in Alzheimer's disease (AD) brains and vice versa. Other studies have supported increased activity in early MCI brains before these become hypometabolic AD brains (e.g. Ashraf et al. 2015, doi: 10.1007/s00259-014-2919-z). Thus the decades-long progression of brains into AD may not follow a linear path. Instead, brains may "invert" into AD. This phenomenon may have confounded our attempts to understand AD pathogenesis. For genetic analysis in vertebrates, zebrafish offer particular advantages for reducing genetic and environmental noise. Families of over 100 siblings can be raised in a common environment. We have created the first models of dominant fAD-like mutations in endogenous zebrafish genes. We exploited large zebrafish families to make detailed transcriptomic analyses of adult brains from young (6 month) and older, infertile (24 month) heterozygous mutants compared to wild type siblings. This revealed a striking pattern of gene expression inversion: genes (predominantly) relatively upregulated in young mutant brains versus wild type brains are subsequently downregulated in older mutant brains versus wild type brains. Expression of FKBP5 (associated with decreased MAPT degradation) was notably inverted. Gene Ontology analysis suggests the genes with inverted expression are important in circadian rhythm, P13K and insulin receptor signalling, stress responses, and transcriptional regulation. Our results support that: 1) Aged fAD brain changes are not linearly consistent with prodromal changes, 2) the AD brain inverts into a discrete, stable transcriptomic state.

Dr Tuan Anh Nguyen

Poster: No. 92

Email: tuan.nguyen@unisa.edu.au **Theme:** Intervention and Treatment

Use of medicines with the potential to affect cognition in people with dementia: a retrospective study in a tertiary hospital in Vietnam

Tuan Anh Nguyen, Libby Roughead

Quality Use of Medicines and Pharmacy Research Centre, School of Pharmacy and Medical Sciences, University of South Australia

Introduction: This study aimed to examine the use of potentially inappropriate medicines in people with dementia in Vietnam, with a particular focus on use of medicines that may affect cognition.

Methods: Medical records of out-patients with dementia attending a tertiary hospital in Vietnam between 1st, Jan 2015 and 31st, Dec 2016 were examined. Medicine use was assessed against medications considered potentially inappropriate for patients with cognitive impairment (PIMcog). Concomitant use of cholinesterase inhibitors (CEIs) and anticholinergics, and antipsychotics use was also examined.

Results: Of the 128 patients, 41% used a PIMcog, 39.1% used CEIs concomitantly with anticholinergics, and 18% used antipsychotics of whom a quarter used antipsychotics longer than three months. The initial doses of risperidone were not optimal in treatment of behavioural and psychological symptoms of dementia.

Discussion: This study highlights the high level of use of medicines that can further impair cognition or reduce the effectiveness of CEIs in the population with dementia in Vietnam. Dementia is an emerging area of disease burden in Vietnam and efforts to improve quality use of medicines for this population are warranted, particularly supporting awareness of and reduction of use of medicines that further impair cognition.

Dr Lezanne Ooi

Poster: No. 93

Email: lezanne@uow.edu.au **Theme:** Intervention and Treatment

Novel nitroxides protect against oxidative stress-induced apoptosis and cytotoxicity in a patient-derived in vitro model of Alzheimer's disease

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2. Science and Engineering Faculty, Queensland University of Technology

Nitroxides are antioxidants eliciting low cellular toxicity that can prevent oxidation by free radical scavenging. As such, they have been shown to be useful in protecting against ß-Amyloid deposition and memory deficits in familial AD mouse models. However, whether nitroxide compounds exhibit neuroprotective capabilities in human sporadic AD neurons remains unknown.

Here we assessed the treatment potential of a newly synthesized nitroxides (1KT123D), generated through coupling the nitroxide tempamine to the nonsteroidal anti inflammatory drug indomethacin, in neurons of individuals with sporadic AD and healthy donors. We differentiated basal forebrain cholinergic neurons from induced pluripotent stem cells in hypoxic conditions (3% O2) and triggered oxidative stress by increasing O2 to 20%. We subsequently monitored cytotoxicity, apoptosis, reactive oxygen species and culture viability after treating with 1KT123D and the known nitroxide CTMIO.

Raising O2 triggered an increase in caspase 3/7 activity and cytotoxicity in cultures from sporadic AD patients, while not affecting healthy neurons. Nitroxide treatment reduced the impact of increased O2 in a dose-dependent manner, without affecting viability of healthy neurons.

Our findings show that neurons from sporadic AD individuals have heightened susceptibility to oxidative stress compared to healthy neurons. Furthermore, the antioxidant properties of the two nitroxides reduced the neurotoxic impact of raised O2 in our patient-derived in vitro AD model. In current experiments we are exploring the electrophysiological properties of cholinergic neurons from AD patients and the effect of nitroxides on cell membrane properties.

Dr Anita Panayiotou

Poster: No. 94

Email: a.panayiotou@nari.edu.au **Theme:** Care

Strategies for Relatives (START) On-Line

Dow B 1,2, Panayiotou A 1, Gaffy E 1, Capon H 1, Loi S 3, Doyle C 4, Tropea J 5, Bryant C 2

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Carers of people living with dementia (PLWD) experience depression and anxiety at higher rates than any other group in our community. Programs are needed to assist carers to manage their role. The STrAtegies for RelaTives (START) program is an effective intervention for reducing anxiety and depression and improving quality of life (QoL) amongst carers in the UK. START is an 8-week manual-based therapy program delivered face-to-face in a one-to-one format to help carers better manage their caring role. The current project adapted and redesigned the UK START manual for Australian carers of PLWD, and is piloting its delivery via video-conferencing to increase accessibility, particularly for carers living in rural areas. The adapted manual is the result of collaboration between University College London (UCL), Melbourne Ageing Research Collaboration (MARC), National Ageing Research Institute (NARI) and The University of Newcastle. Thirty-five carers of PLWD will be recruited from rural and urban Victoria. Depression, anxiety, and QoL measures will be completed before and after the 8-week program. The main aim is to test the feasibility and acceptability of the Australian START program when delivered on-line via video-conferencing. It is expected that the video-conferencing mode of delivery will be acceptable and feasible to carers of PLWD, and that carers will experience improvements in symptoms of anxiety, depression and QoL.

Dr Lua Perimal-Lewis

Poster: No. 95

Email: lua.perimal-lewis@flinders.edu.au **Theme:** Intervention and Treatment

Assistance through personalised online technology for older people with early stage dementia

Lua Perimal-Lewis, Jennifer Tieman, Sue Gordon, Anthony Maeder

Flinders University - Digital Health Research Centre

Background: People with early stage dementia might forget words or names and may be vague in their communication. Mild Cognitive Impairment (MCI) is acknowledged as an indicator of impending dementia; people with MCI exhibit some memory loss, but often do not show other signs of dementia and can function independently. Accessing rich online resources can be a confusing process. This project will allow online resources to coexist in a single artefact, with the choice and complexity level to be customisable to an individual's needs.

Methods: This project will develop and evaluate an adaptive clutter-free, personalised online solution for mobile tablet and smartphone devices for people with MCI.

Results: The aim of this project will be realised by using participatory co-design principles, with the following main functional categories: 'Information', 'Organisation' and 'Wellbeing'. The 'Information' functionality will provide collated information relevant to the person's health condition. The 'Organisation' functionality will enable management of daily living independently without reliance on carers. The 'Wellbeing' functionality will support memory activities and physical activities at an appropriate level to ensure the individual can cope with the activities and is being appropriately challenged, which offers some defence against rapid cognitive decline.

Conclusion: This project will benefit the ageing in place agenda by providing a simple adaptive technology artefact to support individuals experiencing memory loss to live independently and to continue being part of their communities.

Dr Christina Perry

Poster: No. 96

Email: christina.perry@florey.edu.au

Chronic alcohol produces specific cognitive deficits

Christina J Perry 1,2, Annai Charlton, Sophia Luikinga 1,2, Tanawan Leeboonngam 3, Hannah Miller 2, Jee Hyun Kim 1,2, Andrew J Lawrence 1,2.

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3. Srinakharinwirot University, Bangkok, Thailand

Chronic alcoholism is associated with cognitive effects that range from mild impairment to profound and irreversible dementia. Even where mild, these deficits are clinically relevant because they impede the process of behavioural change during therapy. Despite this, addiction therapy frequently fails to account for the cognitive deficits that may be present, and there is poor understanding regarding the mechanisms that underlies this decline. In this project we established a rodent model of chronic alcoholism to measure the cognitive effects and underlying neural changes. Rats had intermittent access to ethanol, or an isocaloric solution, in their home cage under voluntary 2-bottle choice conditions. After 6 months, the animals were divided into two groups, matched by consumption. One group underwent a battery of cognitive tasks using touchscreen technology. The others were perfused and their brains retained for volumetric analysis. Rats consumed on average 6 g/kg/session over the 6 month period. Ethanol-exposed and control rats showed equivalent acquisition of pairwise discrimination, however ethanol rats performed fewer trials ($p<.05$), and with lower accuracy ($p < .05$) when the contingencies were reversed, indicating reduced behavioural flexibility. In addition, when tested in a 5-choice serial reaction time task ethanol-exposed rats showed increased attentional bias towards a reward associated over a neutral cue ($p < .05$). Importantly, the cognitive changes observed - decreased behavioural flexibility and specific attentional bias - resemble those seen in human alcoholics. Going forward we will use this model to describe emerging neuropathology in order to elucidate the mechanism(s) for alcohol-induced cognitive decline.

Dr Lyn Phillipson

Poster: No. 97

Email: lphillip@uow.edu.au **Theme:** Care

Are information and supports adequate to support consumer directed care decisions in the Home Care Packages program?

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Many have heralded the potential benefits of consumer directed care (CDC) within the Home Care Packages (HCPs) program introduced in Australia in 2015 to support older people with complex needs to remain living in the community. However limited attention has been payed to whether the conditions for supporting consumer decisions and equitable outcomes have been met. To address this gap, information resources, training and other supports were identified on .au domains using an advanced Google search on May 2 2017. Key word searches included all of the words: 'aged care' and 'home' and any of the words: 'support' or 'packages' or 'guidelines' or 'policy' or 'program'. The first 100 first page results were reviewed. Snowball searches were also conducted within the Department of Health, My Aged Care and Home Care Today websites. A content analysis was then conducted on 47 identified resources (16 web pages, 30 resources and 1 person support) for: currency, type, content and accessibility. Resources were limited for those who speak or read languages other than English, have low grade level literacy or who have limited capacity for decision making such as those living with dementia. There were no current opportunities for consumer training. The study highlights an urgent need to improve the quality and accessibility of information resources, training and support for CDC decision making to ensure equitable outcomes in the Home Care Packages program.

Professor Constance Dimity Pond

Poster: No. 98

Email: dimity.pond@newcastle.edu.au **Theme**: Care

Primary Care Guidelines for dementia identification and management

Discipline of General Practice, University of Newcastle

Background: This presentation will describe the development of primary care guidelines for dementia, to complement the 2016 NHMRC Clinical Practice Guidelines and Principles of Care for People with Dementia (NHMRC Dementia Guidelines).

Method: These Guidelines, funded by the Cognitive Decline Partnership Centre, are an adaptation of the 2003 RACGP GP Dementia Guidelines. A range of international GP/Primary Care Guidelines were reviewed and key topics identified. As well as assessment, continuing care, BPSD and carer support, from the 2003 guidelines; the team added specific advice on communication, prevention (not in the NHMRC Guidelines), legal issues, elder abuse, younger onset dementia, intellectual disability and rural and remote issues. Input was received from an Advisory Group of carers and consumers and an international Steering committee.

Narrative reviews were conducted for each guideline topic, using questions developed during the initial review process and refined in consultation with the advisory and steering groups. For each topic, a one page summary, a brief overview and a background literature review was prepared. Flowcharts were used to present a visual summary of most recommendations.

Chapters were also reviewed by primary care focus groups and general practice triallists, and modified according to feedback.

Conclusion: A narrative review process has resulted in the production of Primary care guidelines to complement the NHMRC Dementia Guidelines.

Ms Dannielle Post

Poster: No. 99

Email: dannielle.post@unisa.edu.au **Theme:** Intervention and Treatment

Perceptions of the impact of targeted exercise prescription for older people with dementia in residential aged care

Gaynor Parfitt, 1 Megan Corlis, 2 Alison Penington 2, Dannielle Post 1

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2. Research and Development, Helping Hand Organisation, North Adelaide, SA;
3. NHMRC Cognitive Decline Partnership Centre, University of Sydney, NSW.

Dementia impacts the functionality of older adults. Providing avenues in the aged care environment to maintain physical, cognitive, and behavioural functionality as dementia progresses is one of the roles of Accredited Exercise Physiologists (AEPs).

A 12-week exercise program is being delivered to residents in an aged care environment. Evaluation will focus on the impact of the targeted, individually specific, exercise intervention for people who have significant dementia and other chronic health conditions and disabilities. Factors considered include perceptions of the intervention and its impact from the perspective of family members, and care staff, will be analysed through survey and interview data.

Perceptions about who can benefit from AEP-led exercise, from ambulant residents, to residents in 'princess chairs', appear to be changing. There were perceived improvements across a range of factors during the intervention, and no perceived deterioration. Care Staff appear motivated by the effectiveness of the program, supporting the value of AEPs as a member of an allied health team, in the care of dementia patients in the residential aged care environment. Objective functional data and the sustainability of the intervention are currently being investigated.

Dr Sivaraman Purushothuman

Poster: No. 100

Email: siva.p@neura.edu.au **Theme:** Diagnosis/Assessment

Risk factor analysis in pathologically-confirmed dementia with Lewy bodies compared with Alzheimer's disease

Sivaraman Purushothuman & Glenda Halliday

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Background: Dementia with Lewy bodies (DLB) is the second most common form of clinically diagnosed dementia, but pure Lewy bodies at autopsy occurs in only 32% with many having severe Alzheimer pathology instead (Nelson et al. 2010). Consequently, most research on risk factors and other features identify significant overlap between DLB and Alzheimer's disease (AD). In clinical cohorts, risk factors for DLB overlap with those for AD and Parkinson's disease (PD), as may be expected, and include male sex, smoking, education, depression, low caffeine intake and family history (Boot et al. 2013). No study has assessed these risk factors in pathologically confirmed DLB cases.

Objective: To assess risk factors in pathologically confirmed cases of DLB compared with AD.

Study design: Longitudinally followed AD and DLB patients (N=178) who donated their brains to the Sydney Brain Bank for research purposes were selected following ethics approval. All cases with AD (NIA-Reagan criteria) or Lewy body (LB) pathology were included. Chi-square analyses were performed on extracted proforma captured data to determine differences in these key variables between groups.

Results: Twice as many pathological AD cases were misdiagnosed (27% with clinical DLB) compared with pathologically confirmed DLB cases (13% with clinical AD). Most clinical DLB cases had mixed AD with Lewy body pathology (53%). More pathologically confirmed DLB cases were male (81%) compared with AD (46%), whereas more AD cases had some family history of dementia (61%) compared with DLB (40%). There were no differences between groups in the years of education, smoking history, caffeine intake or presence of depression.

Conclusions: Clinical misdiagnosis of DLB is common, but most cases with pathologically confirmed DLB also have AD pathologically. The dominance of male gender as a risk factor for DLB and not AD was confirmed, but no differences in many other risk factors were found to differentiate DLB from AD. Dominant genetic influences appear more likely in AD compared to DLB.

Dr Emily Reeve

Poster: No. 101

Email: emily.reeve@sydney.edu.au **Theme:** Intervention and Treatment

Evidence-based Clinical Practice Guideline for Deprescribing Cholinesterase Inhibitors and Memantine in People with Dementia

Emily Reeve 1,2, Barbara Farrell 3, Kenneth Rockwood2, Sarah Hilmer 1,4

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3. Bruyère Research Institute, University of Ottawa, and University of Waterloo, ON, Canada
4. Royal North Shore Hospital, NSW, Australia

Introduction: There are currently two classes of medications available to treat the symptoms of dementia: cholinesterase inhibitors (ChEIs) and memantine. The potential benefits and risks of these medications may change over time. The purpose of this guideline is to assist healthcare professionals to determine when it might be suitable to trial withdrawal of these medications.

Methods: The Guideline Development Team (GDT) consisted of nine clinicians with experience in caring for people with dementia and two consumer representatives. We followed the process of developing class-specific deprescribing guidelines, which are based on a comprehensive checklist for successful guideline development and the AGREE-II criteria. We also incorporated requirements for Australian National Health and Medical Research Council external guideline approval. The process involved a systematic review and used the GRADE process to assess the quality of the evidence and convert the evidence into recommendations.

Results and Discussion: Four recommendations and three practice points were developed to guide deprescribing of ChEIs and memantine. The recommendations take into account the quality of the evidence, the risks and benefits of deprescribing, the risks and benefits of continuation, consumer values and preferences, and economic considerations.

Conclusion: While there were limitations to the available evidence, the GDT was able to provide recommendations to guide deprescribing of ChEIs and memantine. The recommendations should be considered in the context of the individual and deprescribing should be conducted as a process with consumer engagement throughout.

Mrs Cathy Roth

Poster: No. 102

Email: cathy.roth@bigpond.com **Theme:** Living with Dementia

PALZ-Professionals with Alzheimer's: Retaining Identity

PALZ- Professionals with Alzheimer's

When diagnosed with Alzheimer's Disease or other dementia, those who have worked in a high-powered, intellectually-stimulating environment, lose not only the mental challenges within the workplace, but the social network, so often built through work relationships. Their loss of a sense of identity, dignity, and self-respect is profound. Yet, in the early years of these diseases, many are still high-functioning, knowledge-seeking, socially adept, and professionally inquisitive individuals, frustrated and saddened that their contributions to professional dialogue are no longer deemed valid.

PALZ – Professionals with Alzheimer's addresses this by providing a bi-monthly corporate-style social forum, where attendees are part of interactive presentations by leading professionals, and are subsequently able to expand those discussions with peers, over coffee. Alternate months allow industry groups eg: accountants, lawyers, teachers to have industry-based meetings, or may provide an opportunity for board room or site visits. An annual conference fosters recall of conference attendances of past times, with the conference programming tailored for best receptiveness.

From a societal perspective, the longer the brain can be kept active and engaged, the longer a person is able to function within the community – not drawing on community resources. PALZ – Professionals with Alzheimer's provides an environment that fosters that mental stimulation, but further, is able to do so whilst ensuring the social focus is on the "Who I am" not the "What I have".

Dr. Joanne Ryan

Poster: No. 103

Email: joanne.ryan@monash.edu **Theme:** Prevention

Using the ASPREE Study to advance dementia research

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Background: Large prospective studies of dementia with deep phenotyping will enable better characterisation of risk factors for cognitive decline and dementia.

Methods: ASPirin in Reducing Events in the Elderly (ASPREE) is a double blinded placebo-controlled randomised trial to determine whether daily ingestion of low-dose aspirin can prolong 'disability-free survival' (incorporating onset of dementia or persistent disability and mortality) in older adults when used in a primary prevention setting. Eligible individuals were ≥70 years (≥65 years for US minorities groups) without cardiovascular disease, physical disability or dementia, and with a Modified Mini-mental State Examination (3MS) score <78.

Results: 16,703 Australian and 2,411 US participants were recruited. Participants undergo regular systematic cognitive assessments over an average 5years. Loss to follow-up has been minimal (<5%). Mean (SD) cognitive scores at baseline were: 3MS (global cognition) 93.4 (4.6), Symbol Digit Modalities Test (attention/processing speed) 36.7 (10.2), Hopkins Verbal Learning Test-Revised (delayed recall memory) 7.7 (2.8), Controlled Oral Word Association Test F (language/verbal fluency) 12.1 (4.6). Dementia diagnosis is adjudicated by an international clinical panel after reviewing the results of cognitive and functional assessments, medical records and clinical diagnosis information, and brain imaging and blood tests (as clinically indicated). We estimate approximately 800 individuals will be diagnosed with dementia by the end of the trial (December 2017).

Conclusion: Given the depth and breadth of high quality data which has been gathered on such a large population, we will describe how the ASPREE study provides a valuable resource to study protective and risk factors for dementia.

Dr. Joanne Ryan

Poster: No. 104

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A peripheral epigenetic signature of dementia: blood methylation levels of brain derived neurotrophic factor (BDNF)

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Background: Recent research suggests the involvement of epigenetic processes, such as DNA methylation, in dementia. Epigenetics also provides a promising new class of biomarkers with potential clinical utility for early diagnosis. The aim of this study was to determine whether blood DNA methylation of brain-derived neurotrophic factor (BDNF) was associated with the prevalence and incidence of dementia. BDNF is an important regulator of neuronal activity and neurogenesis, and lower serum BDNF levels have been reported in individuals with dementia.

Methods: 1024 participants aged ≥ 65 years were recruited as part of a longitudinal study of psychiatric disorders in France (the ESPRIT study). Dementia was diagnosed at baseline and follow-up according to the DSM-IV revised criteria by a panel of independent neurologists who reviewed the results of neuropsychological examinations, imaging and detailed medical information. BDNF promoter I methylation was measured using the SEQUENOM MassARRAY platform.

Results: BDNF methylation at baseline was associated with both prevalent dementia and incident dementia over the 12 year follow-up period. Among participants without dementia, BDNF methylation was also associated with baseline scores on the Mini-Mental State Examination (MMSE), and the decline in MMSE scores over time. No effect modification (interactions) were observed with sex or the ApoE-e4 allele, and all associations remained after adjustment for age.

Conclusion: Our findings highlight the potential for blood BDNF methylation to be a biomarker of dementia, however further work is needed to determine how BDNF genetic variation could influence these associations. Replication of these findings is also required.

Dr Theresa Scott

Email: theresa.scott@uq.edu.au **Theme:** Living with Dementia

Poster: No. 105

Strategies Used By Primary Care Practitioners to Support People with Dementia with Driving Cessation

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This research addresses dementia and driving cessation, a major life event, and an immense challenge in primary care. In Australia it is general practitioners (GPs) who identify changes in cognitive functioning and monitor driving issues with their patients. GPs are advised not to base their fitness to drive decisions solely on disease duration, and without clear guidelines or tests, it is a complicated area of practice. We aimed to gain an understanding of the barriers and facilitators that primary care practitioners experience in managing driving cessation with their patients with dementia, and the strategies implemented to address these. A qualitative study was undertaken to understand how GPs transition a patient with dementia to non-driving status. Data were collected through five focus groups with a total 29 GPs in practices across Queensland, Australia. Discussions were audio recorded, transcribed verbatim and thematically analysed taking a phenomenological approach. Preparation and education were identified as key. Because loss of insight into declining driving abilities exacerbated the challenges of stopping, timing of the discussion was regarded as critically important. However, it was complicated with the difficulty of identifying early dementia; and concern for the negative impact that raising the driving issue had on the doctor-patient relationship. A number of in-room tests were reported as somewhat useful, however no single test satisfactorily predicted fitness to drive, and these lacked face validity with patients. GPs noted that involving supportive family members and providing strategies for accessing alternative transportation were helpful. The findings clarify a need for support programs to support GPs and their patients to manage the complex issues around dementia and driving cessation.

Dr Theresa Scott

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Poster: No. 106

Can Telehealth Deliver Improved Outcomes for Older People with Dementia who are Giving up Driving?

Primary Care Clinical Unit, The University of Queensland

This study examined the feasibility of using telehealth technology to deliver a driving cessation intervention aimed at enhancing independence and wellbeing for people with dementia. Telehealth can improve access to health care for people living in geographically isolated areas, which is highly relevant for Australia's dispersed population. Its role in the health care management of community-dwelling older Australians with dementia however, is not fully realized. It was important to understand the potential usability and benefits of telehealth for people with dementia from a number of perspectives. This phase involved an expert reference group of multidisciplinary health professionals from neuropsychology, geriatric medicine and telemedicine. Data were collected via semi-structured interviews with a convenience sample (N=6), recorded and transcribed verbatim and analyzed using a phenomenological framework to identify concepts and themes. There was clear recognition of the need for such an intervention. Following diagnosis, driving cessation was the biggest single issue that people with dementia faced according to these experts – often resulting in depression, and less commonly, suicidal ideology. Suggestions to enhance effectiveness were offered, including limiting the amount of time individuals spent in sessions, to reduce fatigue, and having someone in the room, such as a family member, for support. However, there was consensus that older people with dementia could ably manage telehealth technology, and it was noted as ageist to infer otherwise. These experts acknowledged that telehealth has the potential to change the way that dementia is dealt with in Australia, especially in areas where there are no face-to-face alternatives.

Dr Bingyang Shi

Poster: No. 107

Email: bingyang.shi@mq.edu.au **Theme:** Intervention and Treatment

New Strategy for Blood-Brain Barrier Crossing and Brain Disease Therapy

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Abstract Summary: A key challenge for treating neurodegenerative diseases is the delivery of drugs across the blood–brain barrier (BBB). To overcome this, our group has been developing nanoparticles based strategy to transport drugs across the BBB into brain, offering high-performance therapy for brain diseases.

Introduction: The BBB is a natural protective cellular barrier separating the brain and spinal cord from the rest of the body, preventing toxic chemicals and molecules from entering the brain. However, the BBB also stops most therapeutic drugs from reaching the brain.[1] Over many years, various strategies have been proposed to increase BBB penetration efficiency, including chemical modification of compounds to facilitate their membrane permeability across the BBB, and carrier- or receptor-mediated transcytosis.[2-4] Unfortunately, these approaches are relatively unsuccessful, with the best techniques clinically verified taking less than 1% of drugs through the BBB.[5] Nanoparticles (NP) are emerging as a new class of delivery vehicles that can mediate and/or improve transendothelial penetration of drugs to specific regions of the brain.[6] Conventional nanoparticles, including polymeric nanoparticles,[7] gold nanoparticles[8] and silica nanoparticles,[9] have all been reported to improve molecule transportation across the BBB, but face a list of obvious challenges. One outstanding bottleneck is the difficulty in mapping the distribution of nanoparticles and tracking their entry pathways into the deep tissue of the living brain, where high background noise is generated by blood circulation. This issue stops further systematic study of the mechanism of the nanoparticles based BBB penetration, how sizes, shapes, and surface of nanoparticles affect BBB penetration for advanced BBB penetration. Another fundamental problem is how to avoid particle clearance by the immune system, and how to target the delivery of nanoparticles (and controlled release of drugs) to specific cells or tissues in sufficient quantities for therapeutic efficacy. Clearly further multidisciplinary research is needed to identify a robust biocompatible strategy that combines the multiple functions of BBB penetration, excellent biocompatibility and on-demand targeted delivery of compounds.

Most recently, we firstly investigate how nanoparticles with different surfaces and shapes affect BBB penetration using upconvertion nanoparticles (UCNPs), because the unique advantages of UCNPs such as fine tuning shape/size/surfaces, background free, photo stable, and high deep tissue penetration,[9] results them as ideal model nanoparticles to investigate the underlying mechanisms of how nanoparticles cross the BBB. Furthermore, we also study the strategy that employ the cell membrane of red blood cell to coat the nanoparticles for the fabrication of biomimetic BBB penetrative delivery system, to avoid particle clearance by the immune system. Most importantly, we have discovered that some targeting molecules, for example glucose and transferrin, which can help nanoparticles to pass the BBB. Based on the key information from this study, we further developed a toolbox of efficient BBB penetrable nanoparticles for brain disease therapy and diagnostics.

Dr Olga Shimoni

Poster: No. 108

Email: olga.shimoni@uts.edu.au **Theme:** Prevention

Novel nanocrystalline particles for earlier detection of Alzheimer's onset

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Over the past few decades, there has been a rapid growth in nanoparticles (NPs) discovery and their use for medical therapy and diagnostics [1,2]. Nanoparticles based on crystalline matrix of sodium fluoride have a pronounced ability to host functional ions, such as lanthanide ions. Gadolinium-doped nanoparticles (Gd NPs) have proven to function as enhanced contrast imaging agent for magnetic resonance imaging (MRI) [3]. In this work, we developed ultra-small Gd-doped nanocrystals as a potential MRI sensor. The as-synthesized Gd NPs are generally hydrophobic in nature due to their capping by long-chain hydrophobic ligands (e.g. oleic acid). For application in biomedicine, NPs should be stable

in physiological environment and specifically recognize the target biomolecules. Consequently, we have established a surface functionalization protocol to stabilize NPs in biological media. Furthermore, we demonstrated surface functionalization with molecule that specifically target neuronal cells undergoing apoptosis associated with Alzheimer's or Parkinson's diseases. Overall, our results show a great potential as novel MRI sensor for non-invasive detection of Alzheimer's disease.

Dr Craig Sinclair

Poster: No. 109

Email: craig.sinclair@rcswa.edu.au **Theme:** Living with Dementia

Supported decision-making and dementia: Observations from legislation and case law in three Australian states

Meredith Blake, Pia Castelli-Arnold, Sue Field, Cameron Stewart, Sascha Callaghan, Craig Sinclair

The University of Queensland

This paper addresses the issue of health care decision-making in relation to persons with dementia against the backdrop of the Convention on the Rights to Persons with Disabilities and the subsequent Australian Law Reform Commission Report. It begins by outlining the premise behind recent legal developments promoting the rights of persons with disabilities, and the concept of supported decision-making as a way of securing decisional autonomy for such persons. The paper then examines the legal frameworks which address decision-making for people with impaired decision-making capacity in three Australian jurisdictions, seeking to establish the degree to which these frameworks reflect supported decision-making. This is accompanied by a review of decisions by administrative tribunals in these same jurisdictions as a means of identifying how the legal principles and provisions are operating in practice in the context of persons with dementia. This analysis indicates that, while tribunals regard guardianship orders as a course of last resort, there is little evidence of formal supported decision-making, with the tribunals preferring informal approaches to decision-making in such cases, arguably resulting in a lack of clarity and transparency. By way of comparative analysis, the paper examines the law in British Columbia, Canada, which has in place a statutory framework which provides a formal system for representative agreements as a way of providing decision-making support for persons with compromised capacity. The paper concludes by identifying a number of ways in which Australian approaches to decision-making for persons with dementia could benefit from the Canadian experience.

Dr Craig Sinclair

Poster: No. 110

Email: craig.sinclair@rcswa.edu.au **Theme:** Living with Dementia

Substitute or supported decision-making? Learning from the lived experiences of people with dementia and their carers to guide practice, policy and law reform

The University of Western Australia

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Recent years have seen growing debate regarding the rights of individuals to make decisions about their own lives, and to have these decisions respected. People living with disabilities have traditionally experienced barriers to the full enjoyment of legal capacity, with substitute decision-making often being the default response for people living with cognitive impairments. International treaties, and a recent report from the Australian Law Reform Commission, have challenged this practice, with calls for people living with disabilities to be supported to enact their own decisions, to the greatest extent possible. The emerging practice of 'supported decision-making' has been explored in the disability sector, however there is very little research on this topic in the context of dementia.

This two-phase qualitative study is part of a broader program of research undertaken within the Cognitive Decline Partnership Centre, examining supported decision-making in the context of dementia. The first phase of the study explored lived experiences of decision-making and future planning relating to healthcare, medical treatment and personal or 'lifestyle' matters among people living with dementia and their carers. The second phase of the study involves specific consultation with participants regarding the 'supported decision-making' approach. The researchers use in-depth semi-structured interviews with individuals and dyads (pairs), aiming to draw on the lived experiences of people living with dementia, and their carers, to understand what types of support might be helpful, who is best placed to

provide such support, and the practical issues and safeguards that need to be considered. To date 30 interviews have been undertaken (17 dyad, 13 individual), with key themes including accommodating cognitive impairment, the role of the supporter, and the relational context in which decisions are made and enacted. In many cases supported decision-making was described as 'already happening', although 'independent', 'supported' and 'substitute' decisions could be seen to intertwine in participant'decision-making. In some cases supported decision-making was seen as an abstract idea. Participants have expressed strong support for close and trusted people to be in the role of supporters and provided insights into the role of professionals in facilitating this process. Further work will be focused on refining these themes and developing community resources, in collaboration with Alzheimers Australia / Dementia Australia.

Dr Kate Smith

Poster: No. 111

Email: kate.smith@uwa.edu.au **Theme:** Care

'A Moorditj Life': Development of a quality of life package for older Aboriginal Australians

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Introduction Despite the need there is no quality of life measure for older Aboriginal Australians with dementia. This project aims to develop such a tool, and a package of recommendations.

Method Qualitative Indigenous research methods were utilised. Aboriginal Australians over the age of 45 years living in Perth completed in-depth interviews using a yarning approach. Thematic analysis was used to identify what is important to have a good (Moorditj) life, utilising a phenomenological approach to make meaning of participant stories.

Result and Discussions 20 interviews were completed, with a participant age range of 47-82 years. The key factors currently important to the quality of life of participants were: strong spirit; access to country; cultural knowledge, identity and activities; language; community (family and friends); health; socio-economic factors; individual factors; Eldership and teaching; security; and recreation. Factors additionally important to participants as they grow older included: end of life planning, aged care services, and healing. Factors impacting on quality of life include racism, service issues, adapting to society, colonisation, missions, trauma, substance abuse, and stolen generation causing loss of: culture, family, identity and language. These results will be discussed in yarning groups with people with dementia and their caregivers to finalise items for the tool and wording of items. Validity testing will begin next year.

Conclusion The final package can be utilised by services to identify and improve the quality of life of older Aboriginal Australians, including those with cognitive impairment.

Dr Ashleigh Smith

Poster: No. 112

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Moderate to vigorous physical activity is associated with EEG global power in older adults

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Physical activity is a primary risk factor for late-life Mild Cognitive Impairment (MCI) and dementia. Previous studies have highlighted the potential diagnostic value of resting state electroencephalography (EEG) to discriminate between cognitive states in late-life and the prediction of decline to Mild Cognitive Impairment or dementia. Here we extended this approach by investigating if resting state EEG was associated with individual differences in physical activity levels in older adults without dementia. 7-days of objectively measured 24 h activity data were captured using GENEActiv wrist-worn tri-axial accelerometers in 16 older adults (range 56-82 years, mean age 69.4 ± 6.1, 8 females). Using 60-s epochs, average daily time spent in sleep, sedentary behaviour, light PA and moderate-to-vigorous PA was calculated using pre-defined cut-points using custom COBRA software. In addition, 3-min of resting state EEG (eyes closed) was captured using a 62 channels and global power determined using the (delta + theta)/(alpha + beta) ratio (DTABR); a measure of generalised slowing of

neural activity, previously shown to be sensitive to MCI and vascular burden. When accounting for age and sex, time spent in moderate-to-vigorous physical activity, but not sedentary time, sleep or light physical activity was associated with a lower global DTABR ($p<0.05$). These findings provide evidence that engagement in moderate-to-vigorous physical activity protects against the typical alterations in brain neural synchronisation associated with MCI and dementia.

Professor Velandai Srikanth

Poster: No. 113

Email: velandai.srikanth@monash.edu **Theme:** Prevention

Pilot RCT of multi-modal exercise on cognition in Type 2 diabetes mellitus

Peninsula Health & Monash University

Background: Type 2 Diabetes (T2D) is associated with increased risk of dementia. We aimed to determine the feasibility of a randomised controlled trial (RCT) examining the efficacy of exercise on cognition and brain structure in people with T2D.

Methods: A 6-month pilot parallel RCT of a progressive aerobic- and resistance-training program versus a gentle movement control group in people with T2D aged 50-75 years (n=50). Assessors were blinded to group allocation. Brain volumes, cortical thickness and white matter microstructure were measured using MRI, and cognition using a neuropsychological battery. Outcomes were changes to protocol, recruitment, time to enrol, randomisation, adherence, safety and retention.

Results: The mean age of participants was 66.2 (SD 4.9) years and 48% were women. There were no changes to the design during the study. A total of 114 people were screened for eligibility, with 50 participants with T2D enrolled over 8 months. Forty-seven participants (94%) completed the study (23 of 24 controls; 24 of 26 in the intervention group). Baseline characteristics were reasonably balanced between groups. Exercise class attendance was 79% for the intervention and 75% for the control group. There were 6 serious adverse events assessed as not or unlikely to be due to the intervention. Effect sizes for each outcome variable are provided.

Conclusion: This study supports the feasibility of a large scale RCT to test the benefits of multi-modal exercise to prevent cognitive decline in people with T2D.

Professor Velandai Srikanth

Poster: No. 114

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Longitudinal associations of Type 2 Diabetes Mellitus (T2D) with Cognitive Decline and Brain Atrophy

Peninsula Health & Monash University

Background; T2D is associated with dementia. There are very few longitudinal data describing the longitudinal associations of T2D with cognitive decline and brain atrophy. We aimed to study the longitudinal relationships (1) Between T2D and cognitive decline and (2) Between T2D and imaging markers of brain atrophy.

Methods; Cohort study (3 points of measurement, total follow-up~6 years). T2D sample – from National Diabetes Service Scheme Database in Southern Tasmania, Australia (age >55). Non-T2D sample –randomly selected from electoral roll in Southern Tasmania (age> 60). Cognitive Battery - Digit Symbol Coding, Symbol Search, COWAT, Category Fluency, Stroop Test, Digit Span, Hopkins Verbal Memory Test, Rey Complex Figure copy and delay. Structural MRI - 1.5T MRI brain scan, total brain and ventricular volumes measured using automated segmentation. Multivariable linear mixed level regression for longitudinal modelling.

Results; Total 705 participants, mean age 71 years, 42% female, 49% with T2D. T2D was associated with poorer cognitive scores, smaller brain volume, and greater ventricular volume at baseline. T2D was associated with greater rate of decline in verbal fluency ($p = 0.05$) and verbal memory ($p = 0.001$) and a greater rate of increase in ventricular volume ($p = 0.04$). T2D was associated with lesser rate of decline in visuospatial skills, possibly due to differential sample attrition.

Conclusion; T2D is associated with greater rate of cognitive decline and brain atrophy over 6 years, possibly contributing to the risk of clinical dementia.

Dr Genevieve Steiner

Poster: No. 115

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When life gives you lemons, you make lemonade: validating a phone screening procedure to differentiate mild cognitive impairment from subjective cognitive complaints

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Mild cognitive impairment (MCI) is a heterogeneous syndrome that increases the risk of dementia. One of the difficulties in recruiting people with MCI from the community is that targeted advertising campaigns typically yield a high proportion of potential candidates who have subjective cognitive complaints (SCCs), rather than MCI. SCCs involve the subjective experience of cognitive decline, but the absence of any objective cognitive impairment on standardised neuropsychological tests. In order to save resources and reduce participant burden by unnecessarily inviting people with SCCs in for testing, our team has developed a comprehensive phone screening process to maximise the number of MCI true positives. This process has been facilitated by parallel recruitment for a SCC study. Our phone screening procedure involves: consent, inclusion/exclusion criteria, Telephone Interview for Cognitive Status-Modified (TICS-M), Weschler Test of Premorbid Function (ToPF) Complex Demographics, and a brief clinical interview that probes medical history, subjective premorbid function, evidence of changes in memory and thinking, time course and nature of the changes, potential mitigating situational factors, sleep quality, and mental health concerns (if depression is suspected, the Geriatric Depression Scale is administered). Although this is not the primary aim of the fellowship project, we have found it to be a particularly fruitful exercise with promising results that we hope will aid other groups utilising community-based recruitment strategies.

Dr Brad Sutherland

Poster: No. 116

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Uncovering mechanisms of pericyte contraction and death that reduce energy supply and cause cognitive decline

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Vascular dysfunction, characterised by hypoperfusion and blood-brain barrier (BBB) disruption, can lead to an energy deficit within the brain and could drive pathogenesis of dementia and Alzheimer's disease (AD). Pericytes are spatially isolated cells on capillaries that actively control cerebral blood flow (CBF) by constricting or dilating capillaries. Mild changes in CBF can cause pericyte death, clamping capillaries shut and limiting oxygen supply to the brain. Therefore, pericyte degeneration could switch a transient vascular insult into a chronic restriction of blood supply. We hypothesise that identifying mechanisms of pericyte contraction of capillaries could provide novel targets to prevent energy deficit and subsequent cognitive decline. A gene microarray of human brain vascular pericytes revealed that compared to endothelial cells, there was greater expression of receptors for both contractile (angiotensin-II type 1, endothelin-1A) and relaxant (adenosine A2b, prostaglandin EP4) mediators. Direct administration of the vasoconstrictor endothelin-1 generated a prolonged contraction of pericytes in vitro. AD and vascular dementia are characterised by enhanced free radical production. We exposed pericytes to hydrogen peroxide in vitro, which dose-dependently caused pericyte death. In order to protect pericytes from free radical damage, we placed pericytes in a hypothermic environment (33°C). Hypothermia reduced pericyte death following hydrogen peroxide exposure showing that pericytes are able to be protected from free radical injury. These results show that pericytes respond to both vascular mediators and free radicals, and can be protected from injury, which suggests that they may provide a novel target to improve blood flow and energy supply thereby restricting cognitive decline.

Dr Ryu Takechi

Poster: No. 117

Email: R.Takechi@curtin.edu.au **Theme:** Prevention

Blood-brain barrier dysfunction may be causally associated with cognitive decline and neurodegeneration induced by pre-diabetic insulin resistance in wild-type mice

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Background: Diabetic insulin resistance and pro-diabetic diet are reported to increase dementia risk through unknown mechanisms. Emerging evidence suggests that the integrity of blood-brain barrier (BBB) is central to the onset and progression of neurodegeneration and cognitive impairment. Therefore, the current study investigated the effect of pro-diabetic diets on cognitive dysfunction in association to BBB integrity and its putative mechanisms.

Methods: C57BL/6J mice were chronically ingested with a diet enriched in fat and fructose (HFF) for 4 or 24 weeks. BBB integrity was mesured with cerebral extravasation of plasma IgG and endothelial tight junction expression. Cognitive performance was assessed by Morris Water Maze.

Results: Morris water maze test indicated no significant cognitive decline after 4 weeks of HFF feeding compared to low-fat fed control. However, at this stage, BBB dysfunction accompanied by heightened neuroinflammation in cortex and hippocampal regions was already evident. After 24 weeks, HFF fed mice showed significantly deteriorated cognitive function concomitant with substantial neurodegeneration, which both showed significant associations with increased BBB permeability. In addition, the data indicated that the loss of BBB tight junctions was significantly associated with heightened inflammation and leukocyte infiltration.

Conclusions: The data collectively suggest that in mice maintained on pro-diabetic diet, the dysfunctional BBB associated to inflammation and leukocyte recruitment precedes the neurodegeneration and cognitive decline, indicating the causal association.

Dr Ryu Takechi

Poster: No. 118

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Vitamin d, cerebrocapillary integrity and cognition in murine model of accelerated ageing

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Background: Increased use of vitamin-D (vit-D) supplements has been attributed for improved cognitive performance, an important consideration given that vit-D deficiency becomes more common with older age. However, several lines of evidence suggest that chronically heightened plasma vit-D may paradoxically compromise cognitive function. The mechanism(s) for detrimental effects of exaggerated vit-D on central nervous system (CNS) function have not been delineated. However, in animal model studies, we showed that one possibility might be through heightened neurovascular inflammation that occurs in response to changes in cerebral capillary permeability. Senescence-accelerated-mouse-phenotype strains (SAMP) represent lines of AKR/J mice that feature accelerated aging. The SAMP strain-8 (SAMP8) is considered a relevant animal model for human-ageing, because the pathological traits that develop are age-dependent and occur as a consequence of subtle oxidative metabolic aberrations over a prolonged period of time. SAMP8 mice have been comprehensively assessed for behavioural disturbances and have demonstrated spatial learning and memory deficits. Passive and active avoidance disturbances are indicated and object recognition compromised in older age SAMP8 mice. Methods: SAMP8 mice at the age of 6 and 20 weeks were used. The capillary integrity was assessed by the cerebral extravasation of plasma IgG. Cognitive performance was assessed by Morris Water Maze (MWM). Results: In this study, we present studies in SAMP8 male mice and show that serum 25(OH)D progressively increases with ageing in SAMP8 male. However, we also provide evidence that the increase in serum 25(OH) D occurs concomitant with poorer cognitive performance by MWM analysis and increased capillary permeability. Latency time area-under-curve (AUC) to rescue platform in MWM determined over a 3 day trial increased by approximately 50% in SAMP8 mice at 20 weeks of age compared to baseline at 6 weeks of age. Moreover, in these same mice, parenchymal abundance of IgG within HPF and CTX was markedly increased as SAMP8 mice. Conclusions: Strong evidence of causality between endogenous hypervitaminosis D and poorer maze performance is suggested by the finding that maintenance of SAMP8 mice on a diet deficient in vit-D prevented the age-associated decline in maze performance, concomitant with maintenance of capillary impermeability. The findings may explain paradoxical clinical data reporting associations of serum vit-D homeostasis and cognition.

Dr Jeanette Tamplin

Poster: No. 119

Email: jeanette.tamplin@unimelb.edu.au **Theme:** Living with Dementia

Musical Memories: Connecting community-dwelling people with dementia and their family caregivers through song

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Active music participation may offer benefits for people with dementia (PwD) and their family caregivers (FCG) living in

the community. For the PwD, this capacity to respond to music may facilitate reminiscence and social engagement. Consequently, FCGs may experience meaningful and satisfying connection with their loved one. This study investigated the effects of therapeutic singing groups for PwD/CG dyads on: relationship quality; life satisfaction, caregiver satisfaction, flourishing, and depression in CGs; and anxiety, quality of life, agitation, apathy and cognitive function in PwD.

A mixed-methods, single group pre-post design utilised standardised outcome measures and qualitative interviews. 11 participant pairs attended 20 weekly group sessions (attended by PWD and CG together) that incorporated singing preferred songs and opportunities for social interaction. Findings from this feasibility study have informed the design of a randomized controlled trial. Quantitative results indicated that healthy baseline scores for relationship quality and wellbeing were maintained throughout the 20-week intervention period for both PwD and FCG. Qualitative results demonstrated that participants perceived both social and personal benefits from participation. They felt that singing in the choir stimulated cognitive responses including learning, skill development, and memory for both the PwD and FCG, and their participation in the research project was perceived as both a positive and challenging experience. These results suggest that therapeutic singing groups offer a unique combination of social support and opportunity for creative emotional expression that may maintain quality of life and sustain a positive and fulfilling relationship between PwD and FCG living in the community.

Dr Rachel Tan

Poster: No. 120

Email: rachel.tan1@sydney.edu.au **Theme:** Assessment and Diagnosis

ß-amyloid in Frontotemporal dementia syndromes

Rachel Tan 1,2, Jillian Kril 3, Yue Yang 1, John Hodges 1,2, Victor Villemagne 4, Christopher Rowe 4, John Kwok 1,2, Lars Ittner 2, Glenda Halliday 1,2

1 Brain and Mind Centre, Sydney Medical School, The University of Sydney,
2. School of Medical Sciences, University of New South Wales,
3. Discipline of Pathology, Sydney Medical School, The University of Sydney,
4. Department of Molecular Imaging and Therapy, Centre for PET, Austin Health, Melbourne

The clinical distinction between frontotemporal dementia (FTD) and Alzheimer's disease (AD) remains challenging, with ~25% of patients with an FTD syndrome found to have AD at autopsy, a difficulty likely to be overcome with the use of in vivo ß-amyloid imaging. Importantly however, prior to the publication of the updated pathological criteria for AD in 2012, only neuritic plaques were used for diagnostic confirmation of AD. As such, knowledge on the prevalence of ß-amyloid deposition in the ~75% of patients with an FTD syndrome that do not fulfil pathological criteria for AD is lacking. To address this, the present study assessed ß-amyloid deposition in a large series of 94 autopsy-confirmed FTD cases without pathological AD. We report ß-amyloid deposition in 38% of patients with behavioral variant FTD and in 37% of patients with primary progressive aphasia. The presence and topographical progression of ß- amyloid was found to increase with age in FTD, as observed in controls. The present study also assessed the pathological accuracy of PiB-PET imaging in a cohort of patients with clinical FTD followed to autopsy (n=15). AD pathology was identified in all cases with high PiB retention (n=4) and in one case with low PiB retention. A strong regional correlation was identified between the volume fraction of histological ß-amyloid with PiB standard uptake value ratio scaled to the white matter. Together, the present study has assessed a large pathologically-confirmed series of FTD cases, providing a pathological reference that may aid the interpretation of future in vivo assessments of ß-amyloid in FTD syndromes.

Dr Jane Thompson

Poster: No. 121

Email: jantho@bigpond.com **Theme:** Intervention and Treatment

Involving patients and the public ('consumers') in the NHMRC National Institute for Dementia Research (NNIDR)

Alzheimer's Australia National Dementia Consumer Network

The NNIDR Strategic Roadmap states an intention "… to involve consumers in every stage of dementia research to ensure consumer driven research and translation priorities and outcomes." The NHMRC provides guidance on how patients/the public can be involved at various levels of research, at various stages of the research cycle and in institutions conducting research1. How well is NNIDR meeting these expectations?

Patients/the public were involved in the development of the NHMRC National Dementia Research and Translation Priority Framework which underpins the Roadmap. Within NNIDR, they are involved in the Expert Advisory Panel and Board. This is necessary, but not sufficient, to fulfill expected standards of public involvement. We also need to ensure

that all NNIDR funded projects and researchers actively involve patients/the public in their research in whatever way is appropriate. Researchers may need specific guidance on this, particularly in basic science research, and, patients/the public need to be supported to develop knowledge, skills and experience to be involved.

Examples of patient/public involvement include: setting research priorities and questions; informing research design; guiding funding decisions; shaping ongoing research; disseminating research findings; campaigning for implementation.

Patient and public involvement (PPI) is becoming an essential element of publicly-funded research. The NNIDR is ideally placed to provide leadership in PPI in dementia research in Australia, but needs to develop resources and structures for its researchers and the public it serves.

Miss Esther Tiong

Poster: No. 122

Email: tion0019@flinders.edu.au **Theme:** Intervention and Treatment

Interactive Visual Cues using Intelligent Technologies to Support Care and Health Monitoring Services

Esther Y. C. Tiong 1, David M. W. Powers 1, Anthony. J. Maeder 2

1. Flinders University School of Computer Science, Engineering and Mathematics, Adelaide,
2. Flinders University School of Health Sciences, Adelaide, South Australia

We initially reviewed the possibility of visual cues against impact of reignite flashbulb memories and retention of their short-term memory [1]. The matter on how memory consolidation and duration of memory retention will determine the severity of memory declination, their attentiveness [2] and neuroplasticity of brains. Effective visual cues also discovered to help diagnosis on cognitive declination and type of dementia [3]. Our research aims on building a computerized intelligent system that extracts video keyframes of significant memories to create a set of multi-modal memory hooks with proposed interactive learning interface. By evaluating existing technologies to seek input as to the precise nature of the system, we have come up with logic of intervention: magic choice of conversation mode, using slow tompting technique, repetitive instructions and emphasized consonants that will provide higher attentiveness and interaction between patients and artificial intelligence system. We involved clinical staff and carers (n=17) to develop a functional definition of the system, considered issues on security, privacy and sensitiveness issues and limitation on data storage on memory hardware [4], and examples of various other forms of non-pharmacological interventions [5]. The survey also collected to identify types of major life events that are crucial for digital memory hooks, and need for technique to distinguish associated features from personal life to inform the extraction of video keyframes. Proposed interventions and device interface should be appraised from actual subjects and care staff from institutional environment, also relatives/families and the home environment in future work to formally evaluate the hypothesis from current work.

Miss Esther Tiong

Poster: No. 123

Email: tion0019@flinders.edu.au **Theme:** Living with Dementia

Interactive Visual Cues for Dementia

Esther Y. C. Tiong, David M. W. Powers, Anthony. J. Maeder

Flinders University, Adelaide

Complex attentiveness and deprived memory is often observed with dementia, which causing them unable to learn and retain new knowledge. The value of visual cues has been recognized e.g. for flashbulb memory reignition, retention of short-term memory and useful in assessment of cognitive decline. Our research aims to construct an intelligent agent system with an information environment based on visual cues that supports teaching and learning information and introduce explicit memory hook on dementia. The system will record personal and environment based events, extract video keyframes of significant memories dynamically, and create a set of multi-modal visual cues for recalling memory and encourage memory consolidation. We conducted survey identifying supportive events that promotes likeness and reviewed technologies with relevant support to bring our design concept together for the base of learning and teaching cues. We will formally evaluate a trial intervention with a co-design process involving home caregivers (n=3) to derive a functional definition of our proposed system to improve its usability and effectiveness. We hope our system will assist-to-improve memory, delay chronic progression, promote well-being and support home care. Extending the system to include facility environment will be future work.

Dr Bradley Turner

Poster: No. 124

Email: bradley.turner@florey.edu.au **Theme:** Intervention and Treatment

SMN mitigates neurodegeneration and disease progression in a mouse model of ALS/FTD

Nirma D. Perera 1, Rebecca K. Sheean 1, Peter J. Crouch 2, Anthony R. White 2, Malcolm K. Horne 1, Bradley J. Turner 1

1. Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, VIC,
2. Department of Pathology, University of Melbourne, Parkville, VIC

Cytoplasmic accumulation and aggregation of TAR DNA binding protein 43 (TDP-43) in neurons and glial cells is a pathological hallmark linking amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD). TDP-43 is a RNA binding protein implicated in regulation of RNA splicing, transport and transcription. TDP-43 shows structural and functional overlap with survival motor neuron (SMN), a RNA binding protein also implicated in RNA processing and splicing. We therefore examined a potential contribution of SMN to TDP-43 proteinopathy. Here, we determined a significant and progressive upregulation of SMN protein, but not mRNA, in cortical neurons and spinal motor neurons in a TDP-43A315T mouse model of ALS/FTD. A corresponding accumulation of cytoplasmic SMN complexes occurred in cortical neurons and spinal motor neurons in TDP-43A315T mice. Furthermore, cytoplasmic SMN complexes sequestered both TDP-43 and HuR, consistent with incorporation into stress granules. To address whether SMN can functionally compensate for pathological TDP-43, we crossed transgenic PrP-SMN and TDP-43A315T mice and examined progeny for motor and cognitive behaviour, survival and neuropathology. We demonstrated that transgenic SMN overexpression attenuated neurodegeneration, astrocyte and microglial activation and significantly slowed disease progression in TDP-43A315T mice. Our findings highlight novel molecular interactions of TDP-43 and SMN in ALS/FTD, while SMN overexpression may counter disease progression and neuropathology in TDP-43 proteinopathy. Enhancing SMN levels and function using pharmacological and genetic agents may therefore prove therapeutically beneficial for ALS/FTD.

Ms Pippy Walker

Poster: No. 125

Email: pippy.walker@sydney.edu.au **Theme:** Prevention

Vitamin D Supplementation to Reduce Falls: An Implementation Study in Australian Residential Aged Care Facilities

Walker, P 1 Miller Amberber, A 1 Kurrle, SE2 Kifley, A 1 Cameron, ID 1

1. John Walsh Centre for Rehabilitation Research, University of Sydney, St Leonards NSW., Australia,
2. Division of Rehabilitation and Aged Care, Hornsby Ku-ring-gai Health Service, Hornsby NSW Australia

Introduction: There is strong evidence for the effectiveness of vitamin D supplement use in preventing falls in residential aged care facilities. It is one of the few falls prevention interventions that clearly apply to people with dementia. Despite this evidence, there is poor and variable uptake of this guideline in practice. This project aims to increase the uptake of vitamin D supplement use in the aged care setting.

Methods: A multifaceted interdisciplinary approach was employed, including frequently used implementation strategies such as identifying a local champion, using expert opinion leaders, disseminating educational materials, providing educational outreach visits, using audit and feedback, and facilitating quality improvement activities over a 12 month intervention period. A non-randomised stepped wedge design was used.

Results: Forty-one facilities participated. The prevalence of vitamin D supplement use, as per best practice falls prevention guidelines varied between individual facilities and was on average 56%. Changes in prevalence over the duration of the intervention were inconsistent and generally corresponded with identified barriers or enablers to implementation.

Conclusion: Implementation in the aged care setting is complex, with numerous barriers across different stakeholder groups. Key issues appear to be lack of recognition of the issue and its consequences by key decision makers (general practitioners and senior management), fragmentation of health management responsibilities, and the changing role of aged care to provide principally palliative care. In addition vitamin D supplement guidelines should consider older people receiving in home care as an alternative to living in a residential facility.

Dr Michael Waller

Poster: No. 126

Email: m.waller@uq.edu.au **Theme:** Assessment and Diagnosis

Differences in age at death largely account for sex disparity in Alzheimer's disease and dementia mortality rates in the Australian population

Michael Waller, Ph.D., Rachel Buckley, Ph.D., Colin L Masters, MD, Annette Dobson, Ph.D.

The University of Queensland

Background There is conflicting evidence about sex disparities in rates of Alzheimer's disease (AD) and dementia. We examined this issue using death records for Australia.

Methods We used death certificate data for all individuals over 60 years with any mention of dementia (including AD and vascular dementia) as the underlying or an associated cause of death for 2006-14 (n=184562). Death rates for women and men were compared using Poisson regression.

Findings The crude rate of all deaths with AD or other dementias was 4·9 per 1000 person-years. For women compared to men, the relative rate of mortality with AD or dementia mentioned anywhere on the death certificate was 1·55 (95% confidence interval: 1·53-1·56). After adjusting for single year of age, this rate was attenuated to 0·99, (95%CI: 0·98-1·00). Dementia of 'unspecified' type was most commonly reported as the underlying cause of death (58% of records of death with dementia), and also as an associated cause (76%). AD and vascular dementia were the next most commonly recorded underlying causes of dementia deaths (30% and 12%, respectively). Age-adjusted rates for AD were higher for women than men (1·14, 1·12-1·16), while vascular dementia rates were lower (0·80, 0·78-0·82). Age-adjusted death rates with AD or dementia as the underlying cause increased over the 2006-2014 period, but associated causes decreased; total rates of dementia mortality, on the other hand, remained stable. These patterns across 2006-2014 were similar for women and men, and for all dementia types.

Interpretation Women's older age at death explained most of the sex differences in mortality with Alzheimer's disease or dementia. Completion of death certificates for people with dementia is often imprecise. As such, in order to obtain valid population estimates from death certificates, it is important to combine records across dementia types and underlying and associated causes of death.

Dr Stephanie Ward

Poster: No. 127

Email: stephanie.ward@monash.edu

A Pilot Dementia Clinical Quality Registry to improve Dementia clinical care

Stephanie A Ward 1, Henry Brodaty 2,3, Susannah Ahern 1, Elsdon Storey 1, Arul Earnest 1, Robyn L Woods 1, Mark R Nelson 1,4, Karolina Krysinska 2, Joanne Dean 1, Danny Liew 1 and John J McNeil 1

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2. Faculty of Medicine, Dementia Centres for Research Collaboration, School of Psychiatry, University of New South Wales, Sydney, NSW, Australia;
3. Centre for Healthy Brain Ageing, School of Psychiatry, University of New South Wales, Sydney, NSW, Australia;
4. Menzies Institute for Medical Research, University of Tasmania, Hobart, TAS, Australia

Background: Clinical Quality Registries (CQRs) are powerful and cost-effective tools that promote and monitor the implementation of clinical guidelines into practice, benchmark clinical performance, and by providing feedback, can substantially improve patient care. There is growing recognition of the need for an Australian dementia registry that incorporates a CQR component. However, developing a CQR for dementia in Australia presents complex challenges. These are best overcome through a pilot registry that can develop and test methodologies, and address initial feasibility issues.

Methods: This is a three-year NNIDR-funded project that commenced in September 2017 with the aim of developing and testing methodologies for a dementia CQR. Key steps will include establishing an overall registry purpose and case ascertainment criteria, identifying an epidemiologically sound minimum data set and key quality indicators, exploring and testing patient recorded outcome measures (PROMS) and data linkage, establishing a governance structure for a functioning CQR and costing out a national expansion. Data from an existing large and well-characterised cohort of participants with incident dementia diagnosed during the ASPirin in Reducing Events in the Elderly (ASPREE) study will be utilised, where indicated, to test various elements of the proposal, including identifying participants for testing of PROMs.

Discussion: This project builds on team members' collective expertise in dementia clinical care and CQR development and operation, whilst efficiently utilising data from a large, well characterised cohort. The outcomes from this pilot will inform the most efficient and effective methods for establishing an Australian dementia CQR.

Ms Rochelle Watson

Poster: No. 128

Email: Rochelle.Watson@newcastle.edu.au **Theme:** Assessment and Diagnosis

What is a 'timely' diagnosis? Exploring the preferences of health service consumers regarding when a diagnosis of dementia should be disclosed

Rochelle Watson 1,2, Jamie Bryant 1,2, Rob Sanson-Fisher 1,2, Elise Mansfield 1,2, Tiffany-Jane Evans 2

1. Health Behaviour Research Collaborative, Priority Research Centre for Health Behaviour, School of Medicine and Public Health, University of Newcastle, Callaghan, NSW, Australia;
2. Hunter Medical Research Institute, New Lambton Heights, NSW, Australia

Background: A shift in the field away from early diagnosis of dementia towards timely diagnosis acknowledges the importance of person-centred dementia care. What is considered timely diagnosis disclosure may differ depending on the unique preferences and circumstances of the person with dementia. The perception of 'timely' diagnosis disclosure may also differ between the person with dementia, their family members, and the clinician. This research explored the preferred timing of dementia diagnosis disclosure among health service consumers.

Methods: A cross-sectional survey was conducted with outpatients and their support persons attending an Australian hospital. Participants were aged over 18 years and English-speaking. Participants were recruited in the clinic waiting room and provided a web-connected iPad to complete the survey. Data was collected on socio-demographics and experience with dementia. Preferences for timing of diagnosis disclosure were explored via two hypothetical scenarios.

Results: 446 participants completed the survey. Most participants preferred a dementia diagnosis to be disclosed as soon as possible, regardless of whether the scenario described themselves being diagnosed (92%) or their spouse having dementia (88%). Socio-demographics and previous dementia experience were not significantly associated with preferences. Preferences for self and preferences for spouse were strongly correlated (0.91).

Discussion: Findings may assist to overcome some barriers to timely diagnosis by providing clinicians with guidance about consumer preferences. These preferences, along with increasing prevalence of dementia, may have important implications for models of dementia care.

Dr Rachel Wong

Poster: No. 129

Email: rachel.wong@newcastle.edu.au **Theme:** Prevention

Cerebrovascular resistance is an early biomarker of slow gait and cognitive deficits in healthy older women

Rachel HX Wong, Jay Jay Thaung Zaw, Hamish M Evans, Peter RC Howe

University of Newcastle, School of Biomedical Sciences and Pharmacy, Clinical Nutrition Research Centre, Callaghan, NSW

Cognitive difficulties and gait abnormalities both increase with age; all of these are linked to altered cerebrovascular hemodynamics and collectively predict the speed of transitioning to dementia. We have previously shown that impaired neurovascular coupling compromises cognitive performance in healthy older women; others have also linked cerebrovascular dysfunction to slow gait in the elderly. Here, we determined whether cerebrovascular dysfunction is associated with slow gait and poor cognitive function in a sample of healthy, normotensive older women.

During the baseline assessments of a two-year nutrient intervention, , 146 postmenopausal women aged 65±7 years underwent a neurocognitive battery assessment of cognitive flexibility, processing speed, verbal, working, and episodic memory. Gait speed was determined by dividing the total distance by the time taken during a 2-min walk test, at preferred speed. Transcranial Doppler ultrasound was used to assess cerebral velocities and vessel stiffness in the middle cerebral arteries at rest and during a 3-min hypercapnia challenge.

With age as a covariate, gait speed was negatively correlated with cerebrovascular resistance (ratio of systemic mean arterial pressure to basal mean blood flow velocity) (r=-0.241, P=0.021). This relationship was partially mediated by BMI, central adiposity and fasting triglyceride levels. After taking into account education levels, slow gait was also linked to poor processing speed (r=0.259, P=0.002), verbal memory (r=0.171, P=0.041) and overall neurocognitive performance to the test battery (r=0.176, P=0.035). However, cerebrovascular responsiveness to hypercapnia did not correlate with cognitive function or gait speed.

In our cohort of healthy older women, cerebrovascular resistance appears to be the pathological link between slow gait and cognitive deficits. Preventing the onset of metabolic syndrome in adulthood may be a useful target for dementia prevention.

Dr Rachel Wong

Poster: No. 130

Email: rachel.wong@newcastle.edu.au **Theme:** Assessment and Diagnosis

Subjective cognitive decline is associated with cerebrovascular dysfunction in healthy older women.

Jay Jay Thaung Zaw, Hamish M Evans, Peter RC Howe, Rachel HX Wong

The University of Newcastle

Subjective cognitive decline (SCD) complaints, preceding mild cognitive impairment, is emerging as a marker of prodromal dementia. Impaired cerebrovascular function is related with the severity of cognitive impairment, but this relationship has not been explored in SCD. We examined whether SCD is associated with cerebrovascular dysfunction in a cognitively-normal population.

Using the baseline assessments from a two-year resveratrol supplementation intervention in 146 postmenopausal women aged 65±7 years, SCD was determined by a percentage score from a survey of 20 questions relating to everyday memory complaints. Depressive symptoms, obtained using the Center for Epidemiologic Studies Depression Scale (CES-D), were also normalised to a percentage. Transcranial Doppler Ultrasound (TCD) was used to measure cerebral blood flow velocities (CBFV) in the middle cerebral arteries at rest. Resistance in the cerebral vessels or cerebrovascular resistance (CVRi) was calculated as the ratio between systemic mean arterial pressure and basal mean CBFV.

Independent of age, CES-D was related to SCD ($r=0.364$, $P<0.001$). However, depressive symptoms were unrelated to CVRi or CBFV. After adjusting for years of education and depressive symptoms, SCD was positively correlated with CVRi ($r=0.292$, $p=0.006$) and negatively with basal mean CBFV ($r=-0.227$, $p=0.009$).

We now provide the initial evidence that in our cohort of healthy, normotensive older women, those with SCD are likely to report more depressive symptoms and have reduced CBFV and increased resistance in the cerebral vessels. Therefore, maintaining optimal cerebrovascular function is crucial for delaying the onset of cognitive impairment.

Dr Paul Yates

Poster: No. 131

Email: Paul.YATES@austin.org.au

Vascular risk measures and longitudinal Aβ accumulation: results from the AIBL study of ageing

Austin Health

Interventions to delay or prevent the onset of dementia have potential to considerably reduce its future prevalence. Hence, the interface between risk factors for vascular disease and development of dementia is of great interest, because many vascular risk factors (VRF) are amenable to intervention. We used longitudinal Aâ PET imaging to identify whether VRF factors were associated with increased accumulation of Aâ over six years' follow-up.

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CONTENTS

INTRODUCTION

Dementia is the leading cause of death for Australian women, and the second most common cause of death among the overall population.

At present, an estimated 425,000 Australians are living with dementia. Without a medical breakthrough, this number is expected to increase to more than one million by 2050.

Since 2015, the NHMRC National Institute for Dementia Research (NNIDR) has been targeting, coordinating and translating the strategic expansion of dementia research in Australia. By collaborating with researchers; engaging those living with dementia in research efforts and connecting with health professionals and policy makers, the NNIDR is committed to achieving the World Dementia Council's international target — a five-year delay in the onset of dementia by 2025.

It is in this context that we present to you the full program and abstracts of the Australian Dementia Forum 2018: *Cooperation, Collaboration and International Connections* (ADF2018).

The ADF2018 was held in Sydney on 4–5 June.

Building on last year's Forum success, the ADF2018 aimed to encourage collaboration and capacity building across Australia's network of dementia researchers, and greater connection with international research teams, similarly dedicated to tackling the challenge of dementia.

Researchers submitted over 179 abstracts and of these 45 were selected for presentation at ADF2018, with a further 93 poster presentations across three poster sessions. Three international keynote speakers participated in ADF2018, with a further keynote address delivered by NHMRC Boosting Dementia Research Leadership Fellow, Dr Carol Dobson-Stone.

Our international keynotes, Dr Rachel Whitmer from the University of California Davis, Simon Denegri OBE from the National Institute for Health Research (UK) and Professor Joseph Gaugler from the University of Minnesota, each shared their insights across risk reduction, care, and living with dementia.

The ADF2018 also included the Public Involvement in Research Workshop facilitated by Anne McKenzie AM from the University of Western Australia, and Simon Denegri. The workshop provided a unique opportunity for consumers and researchers to consider ways in which to further encourage consumer involvement in dementia research, to better inform researchers, and to improve outcomes for people living with dementia.

PROGRAMME COMMITTEE

Professor Glenda Halliday, Chair University of Sydney
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Dr Genevieve Steiner Western Sydney University
Dr Rachel Tan University of Sydney
Dr Jennifer Thompson
NHMRC Cognitive Decline Partnership Centre
Professor Bob Williamson Yulgilbar Foundation
Dr Rachel Wong University of Newcastle
Dr Emily You University of Melbourne

ROUND TABLE SESSIONS

Sunday 3 October – By Invitation

10am–12pm
Roundtable 1.1
Rehabilitation in Dementia

Lee-Fay Low
University of Sydney, Sydney, NSW, Australia

This roundtable will bring together existing and interested researchers in rehabilitation in dementia from a range of backgrounds including psychologists, occupational therapists, speech pathologists, physiotherapists and medical practitioners. The group will share current projects, identify potential synergies and methodological challenges, and kickstart new research ideas and collaborations. There is also the possibility of working together on a book on the topic. The group will also discuss strategy and opportunities in contributing to advocacy efforts with regards to rehabilitation and dementia.

10am–12pm
Roundtable 1.2
Exercise is prevention: Recommendations and strategies for the implementation of exercise as a factor to reduce dementia risk

Dr Belinda Brown & A/Prof Jeremiah Peiffer
Murdoch University, Western Australia

The purpose of this roundtable discussion, through engagement with researchers, policymakers, clinician and consumers, will be to evaluate the impact of exercise on cognitive health resulting in a position statement for the use of exercise as a preventative strategy for dementia. Further discussion will focus on identifying key implementation strategies necessary for the delivery of exercise interventions to the broader aged community. Information from this forum will be used to inform future policy and identify areas of needed research. Discussion of key funding opportunities and strategies to enhance funding success for exercise and dementia research will also be discussed.

12.30pm
Lunch

1pm–3pm
Roundtable 2.1
Safe and effective use of medicines in people living with dementia

Edwin Tan
Centre for Medicine Use and Safety, Monash University, Parkville, VIC

Lisa Kalisch Ellett
School of Pharmacy and Medical Sciences, University of South Australia, Adelaide, SA

Tuan Nguyen
School of Pharmacy and Medical Sciences, University of South Australia, Adelaide, SA

Julia Gilmartin-Thomas
School of Public Health and Preventive Medicine, Monash University, Melbourne

Emily Reeve
Kolling Institute of Medical Research, University of Sydney, Sydney, NSW

The roundtable session will bring together researchers and health professionals who have an interest in optimising medication use in people living with dementia. It will provide opportunities for local and international research collaboration, the development of new research directions in high priority areas, and the continuation of an ongoing special interest group on this topic.

1pm–3pm
Roundtable 2.2
The long and winding path to prevention part 2: Collaboration and co-ordination of dementia prevention efforts

Helen Macpherson
Deakin University, Vic, Australia

This round table will discuss strategies for researchers to better engage consumers, community organisations, clinicians and policy makers in dementia prevention research. We will determine how we can more effectively share resources to maximise the impact of dementia prevention research. We will discuss opportunities to contribute to the upcoming Dementia Centre for Research Collaboration (DCRC) initiated interest groups and training program, as well as the International Research Network on Dementia Prevention (IRNDP). This round table will involve participants of the dementia prevention special interest group formed from the 2017 event. Clinicians, representatives from relevant government and NGOs including Dementia Australia and consumer advocacy groups will be invited to participate.

PROGRAMME

Monday 4 June 2018

7am
Registration desk open

Joint Opening Sessions

8.30am
Welcome to Country

8.45am
Opening
Minister for Aged Care, the Hon Ken Wyatt MP (appearing via video link)

9am
Introduction to Plenary
Glenda Halliday

9.05am
Consumer Presentation
— the lived experience of dementia
Isabelle Burke

9.15am
Keynote address
Epidemiology of dementia in real world settings: Clues from health over the lifecourse
Dr Rachel Whitmer

Rapid Fire Presentations

10am
Isogenic induced pluripotent stem cells to model of Alzheimer's disease
Dr Damian Hernandez

10.05am
Detection of dopamine using fluorescent nanosensors
Dr Olga Shimoni

10.10am
Anticholinergic burden is associated with negative health outcomes in elderly Aboriginal people
Dr Karen Mate

10.15am
Does statin use affect cognition in older adults? A pilot N-of-1 deprescribing trial
Mr Alexander Clough

10.20am
Brain Training: A question of more than just efficacy
Ms Nicole Ee

10.25am
The "Music, Mind and Movement (MMM)" Program for People with Dementia
Ms Olivia Brancatisano

10.30am
Morning tea

Parallel Sessions 1

Theme: Prevention
Chairs: Professor Kaarin Anstey & Dr Ashleigh Smith

11am
Group presentation: three international consortia of cognitive ageing and dementia studies
Led by Dr Darren Lipnicki

11.30am
Evidence to inform global dementia risk reduction policy and guidelines: An umbrella review of 103 meta-analyses of 32 risk factors for Alzheimer's disease, vascular dementia and any dementia
Prof Kaarin Anstey

11.45am
Longitudinal association of antihypertensive agent choice and brain atrophy
Dr Chris Moran

12pm
Antihypertensives and cognitive function, a systematic review and meta-analysis
Dr Ruth Peters

12.15pm
Hearing loss and the risk of dementia in later life
Dr Andrew Ford

12.30pm
Lunch

Theme: Care
Chairs: Professor Henry Brodaty & Dr Kylie Radford

11am
Initiation of antipsychotic medicines in older Australians during hospital admission
Dr Lisa Kalisch Ellett

11.15am
The effect of xerostomic medication on oral health in persons with dementia: findings from the Swedish
Dr Edwin Tan

11.30am
Oral health screen may decrease aspiration pneumonia risk for adults with dementia in residential aged care
Dr Lynette Goldberg

11.45am
Good Spirit, Good Life: A quality of life tool for Aboriginal Australians with Cognitive Impairment
Dr Kate Smith

12pm
The "Golden Angels" Effects of trained volunteers on patient and family carer outcomes for people with dementia and delirium in rural hospitals
Ms Annaleise Blair

12.15pm
Promoting Independence Through quality dementia Care at Home (PITCH): a co-designed project
A/Prof Briony Dow

12.30pm
Lunch

1.30pm
Themed Poster Session
Prevention & Care & Living with Dementia

Parallel Sessions 2

Prevention
Chairs: Professor Kaarin Anstey & Dr Ashleigh Smith

2pm
Association between a dietary inflammatory index and brain MRI biomarkers — the Cognition and Diabetes in Older Tasmanians study
Miss Fateme Zabetiantarghi

2.15pm
Cerebral atrophy in patients with type 2 diabetes and left ventricular hypertrophy: preliminary data
Dr Sheila K Patel

2.30pm
The potential of the Mediterranean diet for the prevention of dementia in Australia: Research findings, implementation and challenges
Ms Alexandra Wade

2.45pm
A decade of collaboration between researchers, health services and Aboriginal communities to understand ageing and dementia
Dr Kylie Radford

Parallel Sessions 2

Care
Chairs: Professor Henry Brodaty & Dr Kylie Radford

2pm
Making the Economic Case for Interventions for Dementia: What Now and What Next for Model-Based Evaluations
Prof Colin Green

2.15pm
Facilitating family informed hospital care for the person with dementia
A/Prof Christine Toye

2.30pm
Adapting the World Health Organisation iSupport program to the Australian socio-cultural context: A pilot study
A/Prof Lily Xiao

2.45pm
Collaborations in Care: Consumer engagement from research question to implementation
Prof Susan Kurrle

3pm
Afternoon Tea

Joint Closing Sessions

3.30pm
Introduction to Plenary
Elizabeth Beattie

3.35pm
Consumer Presentation
— the lived experience of dementia
John Quinn and Glenys Petrie

3.45pm
Keynote address
Advancing dementia caregiving research: A synthesis and consideration of current recommendations
Professor Joseph Gaugler

4.30pm
Panel discussion: Translation to Care
Chair: Elizabeth Beattie
Simon Denegri, Professor Joseph Gaugler, Dr Maria O'Reilly, Dr Theresa Scott

5.30pm
Monday Program concludes

5.30pm–7.30pm
Welcome Reception

Tuesday 5 June 2018

7am
Registration desk open

Joint Opening Sessions

8.30am
Introduction to Plenary
Dr Jane Thompson

8.35am
Consumer Involvement in Research Presentation
Theresa Flavin, interviewed by Maree McCabe, Dementia Australia CEO

8.45am
Keynote address
Partners in time: dementia and public involvement in research
Simon Denegri

Parallel Sessions 3

Living with Dementia
Chairs: Dr Lee-Fay Low & Dr Clement Loy

9.30am
Supported decision-making in the context of dementia
Dr Damian Hernandez

9.45am
Rights based care and support
Ms Sue Pieters-Hawke

10am
Research into practice: The journey towards Brisbane Airport becoming "Dementia Friendly"
Dr Maria O'Reilly

10.15am
Making the invisible companion of people with dementia visible in economic studies: what is clinical research teaching us?
Dr Kim-Huong Nguyen

10.30am
Morning tea

Parallel Sessions 3

Intervention & Treatment
Chairs: Dr Lee-Fay Low & Dr Clement Loy

9.30am
Comprehensive touchscreen cognitive characterisation of APP/PS1 mouse model of Alzheimer's disease reveals subtle and progressive impairments
Ms Amy Shepherd

9.45am
Does stroke induce remote brain atrophy in mice?
Dr Vanessa Helena Brait

10am
Distinct microglial molecular and functional phenotypes in Alzheimer's disease are controlled by amyloid plaque phagocytosis
Dr Alexandra Grubman

10.15am
Scanning Ultrasound as a novel treatment modality for Alzheimer's disease
Prof Jürgen Götz

10.30am
Morning tea

Parallel Sessions 4

Assessment & Diagnosis
Chairs: Dr Shelley Forrest & Dr Yen Ying Lim

11am
Group Presentation: Imaging and data platform for dementia research
Ms Amy Shepherd

11.30am
NIA/AA Research Framework: Towards a biological definition of Alzheimer's disease. Implications for research and diagnosis
Prof Christopher Rowe

11.45am
Mixed pathology in Alzheimer's disease
Prof Glenda Halliday

12pm
Distinct TDP-43 inclusion morphologies in Frontotemporal lobar degeneration with and without amyotrophic lateral sclerosis
Dr Rachel Tan

12.15pm
Facial mimicry and arousal in frontotemporal dementia: phenotypic profiles and neural correlates
Dr Fiona Kumfor

12.30pm
Lunch

Parallel Sessions 4

Intervention & Treatment
Chairs: Dr Genevieve Steiner & Annette Moxey

11am
CogTale: A novel repository of cognition-oriented treatment trials
Dr Alex Bahar-Fuchs

11.15am
The Dementia Care in Hospitals Program (DCHP) — Collaboration driving sustainability and national spread
A/Prof Mark Yates

11.30am
Improving medication use for people with dementia and the need of a new model of care
Dr Tuan Anh Nguyen

11.45am
α1-adrenoceptors: Investigating Novel Drug Targets for Alzheimer's diseases
Ms Alaa Abdul-Ridha

12pm
Rectifying functional connectivity in mild cognitive impairment using brain stimulation: Which regions should be targeted?
Dr Leonardo Gollo

12.15pm
Longitudinal assessment of attentional deficits following stroke in rodent models
Dr Katrina O'Brien

12.30pm
Lunch

1.30pm

Themed Poster Session
Assessment & Diagnosis, Intervention & Treatment

Parallel Sessions 5

Assessment & Diagnosis
Chairs: Dr Shelley Forrest & Dr. Yen Ying Lim

2pm

Prevalence of dementia and survival with dementia in people entering residential aged care in Australia: trends from 2008 to 2014

Dr Stephanie Harrison

2.15pm

Ethnicity and Alzheimer's disease: A global perspective

Prof Peter Panegyres

2.30pm

Cognitive assessment to support dementia diagnosis in Aboriginal Australians

Ms Louise Lavrencic

2.45pm

Indigenous Community Approaches to the Development of Assessment Tools for Cognition: An International Perspective

A/Prof Dina LoGiudice

Parallel Sessions 5

Intervention & Treatment
Chairs: Dr Genevieve Steiner & Annette Moxey

2pm

An Integrated Approach to Management of Behavioural and Psychological Symptoms in Dementia

Dr Nadeeka Dissanayaka

2.15pm

Educational interventions to improve knowledge and practice: The Understanding Dementia and Preventing Dementia MOOCs

Dr Maree Farrow

2.30pm

Engaging caregivers as care partners: lessons learned in implementing an interdisciplinary, home-based reablement program for people living with dementia

Dr Loren Mowszowski

2.45pm

A practical and ethical analysis of incorporating patient preferences into dementia research policy and practice

Dr Cynthia Forlini

3pm
Afternoon Tea

Joint Closing Sessions

3.30pm

Introduction to Plenary

Janice Besch

3.35pm

Consumer Group Presentation
— the lived experience of dementia

Dr Ron Sinclair, Danijela Hlis, Elaine Todd and Ian Gladstone

3.45pm
Keynote address

Genetics: hopes and hurdles in dementia research

Dr Carol Dobson-Stone

4.30pm
Awards & Closing

Janice Besch

KEYNOTE SPEAKERS

SIMON DENEGRI

Simon Denegri OBE is National Director for Patients, Carers and the Public in Research at the National Institute for Health Research (NIHR).

Simon was Chair of INVOLVE — the national advisory group for the promotion and support of public involvement in research funded by NIHR — from 2011 unttil 2017. Simon was Chief Executive of the Association of Medical Research Charities (AMRC) from 2006 until 2011 and, prior to this, Director of Corporate Communications at the Royal College of Physicians from 2003. Simon also worked in corporate communications for Procter & Gamble in the United States from 1997 to 2000. Simon writes and speaks extensively about community and public involvement in health and social care and blogs at simon.denegri.com. Simon also writes poetry which he publishes at otherwiseknownasdotcom.wordpress.com. Simon was awarded the OBE in the Queen's Birthday Honours 2018.

DR CAROL DOBSON-STONE

Carol Dobson-Stone, DPhil, is an NHMRC Boosting Dementia Research Leadership Fellow, based at the University of Sydney.

Dr Dobson-Stone completed her PhD in human genetics at the University of Oxford, UK, in 2004. Shortly thereafter, she was awarded a European Molecular Biology Organisation Fellowship to work on brain function genetics at the Garvan Institute of Medical Research, moving to Neuroscience Research Australia in 2006. She was appointed as a Senior Research Fellow to the Brain and Mind Centre at the University of Sydney in 2017. Dr Dobson-Stone is a molecular geneticist and has led several NHMRC Project Grants examining genes that are mutated in dementia and related neurodegeneration, particularly frontotemporal dementia and motor neuron disease/amyotrophic lateral sclerosis. Her research straddles multiple steps on the pathway from genetic disease to targeted therapy. She uses next-generation sequencing data from dementia patients to identify potentially pathogenic DNA variants in candidate genes. She is developing high-throughput cellular assays of dementia-relevant biological phenotypes, in order to determine pathogenicity of DNA variants. Her work also involves in-depth characterisation of candidate disease genes using molecular biological and cell culture assays.

PROFESSOR JOSEPH GAUGLER

Dr Joseph E. Gaugler, PhD is the Robert L Kane Endowed Chair and Long-Term Care Professor in Nursing at the University of Minnesota.

Dr Gaugler's research examines the sources and effectiveness of long-term care for persons with Alzheimer's disease and other chronic conditions. An applied gerontologist, Dr Gaugler's interests include Alzheimer's disease and long-term care, the longitudinal ramifications of family care for persons with dementia and other chronic conditions, and the effectiveness of community-based and psychosocial services for older adults with dementia and their caregiving families. Underpinning these substantive areas, Dr Gaugler also has interests in longitudinal and mixed methods.

PROFESSOR RACHEL WHITMER

Rachel Whitmer, PhD, is Professor Public Health Sciences, Chief Division of Epidemiology at University of California Davis.

Dr Whitmer received her BS in Psychology/Neuorscience Magna Cum Laude from the University of Massachusetts, Amherst, her PhD in Human Development from the University of California, Davis, and Fellowship in Cardiovascular Epidemiology at the School of Public Health, University of California, Berkeley. Dr Whitmer was a K12 scholar through the NIH Office of Research in Women's Health Building Interdisciplinary Research Careers in Women's Health (BIRCWH) program, administered by the Division of Research at Kaiser Permanente and the University of California, San Francisco, from 2003–2005. She was a Fulbright Faculty Mentor in 2010–11. Dr Whitmer leads a laboratory of population-based science in brain aging. Her group focuses on the following themes: Ethnoracial disparities and diversity in cognitive aging and dementia outcomes, Early-life contributions to brain health and dementia risk; and Metabolic and vascular influences on brain aging. Her group utilizes lifecourse methods to address these themes. Dr Whitmer is Principal Investigator of several studies, among them the SOLID (Study of Longevity in Diabetes), a cohort study of 1200 individuals with diabetes mellitus; KHANDLE (Kaiser Healthy Aging and Diverse Life Experiences), a multiethnic cohort of 1,800 elderly individuals; and Kaiser STAR (Study of Healthy Aging in African Americans), a cohort of 700 African Americans age 50 and older. The primary objective of her research program is to identify and understand risk and protective factors for cognitive and brain aging in populations at high risk for dementia, including ethnic minority groups and those with chronic disease such as diabetes mellitus.

PRESENTATION ABSTRACTS

MS ALAA ABDUL-RIDHA

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Theme: Intervention and Treatment

α1-adrenoceptors: Investigating Novel Drug Targets for Alzheimer's diseases

Alaa Abdul-Ridha
The Florey Institute of Neuroscience & Mental Health, The University of Melbourne, Parkville, Victoria

Ross Bathgate, Daniel James Scott
The Florey Institute of Neuroscience & Mental Health, The University of Melbourne, Parkville, Victoria; The Department of Biochemistry & Molecular Biology, The University of Melbourne, Parkville, Victoria

G protein-coupled receptors (GPCRs) comprise the largest family of cell-surface receptors and play critical roles in brain neurotransmitter systems that are disrupted in Alzheimer's disease (AD) and related neurodegenerative diseases. GPCRs also affect the major hallmarks of AD pathology, regulating the formation β-amyloid plaques and neurofibrillary tangles. Currently, there are no approved GPCR targeting drugs for treating AD or its symptoms. The adrenoceptors (ARs) are a family of nine closely related but distinct GPCRs that modulate the cardiovascular and nervous systems in response to binding adrenaline and noradrenaline. The AR's are divided into three subfamilies (β1-AR, β2-AR and β-AR) which are further divided into subtypes. Of particular interest are the β1A-AR, β1B-AR and β1D-AR subtypes, which are the most abundant AR's in the brain and are emerging therapeutic targets for AD and other neurodegenerative diseases. Although the α1-ARs are targeted clinically by non-selective β1-AR blockers for treating hypertension and benign prostatic hyperplasia, their individual roles remain poorly understood due to the lack of subtype selective ligands. Evidence suggests that activation of β1A-AR is neuroprotective, whereas chronic β1B-AR stimulation leads to neurodegeneration. Subtype selective ligands are required however, to further our understanding of the physiological role of individual receptors and validate their potential as therapeutic targets for AD. We used state-of-the-art biophysical screening methods and identified several novel and subtype selective compounds for the β1-ARs. These compounds represent ideal starting points for further optimisation and structure-activity studies. Interestingly, two of these novel compounds exhibit dual functionality, where they act as partial agonists at β1A-AR and antagonists at β1B-AR. These compounds are currently being characterised and optimized for animal studies, as they may represent hits with potential for lead development in treating AD and AD symptoms.

PROFESSOR KAARIN ANSTEY

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Theme: Prevention

Evidence to inform global dementia risk reduction policy and guidelines: An umbrella review of 103 meta-analyses of 32 risk factors for Alzheimer's disease, Vascular dementia and Any dementia

Kaarin J. Anstey, Ranmalee Eramudugolla, Ruth Peters
University of New South Wales, NSW, Australia; Neuroscience Research Australia (NeuRA), NSW, Australia

Nicole Ee
Neuroscience Research Australia (NeuRA), NSW, Australia

Critical evaluation of data synthesis of the evidence for risk factors for dementia is needed to inform guidelines on dementia prevention. We developed novel 'Body of Evidence Metrics' (BEM) for 32 putative risk factors for Alzheimer's disease (AD), Any Dementia and Vascular dementia (VaD) that indexed the volume of evidence, geographical coverage, consistency of exposure, age of exposure, quality of outcome measure, and follow-up length. Pubmed and Cochrane databases were searched from inception to Dec 2017 for meta-analyses of primary prospective studies risk factors. Seventy four publications reporting meta-analyses of mostly high quality (mean AMSTAR criteria = 7.82) were identified and 78% of risk factors were evaluated for standard or clinical outcome measures. For AD, there were more than 40 primary studies of smoking, depression and diabetes and less than 10 primary studies of cognitive engagement. There were limited data available on risk factors for VaD. Exposure measures were highly variable and follow-up durations were mostly short ((<10 years) with the evidence for most risk factors lacking data from long-term follow-ups (15+ years). There were no data on mid-life exposure for more than 60% of risk factors. Importantly, there was a lack of geographical representation, with 70% of risk factors (including key factors such as BMI) based on populations drawn solely from North America and Europe. Latin American and Caribbean populations were the least represented, followed by Africa and Australia/Oceania. The findings highlight data and evidence gaps to inform research priorities, and have implications for designing evidence-based dementia risk reduction programs.

DR ALEX BAHAR-FUCHS

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Theme: Intervention and Treatment

Cognition-Oriented Treatments Article Library and Evaluation (CogTale): A novel repository for the evaluation, synthesis, and translation of research on cognitive interventions for older adults

Bahar-Fuchs A, Marques DM, Mancuso S, Zelong C, Hampstead B.M., Belleville S, Dwolatzky T, Sanz-Simon S, Perin SE, Anstey KJ, Goodenough B, Jayaputera GT, Sinnott R

Cognition-oriented treatments (COTs), such as cognitive training, are ever more popular among older adults despite the ongoing debate regarding their benefits. Numerous systematic reviews have produced mixed findings and there is a dearth of credible and unbiased resources that stakeholders can turn to for complete up-to-date evidence. CogTale is a novel platform that aims to accelerate evidence synthesis as well as provide stakeholders access reliable evidence to improve decision making. A comprehensive and dynamic data extraction interface, covering a wide range of design, methodology, and results of eligible trials was developed and forms the platforms' database. CogTale allows users to conduct simple and advanced trial searches. Methodological quality scores and all relevant effect sizes are automatically computed for each trial using coded algorithms. Additional algorithms are used to pool effect estimates from selected studies, and report templates generate plain language evidence reports and statistical tables. Pilot testing of the application's functionality is underway and formal launch is expected by July 2018. Extraction and entry of trial data into CogTale is ongoing and registered researchers are able to enter their own trial data. We anticipate that within 12 months most of the extant literature base will be coded onto the repository. CogTale will provide a much needed independent and critical collaborative platform. It will serve the research, clinical, and general user communities, with the capacity to accelerate knowledge synthesis efforts and offer credible and easily accessible evidence regarding the rapidly growing field of COTs in older adults.

MS ANNALIESE BLAIR

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Theme: Care

The "Golden Angels": Effects of trained volunteers on patient and family carer outcomes for people with dementia and delirium in rural hospitals

Winner — Best method for Public Involvement in Research

Annaliese Blair, Katrina Anderson, Catherine Bateman
Aged Care Evaluation Unit, Southern NSW Local Health District, Queanbeyan, New South Wales, Australia; NHMRC Cognitive Decline Partnership Centre, Sydney, Australia

Objective: To evaluate the outcomes of trained volunteer support for older patients with cognitive impairment and their family carers in rural hospitals. Design: A mixed method, non-randomised, controlled trial. Participants: Older adults admitted to 7 rural acute hospitals. Intervention: (n=270) patients were >65 years with a diagnosis of dementia and/or delirium or had risk factors for delirium and received volunteer services. Family carers (n=83) of intervention patients were interviewed. Control (n=188) patients were randomly drawn from patients admitted to the same hospital 12 months prior to the volunteer program who would have met program eligibility criteria. Intervention: Trained volunteers provided 1:1 person centred care focusing on nutrition and hydration support, hearing/visual aids, activities, and orientation. Measures: Medical record audits provided data on volunteer visits, diagnoses, length of stay (LOS), behavioural incidents, readmission, specialling, mortality, admission to residential care, falls, pressure ulcers and medication use. Structured interviews were conducted with family carers. Outcomes: Across all sites there was a significant reduction in rates of 1:1 specialling (p=.011) and 28 day readmission (p=.006) for patients receiving the volunteer intervention. LOS was significantly shorter for the control group (p=.001). All other patient outcomes were equivalent for the intervention and control group (p>.05). Family carers reported improved hydration and nutrition, reduction in patient distress, reduction in family care burden and provision of respite. Conclusion: The volunteer intervention is a safe, effective and replicable way to support person centred care for older patients with cognitive impairment and their family carers in rural hospitals.

DR VANESSA HELENA BRAIT

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Theme: Intervention and Treatment

Does stroke induce remote brain atrophy in mice?

Vanessa H Brait, David K Wright, Charlotte M Ermine, Katrina R O'Brien, Lachlan H Thompson, Jess Nithianantharajah, Katherine A Jackman, Amy Brodtmann
The Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, VIC, Australia

Leigh A Johnston
The Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, VIC; Australia and Department of Biomedical Engineering, University of Melbourne, Parkville, VIC, Australia

Dementia and cognitive impairment are becoming increasingly recognised as major post-stroke sequelae. It is not known if they are a direct consequence of the stroke, or of chronic mid-life risk factors. We hypothesised that these are linked to brain atrophy observed after stroke, and aimed to test this in animal models, by investigating whether remote brain atrophy occurs after stroke in mice. Male C57Bl6J mice were exposed to a 30-minute intraluminal filament-induced middle cerebral artery occlusion (MCAO). T2-weighted MRI scans (4.7T Bruker Biospin) were performed at baseline and 1, 4, 12, 24, 36 and 48 weeks post-stroke. Regions-of-interest were manually delineated at all time-points. We found significant atrophy in the ipsilateral cortex at 4 to 48 weeks post-stroke compared with sham-operated mice. Significant atrophy was measured in the ipsilateral hippocampus at all timepoints from 4 weeks post-stroke compared with sham-operated mice, but only when the hippocampus was directly affected by the infarct. Interestingly, in the sham-operated mice, there was an increase in both right and left hippocampal volume at 24 weeks post-surgery that remained elevated up until 48 weeks. This same pattern was observed in the contralateral hippocampus of stroked mice, as well as the ipsilateral hippocampus of stroked mice in which the hippocampus was not directly affected by the infarct. These findings suggest that in normal mice the stroke lesion itself does not produce brain volume changes remote to infarct-affected areas. Instead, our findings demonstrate novel temporal cortical and hippocampal volume changes up to 48-weeks post-sham and -MCAO.

DR NADEEKA DISSANAYAKA

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Theme: Intervention and Treatment

An Integrated Approach to Management of Behavioural and Psychological Symptoms in Dementia

Nadeeka N. Dissanayaka
UQ Centre for Clinical Research, Faculty of Medicine, The University of Queensland; School of Psychology, The University of Queensland; Department of Neurology, Royal Brisbane & Woman's Hospital

Rachel Brimelow
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Nicole Walker, Nancy A. Pachana
School of Psychology, The University of Queensland

Gerard J. Byrne
UQ Centre for Clinical Research, Faculty of Medicine, The University of Queensland; School of Psychology, The University of Queensland; Mental Health Service, Royal Brisbane & Woman's Hospital

Behavioural and Psychological Symptoms in Dementia (BPSD) contribute to an increased burden in residential aged care (RAC). Psychotropics are highly prescribed for management of BPSD; however, inappropriate prescriptions may lead to serious adverse effects. Novel collaborative approaches are required to successfully manage BPSD. This research assessed psychotropic prescribing in dementia and developed alternative interventions to reduce BPSD. Out of 779 persons living in RAC facilities 444 were diagnosed with dementia. 49.9% of dementia patients were prescribed with any psychotropic medication with 53.4% of the prescriptions were deemed potentially inappropriate according to the Beers criteria. Compared to residents without dementia, residents with dementia were more likely to be prescribed with antidepressants (OR=1.50, 95%CI=1.09-2.09, p=0.014) and antipsychotics (OR=1.89, 95%CI=1.23-2.87, p=0.004). Reasons for prescribing suggested that residents with dementia were twice as likely to be prescribed for agitation (OR=2.01, 95%CI=1.07-3.76, p=0.030) and psychosis (OR=2.11, 95%CI=1.05-4.26, p=0.036). An intergenerational pilot intervention, the Good Neighbour Program (GNP), was developed pairing psychology undergraduates (N=14) with RAC residents (N=64). The GNP demonstrated positive outcomes for students, residents and RAC staff (N= 38) using mixed methods. A second pilot intervention was trialled in RAC residents in a different facility (N=13) using virtual reality (VR) immersive environments for relaxation. Outcomes using mixed methods suggested feasibility of VR applications in dementia with decreasing resident apathy and providing the opportunity for reminiscence. Our new psychosocial and innovative technology assisted interventions appear promising to reduce BPSD. Large scale controlled trials are planned to further evaluate efficacy of these new interventions in dementia.

ASSOCIATE PROFESSOR BRIONY DOW

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Theme: Care

Promoting Independence Through quality dementia Care at Home (PITCH): a co-designed project

Briony Dow, David Ames, Sue Malta
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Brendan Hallam, Colleen Doyle, Anita Panayiotou, Frances Batchelor, Luke Gahan, Ellen Gaffy
National Ageing Research Institute, Parkville, VIC, Australia

Margaret Winbolt
LaTrobe University; Bundoora, VIC, Australia

Steven Savvas
National Ageing Research Institute, Parkville, VIC, Australia; Royal Freemasons, Melbourne, VIC, Australia

Philip Clarke
The University of Melbourne, Parkville, VIC, Australia

Claudia Cooper, Gill Livingston
Division of Psychiatry, University College London, London

Constantine Lyketsos
Johns Hopkins University, Baltimore, MD, USA

Jason Burton
Alzheimer's WA, Western Australia, Australia

Lee-Fay Low
University of Sydney, Sydney, NSW, Australia

Sam Scherer
Royal Freemasons; Melbourne, VIC, Australia

Samantha Loi
Melbourne Neuropsychiatry Centre; Parkville, VIC, Australia

Jay Stiles
National Ageing Research Institute, Parkville, VIC, Australia; Division of Psychiatry, University College London, London

Anne Fairhall
Family carer representative; Project advisory group chair

Anita M Y Goh
National Ageing Research Institute, Parkville, VIC, Australia; The University of Melbourne, Parkville, VIC, Australia; Melbourne Neuropsychiatry Centre; Parkville, VIC, Australia

This project aims to improve outcomes for people living with dementia and their paid and family carers by co-designing and testing an evidence-based specialist training program for community dementia care — the "PITCH program". Our co-design process involves people living with dementia, carers, home care workers, case managers and service providers as active research partners in all facets of the project, to help ensure the final PITCH program meets their needs and is usable. We plan that this program will directly benefit people living with dementia and their carers by up-skilling home care workers to provide care that promotes independence, improves quality of life, and reduces carer burden. The project team is diverse, from Victoria, NSW, Perth, the USA and UK. Effective collaborations with service providers (Australian Unity, Benetas, Bluecross, Royal Freemasons, Villa Maria Catholic Homes) are in place. A family carer of someone living with dementia leads the project advisory group, which consists of people living with dementia, family carers, and representatives from the following fields: health professional, home care professional, aged and community services, CALD community, DHHS, and aged care education. We will present results of focus groups and interviews held with these stakeholders about their perceptions of home care, how they are currently experiencing home care, and how their experience could be improved. The presentation will also describe what they think are the main elements that should be included in the PITCH program to effect a highly skilled, knowledgeable and empathic workforce delivering home care support services.

DR MAREE FARROW

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Theme: Intervention and Treatment

Educational interventions to improve knowledge and practice: the Understanding Dementia and Preventing Dementia MOOCs

Maree Farrow, Kathleen Doherty, Shannon Klekociuk, Fran McInerney, James Vickers
University of Tasmania, Hobart, Tasmania, Australia

There is growing demand for evidence-based dementia education to enable more effective dementia care as well as wider adoption of strategies to prevent dementia. The Wicking Dementia Research and Education Centre developed the Understanding Dementia Massive Open Online Course (UD-MOOC) to increase knowledge of dementia and person-centred care practices, particularly for those providing care. The Centre's Preventing Dementia MOOC (PD-MOOC) was developed to educate people with an interest in reducing their own risk, as well as those providing related health services, on the scientific basis of dementia risk reduction. Six iterations of the UD-MOOC from 2013 to 2017 attracted a total of 119,611 enrolments, with 47,793 (40%) completing the course. Two offerings of the PD-MOOC in 2016 and 2017 attracted 27,048 enrolments and 13,778 (51%) completed. Around one third of MOOC participants were international. In their feedback on completion, 76% of 2017 UD-MOOC and 75% of 2017 PD-MOOC feedback survey respondents agreed they had already applied the knowledge gained from the MOOC. In addition to having increased knowledge, UD-MOOC completers specified they were changing care practices, while PD-MOOC completers specified they were increasing risk reduction related behaviours. One of the most common ways of applying knowledge specified by participants of both MOOCs was sharing what they had learned with others. Thousands of MOOC participants globally have therefore become collaborators in our education efforts, helping to educate others and contributing to improving dementia care practices and reducing dementia risk, and potentially incidence, in the community.

DR ANDREW FORD

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Theme: Prevention

Hearing loss and the risk of dementia in later life

Andrew Ford, Osvaldo Almeida
Medical School, University of Western Australia; WA Centre for Health & Ageing, University of Western Australia; Department of Psychiatry, Royal Perth Hospital

Graeme Hankey
Medical School, University of Western Australia; Department of Neurology, Sir Charles Gairdner Hospital

Bu Yeap
Medical School, University of Western Australia; Department of Endocrinology, Fiona Stanley Hospital

Jonathan Golledge
Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University; Department of Vascular and Endovascular Surgery, The Townsville Hospital

Leon Flicker
Medical School, University of Western Australia; WA Centre for Health & Ageing, University of Western Australia; Medical School, University of Western Australia; WA Centre for Health & Ageing, University of Western Australia

Dementia is a major source of disability worldwide and there are currently no available disease-modifying treatments. Hearing loss may be associated with increased risk of dementia in later life and therefore could be a potentially modifiable risk factor given the availability of efficacious treatments. We investigated the association of hearing loss and dementia through two complementary approaches: a prospective, cohort study of 37898 older men (mean age 72.5 4.6 years) with a mean follow up of 11.1 years and a systematic review and meta-analysis of prospective studies. In our cohort, men with hearing loss were more likely to develop dementia (n=6948, 18.3%) than men free of significant hearing impairment — adjusted hazard ratio 1.69, 95%CI=1.54-1.85. The aggregated hazard of dementia was 1.49 (95%CI 1.30-1.67) in those with hearing impairment (fourteen included studies). Study quality, duration and dementia type did not alter the results considerably. We found an increased risk of incident dementia with hearing impairment in both our novel data and the meta-analysis. This is an important finding, particularly in light of recent suggestions that mid-life hearing loss may account for up to 9.1% of dementia cases world-wide, and efforts to reduce its impact should continue to be explored.

DR CYNTHIA FORLINI

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Theme: Intervention and Treatment

A practical and ethical analysis of incorporating patient preferences into dementia research policy and practice

Cynthia Forlini
Sydney Health Ethics, Sydney School of Public Health, University of Sydney, Sydney, NSW, Australia

The World Health Organization has declared dementia a public health priority. The process of aligning the research agenda with this priority has elicited significant challenges in studying the prevention, detection, and treatment of dementia. For example, emerging technologies such as speech tracking through smartphone apps are being investigated as tools to detect cognitive decline. However, studies are limited by ethical and legal concerns for adequate consent and privacy, often hindering recruitment of key research participants with moderate to severe cognitive impairment. Overall, these challenges may be preventing valuable translational research that would benefit the health, care and quality of life of dementia patients and their caregivers. Robust justification to support whether and how the policies and practices that govern dementia research should be changed remains elusive. This paper addresses the perennial question in the ethics of science of whether descriptive data from the social sciences can provide an ethical impetus for what ought to be done. Empirical evidence about the preferences of dementia patients is reviewed to address the most ethically challenging issues in dementia research: (1) motives for research participation, (2) informed consent, (3) recruitment, (4) potential risks, and (5) data sharing. Patient preferences are then situated in the context of current research ethics policies to demonstrate how their implementation might create opportunities for dementia research or pose collateral practical and ethical challenges. This analysis initiates a dialogue about options for reforming dementia research and continues the debate on how to best collaborate with patients and integrate their preferences.

DR LYNETTE GOLDBERG

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Theme: Care

Oral health screening may decrease aspiration pneumonia risk for adults with dementia in residential aged care

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Many adults with dementia in residential aged care are dependent on others for feeding and oral care. Langmore and colleagues in the United States have shown this co-related dependency is a strong predictor for aspiration pneumonia due to pathological oral microorganisms from saliva, tooth decay, and an unclean mouth migrating into the lungs and the inability of adults to cough and clear the aspirated material. The subsequent lung infection frequently results in hospitalisation and increasing frailty. One potential strategy to prevent this cascade is to screen the oral function of adults when they move into care. We present findings from Stage 1 of an NNIDR-funded oral health project where an interdisciplinary team screened 142 residents using the Oral Health Assessment Tool (OHAT), the Mini-Nutritional Assessment (MNA), the Yale Swallow Protocol, and the EuroQOL-5D-3L. Residents' diagnoses, age, gender, prescribed medications, and clinical signs of potential aspiration were documented from medical files. Of the residents, 78% warranted referral to a dentist; 57% were at risk for malnourishment; 13% were actually malnourished; and 70% failed or refused the swallow protocol, indicating difficulty with, or apprehension about, swallowing thin liquids safely. Self-reported quality of life ranged from 34–95% (M = 65%). The collaborative team of a speech pathologist, dentist, nutritionist and pharmacist was instrumental in assisting nurses and carers to screen for, identify, and address issues in oral health and function. Residents are being tracked to determine the outcome of reduced aspiration pneumonia risk and results will be known soon.

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Theme: Intervention and Treatment

Rectifying functional connectivity in mild cognitive impairment using brain stimulation: Which regions should be targeted?

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Mild cognitive impairment (MCI) is a major risk factor for onset of Alzheimer's disease and reflects deficits in functional brain networks. A promising therapeutic approach to alleviate disrupted functional connectivity, and mitigate further cognitive declines, is via brain stimulation. Despite a broad therapeutic potential for brain stimulation, it is still unclear which target site is optimal to rectify functional networks. We sought to determine the extent to which alterations in functional brain networks between MCI and healthy controls can be alleviated following stimulation of 512 brain regions. We reconstructed and compared whole-brain structural and functional connectivity between 94 elderly healthy controls and 42 amnestic MCI subjects. We found that differences in the brain structure (connectome) are associated with large differences in functional brain networks. Employing a previously validated large-scale computational model, we found that up to 58% of the differences in seed-to-whole brain resting-state functional connectivity could be restored following carefully customized stimulation. We identified 89 brain regions that after stimulation reduced the differences in functional connectivity by over 10%. Moreover, stimulation of one fifth of the brain regions had a deleterious effect of increasing the differences in functional connectivity by more than 30%. Our results identify sets of regions that are strong candidates to be targeted and the ones that should be avoided. More broadly, this work highlights a therapeutic potential of targeted stimulation, and provides evidence towards establishing a novel and principled approach for the usage of localized brain stimulation as a treatment for MCI.

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Theme: Intervention and Treatment

Scanning Ultrasound as a novel treatment modality for Alzheimer's disease

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Objectives: Alzheimer's disease (AD) is characterized by deposition of amyloid-ß and tau. A challenge in targeting these molecules is presented by the blood-brain barrier (BBB), that limits the uptake of therapeutic agents by the brain. We have shown previously, that SUS on its own can remove amyloidß and restore memory functions in APP23 mice. We also showed that SUS facilitates uptake of an antitau therapeutic antibody fragment, leading to improved therapeutic outcomes. A challenge is to develop the technology for the application in humans, due to a highly attenuating human skull. The objective of the current work was to determine the suitability of SUS in aged APP23 mice, to improve the SUS protocol to treat tau pathology, and to determine whether the methodology can be developed for use in a larger animal model that more closely models the human skull and brain. Methods: We applied SUS to aged APP23 mice, optimized the SUS treatment regime in tau mutant K3 mice, and evaluated sheep for safe BBB opening. Results: We will present SUS data in aged APP23 mice. We identified that 14 weekly treatments of tau transgenic K3 mice with SUS on its own significantly reduces tau pathology and improves memory and motor functions. We further established a protocol in sheep that allows for safe BBB opening. We further succeeded in running simulations to predict the attenuation and focal zone of the ultrasound treatment. Conclusions: Our study presents scanning ultrasound as a viable tool to treat proteinopathies including AD.

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Theme: Intervention and Treatment

Making the Economic Case for Interventions for Dementia: What Now and What Next for Model-Based Evaluations?

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Economic pressures across health care systems dictate that governments will continue to mandate the provision of evidence on the cost effectiveness of interventions for dementia. Due to the longer term nature of both pharma and non-pharma interventions, which may either prevent, delay or treat dementia, such analyses require a model-based evaluative framework involving an evidence synthesis approach. Building on our recent rigorous systematic review, and highlighting international collaborations, we (i) provide a summary of methods available to model disease progression and to undertake economic evaluation in a dementia setting (mostly Alzheimer's disease); (ii) point to key areas of model structure, data, and uncertainty, which require critical review, and should be clear/transparent to policy/decision makers; (iii) point out key areas where improvements are of great importance, such as how models characterise dementia and its progression, and a common neglect of impacts and issues beyond the immediate clinical context (e.g. broader outcomes for patients and carers, informal care). Responding to many of these research and policy needs we describe the development of a new model-based framework for the assessment of interventions in the early stages of Alzheimer's disease, using a multi-domain description of dementia progression. We also highlight how a new international collaboration is seeking to develop this modelling framework to adapt it to an Australian decision-making context, and to widen the scope of the framework to capture more fully the wider societal impacts of dementia, and the system level requirements for treatment and care for people with and affected by dementia.

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Theme: Intervention and Treatment

Distinct microglial molecular and functional phenotypes in Alzheimer's disease are controlled by amyloid plaque phagocytosis

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Microglia are brain immune cells that remove cellular and extracellular debris and regulate synaptic plasticity, maturation and removal. Recently altered microglial genomics, epigenomics and functions emerged as key contributors to Alzheimer's disease (AD). Nonetheless, whether toxic microglial inflammatory cytokine secretion and aberrant synapse overpruning outweigh the beneficial amyloid clearance functions of microglia in AD remains highly controversial. To address these questions, we explored whether functional differences in amyloid plaque phagocytosis in an AD mouse model result from or contribute to the underlying molecular and functional diversity of microglia in AD. Using a combination of bulk and single cell RNA-seq, proteomics and epigenomic approaches, we showed that the plaque phagocytic subset of microglia are molecularly distinct from physiological microglia and from non-plaque containing microglia in AD brains. Indeed, several later onset AD risk factors and their direct interacting partners are differentially expressed in plaque-containing microglia. To uncover the mechanism of induction and maintenance of this differential molecular phenotype, we used a chimeric organotypic hippocampal slice culture and FACS sorting approach, revealing that the altered transcriptional program can be activated in wild-type microglia by direct exposure to amyloid plaques in situ. Lastly, we show that plaque-phagocytic microglia in the dentate gyrus prune significantly less synapses than nearby microglia not containing intracellular amyloid. Combined, our data identify distinct microglial signatures and their origin in AD mice, suggesting that plaquecontaining microglia are beneficial despite their molecular divergence from physiological microglia, and thus enhancing their function may counteract microglia-dependent synapse overpruning in AD models

PROFESSOR GLENDA HALLIDAY

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Theme: Assessment and Diagnosis

Mixed pathology in Alzheimer's disease

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Background: The new diagnostic criteria for Alzheimer's disease (AD) recognise the importance of biomarkers for identifying the underlying pathology, and also that >50% of all clinical AD cases have mixed pathology at autopsy (particularly prevalent in the elderly). Objective: To review the current literature on mixed pathology in AD and report findings of mixed pathology in longitudinally followed AD cases collected by the Sydney Brain Bank (SBB, N=217). Results: Population frequencies of AD pathologies show 50% with sparse tangle formation by age 50y and 50% with sparse amyloid deposition by age 70y. Mild cognitive impairment is related to more cerebrovascular disease rather than AD. In the SBB cohort, 75% of the AD cases had sufficient additional neuropathology at autopsy to reach diagnostic criteria for a second neurodegenerative disease. This is consistent with the 65–90% observed with a second neurodegenerative disease in many other datasets of longitudinally followed cases. Conclusion: Our data, and those of others, show that mixed pathologies dominate in people with clinical AD (more than 50% have multiple pathologies). Discussion: The main question then is the timing of these pathologies. This has not been answered for AD, but if the average age of clinical onset is 70y for AD, then this is a similar age when dementia occurs in patients with Lewy body disease, and also the age when the cumulative incidence of cerebrovascular disease rises sharply. Multiple pathologies in people with clinical AD are likely to reduce the success of any therapies targeting only AD.

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Theme: Assessment and Diagnosis

Prevalence of dementia and survival with dementia in people entering residential aged care in Australia: trends from 2008 to 2014

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Objectives: To examine trends in the prevalence of dementia and the survival of those with dementia when entering residential aged care in Australia. Methods: A retrospective study using the national historical cohort of the Registry of Older South Australians (ROSA) was conducted. This cohort includes information on aged care recipients from the National Aged Care Data Clearinghouse linked with National Death Index data. The study sample (2008–2014) included people who started permanent residential care and dementia was identified according to the person's most recent Aged Care Assessment Team (ACAT) or Aged Care Funding Instrument (ACFI) assessment. Generalized linear models adjusted for age and sex were used to estimate risk of mortality for people with dementia. Results: Between 2008 and 2014, 351,694 people entered residential aged care and had an available ACAT or ACFI assessment. The prevalence of dementia declined by an estimated -0.7% each year (95% confidence interval (CI) -0.8, -0.6, p<0.001) for the overall cohort. One-year mortality rates increased from 2008 to 2014 for people living with dementia for females only (0.2% each year 95%CI 0.1, 0.4, p=0.001). People living with dementia had a lower risk of 30-day, 90-day and one-year mortality (Risk Ratio for one-year mortality (95%CI): 0.86 (0.85, 0.87), p<0.001). Conclusions: In Australia, for people entering residential aged care, dementia prevalence is declining and one-year mortality rates for women living with dementia are increasing. People living with dementia have a reduced risk of death in the first year of entering residential care compared to those without dementia.

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Theme: Care

Initiation of antipsychotic medicines in older Australians during hospital admission

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Background: International research shows that antipsychotics are frequently initiated in hospital for people with dementia, and that use continues post-discharge even when there is no clear indication. We located no Australian studies on this topic. Aim: To identify the hospital admissions (excluding psychosis) associated with highest risk of antipsychotic initiation and continuation in a cohort of older Australians Methods: We conducted a retrospective analysis of Australian Government Department of Veterans' Affairs administrative claims data. We included people admitted to hospital from 1 Jan 2014 to 31 Dec 2014, aged ≥65 years, who were antipsychotic naïve. We determined the number and type of hospital admissions associated with antipsychotic initiation. Where antipsychotics were initiated, we determined the time to cessation after discharge. Results: In 2014 there were 140,389 hospital admissions for 66,386 people who met our inclusion criteria. The median age at admission was 86 years (interquartile range 76–90 years) and 49.9% involved men. 733(0.5%) of admissions were associated with antipsychotic initiation, most commonly where the primary diagnosis was delirium or dementia (96/733 (13%) of admissions associated with antipsychotic initiation). When secondary diagnoses were considered, 47% (345/733) of admissions with antipsychotic initiation had delirium or dementia as a secondary diagnosis. For people who initiated antipsychotics during admission, only half had ceased within one year. Conclusion: Initiation of antipsychotics during hospital admissions was uncommon in our study population; however, amongst those who did initiate, long-term use followed. Appropriate use of antipsychotics in people with delirium or dementia should be the focus of future research.

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Theme: Assessment and Diagnosis

Facial mimicry and arousal in frontotemporal dementia: phenotypic profiles and neural correlates

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Patients with frontotemporal dementia show profound changes in personality and behaviour. In asymptomatic gene carriers, the insula is one of the earliest regions of atrophy. This brain region is essential for integrating internal arousal and emotional experience. This collaboration between the University of Sydney and University of New South Wales aimed to improve diagnosis of frontotemporal dementia by assessing surface facial electromyography (EMG) and skin conductance level (SCL) responses in 23 behavioural-variant frontotemporal dementia (bvFTD) patients, 14 semantic dementia (SD) patients and 22 healthy older controls, while viewing emotional video clips. Voxel-based morphometry was conducted to identify neural correlates of psychophysiological responses. Our results showed that unlike controls, patients with bvFTD did not show differential facial EMG responses according to emotional condition, whereas SD patients showed increased zygomaticus EMG responses to both positive and neutral videos. Controls showed greater SCL when viewing positive and negative videos, however, both bvFTD and SD groups showed no change in SCL across conditions. Dampened zygomaticus EMG response to positive films was associated with reduced right insula integrity, whereas reduced arousal was associated with lower integrity of the caudate, amygdala and temporal pole. Our results demonstrate that while bvFTD patients show an overall dampening of responses, SD patients appear to show heightened physiological responses. These results identify potential mechanisms for the abnormal social behaviour in bvFTD and SD. Future studies will assess preclinical gene carriers to determine the potential of psychophysiological measures to inform early diagnosis and tracking of progression in frontotemporal dementia.

PROFESSOR SUSAN KURRLE

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Theme: Care

Collaborations in Care: Consumer engagement from research question to implementation

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The Cognitive Decline Partnership Centre (CDPC) is a partnership between aged care providers, consumers, clinicians and researchers. The CDPC's major focus is on implementation of current knowledge into practice and developing and implementing research that improves care for people with dementia. Involving consumers (people with dementia and their carers) has been integral to all aspects of the CDPC. The Consumer Dementia Research Network of Dementia Australia was engaged as the main consumer representative from the beginning of the CDPC. This presentation will describe how the CDPC dementia research and implementation program has involved consumers in initiating and developing all the research projects, and shows how the involvement of consumers can lead to more relevant research and improved translation of research findings into practice. It will also outline the lessons learnt about how to effectively involve consumers in research and implementation projects

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Theme: Assessment and Diagnosis

Cognitive assessment to support dementia diagnosis in Aboriginal Australians

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Koori Growing Old Well Study Investigators

Dementia prevalence in Aboriginal Australians is three times higher than the national population, making assessment and timely diagnosis a priority. The Kimberley Indigenous Cognitive Assessment is the primary culturally-sensitive method for dementia screening in Aboriginal Australians. The MiniMental State Examination has also been shown to effectively screen for impairment in urban/regional people, comprising a majority of the Aboriginal population. However, these measures assess limited cognitive domains and more comprehensive assessment is often needed to guide diagnosis and monitor change. Existing validated cognitive tests might be appropriate for assessing cognitive function in urban/regional Aboriginal people, limiting the need to develop new tools. We assessed the utility of widely used cognitive tests in this population, across several domains. A representative community sample of older adults participated (60+ years, English-speaking, mean 9 years education), including individuals with no cognitive impairment (n=31), MCI (n=38), and dementia diagnosis (n=35). Cognition was assessed using the Addenbrooke's Cognitive Examination (ACE-R), Digit Span, Logical Memory, and Oral Trail Making. With little exception, measures discriminated between each group: intact group showed best performance, and dementia group were most impaired. ROC curve analysis showed the ACE-R was excellent at discriminating intact and dementia (area=.986); with ACE-R score <83 the optimal cut-off for dementia (Youden's J=.877, sensitivity=.941, specificity=.935). This is comparable with previous UK sample cut-offs. Results suggest cognitive tests developed for the broader population can be useful in an urban Aboriginal context. These measures may assist with diagnosis of cognitive impairment in Aboriginal people, and appear sensitive to dementia-related impairment.

ASSOCIATE PROFESSOR DINA LOGIUDICE

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Theme: Assessment and Diagnosis

Indigenous Community Approaches to the Development of Assessment Tools for Cognition: An International Perspective

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The International Indigenous Dementia Research Network has been formed to address the needs of Indigenous peoples with dementia and their carers and communities worldwide. Studies have reported relatively high rates of cognitive impairment and dementia in Indigenous communities — often at younger age of onset and in association with high rates of chronic conditions such as diabetes and frailty. The Network's primary aims are to increase the knowledge required to ensure accurate, culturally respectful approaches to detection and management of cognitive impairment and dementia in older indigenous peoples, and to address the inequities underlying the high prevalence of dementia in Indigenous people worldwide. The collaboration includes researchers from Australia, Canada, North America, Brazil and New Zealand who work closely with Indigenous community partners and local health care providers to adapt and develop culturally appropriate assessment tools for cognitive impairment and dementia. A number of tools are in the process of being locally adapted and validated, based on the Kimberley Indigenous Cognitive Assessment Scale (KICA). These include: the Canadian Indigenous Cognitive Assessment (CICA) for use with older Anishinaabe adults in Ontario; the KICA for use with Indigenous Brazilians and the development of a Māori-responsive assessment tool for dementia diagnosis. This presentation will describe the processes and challenges of adapting cognitive assessment tools for use in diverse Indigenous communities from an international perspective.

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Theme: Prevention

Longitudinal associations of antihypertensive agent choice and brain atrophy

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Background: The relationship between hypertension and an increased risk of dementia is well known. However, the effects of particular antihypertensive treatments on dementia risk are unknown. Data from animal models suggest angiotensin receptor blockers (ARB) may drive pathways beneficial to brain health and that angiotensin-converting enzyme inhibitor (ACEi) may drive pathways related to neurodegeneration. However, there have been few studies performed in humans and the results of these studies have varied widely. Aim: We aimed to study whether ACEi use was associated with greater decline in brain atrophy when compared to ARB use. Methods: Community-dwelling volunteers aged 55–90 years were recruited into the Cognition and Diabetes in Older Tasmanians longitudinal study. Brain MRI (total brain volume) measurements were performed at 3 time points over 4.6 years. Medication lists were manually reviewed and antihypertensive class identified. Mixed models were used to examine longitudinal associations between antihypertensive class and MRI brain measures independent of vascular risk factors. Results: There were 163 people taking ACEi (mean age 69.9 years) and 125 taking ARB (mean age 69.5 years) at baseline. There was an interaction between antihypertensive type and time (p=0.03) after adjustment for age, sex, education and vascular risk factors, such that people taking ACEi at baseline demonstrated greater decline in total brain volume than those taking ARB. Conclusions: Baseline use of ACEi was associated with greater rates of brain atrophy than those taking ARB drugs at baseline. The exact mechanisms underlying this association are unknown but warrant further investigation.

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Theme: Intervention and Treatment

Engaging caregivers as care partners: lessons learned in implementing an interdisciplinary, home-based reablement program for people living with dementia

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We recently completed a pilot randomised controlled trial of an Interdisciplinary, Home-bAsed Reablement Program (I-HARP) to deliver evidence-based functional, cognitive and social rehabilitation strategies for people with dementia within their home environment. While focusing on key principles of person-centred and individually tailored care, client-directed goal setting, and a collaborative therapeutic approach of reablement by a registered nurse, occupational therapist and neuropsychologist, we also sought to engage family carers in shared decision-making and strategy implementation, to facilitate client goal attainment. Alongside our person-centred approach, we quickly recognised a critical responsibility for more proactive collaboration with carers, a) involving timely education and support in the process of reablement, treating them as care partners, and b) providing dedicated opportunities to address carers' knowledge about dementia as well as their psychological wellbeing. We therefore implemented one individualised carer support session early in the intervention. Qualitative findings suggested caregiver benefit and improved overall wellbeing, but caregiver burden scores increased among the intervention group post-intervention. At 12-months from baseline, carers observed increased client independence and social engagement following I-HARP, and reported fewer depressive symptoms themselves compared to carers in the control group. Our experience in working with carers during this pilot trial has demonstrated the importance of specifically and intentionally supporting carers within the context of person-centred dementia care, and engaging them as key care partners in client reablement. These valuable lessons have informed the design of a larger-scale I-HARP trial, with an enhanced carer support component, funded under the NHMRC Boosting Dementia Research scheme.

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Theme: Intervention and Treatment

Improving medication use for people with dementia and the need of a new model of care

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Background: This narrative review aimed to discuss why medication use in people with dementia is challenging and how to improve it. Methods: Literature searches were conducted using MEDLINE, EMBASE and the Cochrane Library of Systematic Reviews databases from conception to August 2017 with limitation to English language. Key search terms included quality use of medicines (QUM) and medication related problem in combination with dementia or Alzheimer's. Papers describing factors affecting QUM in people with dementia were included. Results: There is limited literature reporting factors affecting QUM in people with dementia, which can be classified into those related to patients, physicians and the healthcare system. Patient-related factors included the progressive cognitive and functional deterioration; age-related changes in pharmacokinetics and pharmacodynamics; and the fact that dementia often coexists with other chronic diseases, thus being associated with multiple medicines use. Physician-related factors included diagnostic and therapeutic knowledge and skills; and pressure to manage behavioural and psychological symptoms of dementia. System factors included failure to coordinate care; lack of guidelines for multimorbidity; and prescribing culture. These factors collectively increase the risk of medication related problems, treatment conflicts and poor treatment outcomes. Conclusions: The management of medication in people with dementia requires the increasing involvement of pharmacists to provide a number of cognitive services including medication reconciliation, medication review, adherence services and proactive adverse reaction monitoring. This needs to be integrated into a multidisciplinary, patient-centered, integrated and coordinated model of care to improve QUM and health outcomes for people with dementia.

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Theme: Living with dementia

Making the invisible companion of people with dementia visible in economic studies: what is clinical research teaching us?

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People with dementia require high levels of care due to cognitive impairment, behaviour symptoms and limited physical functioning. Most care happens in the community and is provided by informal caregivers. Without them, the quality of life and health outcomes of people with dementia would be poorer and residential aged care placement would arise sooner in the journey. However, caregivers are mostly invisible in the research on economic impacts of interventions for people with dementia. When they were represented, it was usually as the "opportunity cost of informal care". Family caregiving is a dynamic process, and both care recipient and caregiver constantly adjust to each other's changes, which impacts on dementia progression, health outcomes and quality of life of both. If this dynamic process is absent in economic studies, trade-offs between caregiver and people with dementia, both in opportunity costs and health outcomes, are masked. Subsequently, interventions, based on their clinical and cost-effectiveness, may be categorised as cost-effective when they are not (or vice versa), leading to sub-optimal resource allocation. This review explores how previously published research on co-dependency of dementia dyads and reciprocal effects of dementia progression on psychological, physical and subjective outcomes of caregivers can inform and be used in the economic evaluation of dementia interventions. When this rich body of knowledge can be embedded in future economic studies, interventions and care practices that strike the right trade-off balance will be identified and rapidly translated into practice to improve health outcomes and quality of life for the dementia dyads.

MS KATRINA O'BRIEN

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Theme: Intervention and Treatment

Longitudinal assessment of attentional deficits following stroke in rodent models

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The global burden of stroke is substantial; and up to two thirds of ischaemic stroke survivors will develop cognitive impairments or vascular dementia. Specifically, deficits in executive processes and attention are key cognitive domains impacted following clinical stroke. Whilst animal models are essential for effective translation and development of any therapy, accurately modelling cognitive dysfunction in animal models of stroke has been limited. To address this, in this collaborative study we aimed to longitudinally examine changes in attentional processing using two rodent ischemic injury models: the middle cerebral artery occlusion (MCAO) in C57Bl6J mice and the endothelin-1 injury in Long Evans rats. We assessed attention in mice and rats employing the rodent touchscreen Continuous Performance Task (CPT) paradigm and examined cognitive performance before inducing stroke, and at 4, 12, 24, 36 and 48 weeks post-injury. We observed that mice exposed to MCAO showed robust deficits in attentional processing that persisted until 48 weeks post-stroke. In comparison, we observed no changes in attention following endothelin-1 injury to the motor cortex in rats. Our findings provide the first evidence for longitudinal cognitive changes in a rodent model of stroke, recapitulating that observed in the clinic. Moreover, our results further strengthen the need for animal studies to assess different species and injury models towards better modelling clinical stroke.

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Theme: Living with dementia

Research into practice: The journey towards Brisbane Airport becoming "Dementia Friendly"

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Discussions about dementia in recent years have undergone a paradigm shift from the concept of "being cared for" to "living well". For many people, living well includes opportunities for travel. A diagnosis of dementia does not preclude a desire or ability to travel, yet discussions about the accessibility of air travel remain limited. This paper will report on a project that used a knowledge translation framework to collaborate with airport decision makers and staff, as well as people living with dementia and their care partners, to improve the accessibility of airports for travellers with dementia. Prior research by this team identified the airport as the most challenging component of the air travel experience for people with dementia. We consulted with Brisbane Airport Corporation to develop a Dementia Friendly Action Plan based on the results of this research and an environmental audit. The action plan included changes to the environment (e.g. signage, seating), dementia awareness training for staff, and the development of a guide to the airport for travellers with dementia. As a result of this, Brisbane Airport was endorsed by Alzheimer's Australia (now Dementia Australia) as Australia's first dementia friendly airport. If we are to truly increase the self determination and independence of people living with dementia, we need to ensure that they can participate in a broad range of activities, which includes the ability to travel by air; in this way they can continue to live well with dementia.

PROFESSOR PETER PANEGYRES

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Theme: Assessment and Diagnosis

Ethnicity and Alzheimer's disease: A global perspective

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Little is known about factors associated with early-onset Alzheimer's disease (EOAD), which starts before the age of 65. We describe an international collaboration that led to an elucidation of the role of ethnicity in EOAD. Information on demographics, self-reported co-morbidities, cognitive functions (MMSE and ADAS-COG), and ApoE genotypes were collected for 6500 subjects from the C-Path Online Data Repository — a global collaborative database. Cognitive function changes over time and odds of EOAD by ethnicity were analysed by the mixed model and the logistic regression. Caucasians accounted for 89.0% of the study population, followed by 4.7% Asians, 2.7% African Americans, 2.4% Hispanics and 1.2% Native Americans, Alaskans and Hawaiians. Age, gender, EOAD status, co-morbidities, family history of AD and ApoE genotypes were significantly different by ethnicity. A significant interaction with time, ethnicity and cognitive performance was found. After adjusting for co-morbidities and gender, the odds of EOAD among African Americans (OR: 1.6, 95%CI: 1.1-2.4) and Native Alaskans, Americans and Hispanics (OR: 2.1, 95%CI: 1.2-3.5) were significantly higher, compared with Caucasians. EOAD is found more frequently in Native American Indians, Alaskans, Hawaiians and other minorities, including Hispanics. EOAD occurs independently of hypertension, stroke and atrial fibrillation. Ethnicity may impact AD through age of onset, co-morbidities, family history, ApoE gene status and cognitive change over time. The greater odds of EOAD among African Americans, Alaskans and Hawaiians suggest that some ethnicities may be at risk of AD at a younger age. This finding has impact for ethnic minorities in all countries, including Australia.

DR SHEILA K PATEL

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Theme: Prevention

Cerebral atrophy in patients with type 2 diabetes and left ventricular hypertrophy: preliminary data from the Diabetes and Dementia (D2) study

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Type 2 diabetes mellitus (T2DM) is associated with an increased risk of dementia. Left ventricular hypertrophy (LVH) is prevalent in T2DM and an independent predictor of cognitive impairment. In this preliminary analysis, we compared brain atrophy between healthy participants and T2DM, and those with T2DM according to the presence or not of LVH. Healthy participants without diabetes or dementia (n=37, controls) participating in the Cognition And Neocortical Volume After Stroke study were compared to 39 patients with T2DM. A 3T MRI was undertaken and FreeSurfer v6.0 was used to perform volumetric segmentation of the MR images. Differences in total brain volume (TBV), mean cortical thickness and subcortical volumes were compared. T2DM patients also had an echocardiographic assessment of LVH. Compared to controls, T2DM patients were younger (mean ± SD) 63 ± 7 vs. 68 ± 6 years (p=0.003), with more obesity (BMI 31 ± 6 vs. 26 ± 4, p<0.0001) and hypertension (73 vs. 43%, p=0.013). T2DM patients had significantly more atrophy of the amygdala (p=0.016), nucleus accumbens (p=0.001) and brainstem (p=0.010). Differences remained significant after adjustment for age, education level, total intracranial volume (TIV), BMI and hypertension. T2DM patients with LVH (36%) had more atrophy in the amygdala (p=0.020) and reduced TBV (p=0.006) compared to T2DM patients without LVH. Differences in TBV were independent of sex, TIV and education level (p=0.005). T2DM contributes to accelerated structural brain aging, manifesting as cerebral atrophy. The copresence of LVH in T2DM may represent a risk factor for subsequent cognitive impairment and dementia.

DR RUTH PETERS

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Theme: Prevention

Antihypertensives and cognitive function, a systematic review and meta-analysis

Ruth Peters, Kaarin Anstey
On behalf of the MELD collaboration
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Awareness of the importance of vascular risk factors and a focus on repurposing existing medication have led to a renewed interest in antihypertensive drug classes and possible pleiotropic effects for protection of cognition as we age. Our aim was to examine the effect of antihypertensive class on cognition using harmonised data from multiple datasets. We systematically searched the literature and invited investigators of studies with longitudinal follow-up, cognitive outcomes and antihypertensive class data to contribute. Over 50,000 participants from 27 studies drawn from Australia, North America, Asia and Europe were included. Among participants aged >65 years only diuretic use had a positive association with cognition but this was inconsistent. Diuretics were associated with a 17% reduction (95% CI 28%:4%) in risk of dementia compared to no treatment among those with ≥1 year follow-up but not in those with ≥5 year follow-up, and a 31% reduction (49%:8%) in risk of cognitive decline compared to other antihypertensive classes with ≥5 but not ≥1 year follow-up. Limited data precluded meaningful analyses in those ≤65 years. In secondary analyses antihypertensive treatment overall was associated with a 35% reduction (49%:18%) in risk of dementia with ≥5 year follow-up in clinical trial populations. In conclusion, whilst there was evidence supportive of blood pressure lowering there was no consistent evidence for a pleiotropic effect of antihypertensive class on cognitive outcomes in those >65 years. There is no evidence to support the selection of specific antihypertensive classes to protect cognition in older adults.

MS SUE PIETERS-HAWKE

SPH Resources

Theme: Care

Rights Based Care and Support

This is not an abstract for presentation of conducted research. It is, rather, a plea to present the case for uptake of research into transitions towards care and support based on Human Rights (Rights based Care & Support. RBCS) People with dementia themselves have made a powerful case internationally for RBCS for themselves and others. As an advocate, educator and consultant in the field, I have developed support for it's wholehearted adoption. This urgently requires a diversity of research approaches, grounded in participation with consumers, to develop a plurality of viable models for supporting People living with Dementia and the people who love and support them (carers). It further requires research and valorization of processes that can create transitions towards RBCS in existing situations, and lead to the transformation of care as we know it towards something that people really want. So my presentation will be a brief outline of how we got to this point, but then more questions that needs be addressed to go in this direction, rather than ready-made answers.

DR KYLIE RADFORD

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Theme: Prevention

A decade of collaboration between researchers, health services and Aboriginal communities to understand ageing and dementia

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Koori Growing Old Well Study Investigators

The Koori Growing Old Well Study (KGOWS) is an epidemiological cohort study, first funded by NHMRC in 2008, arising from an observed need for better dementia and aged care in NSW Aboriginal communities. A key finding is that the prevalence of dementia is three times higher in this population compared to non-Aboriginal Australians. This study was established in close collaboration with Aboriginal Community Controlled Health Organisations, NSW Health co-investigators, and local guidance groups to understand ageing and dementia, document service access, raise awareness and build capacity. These continued partnerships have enabled evolution of research over time, in conjunction with translational projects and local service improvements. At baseline (2010–2012), 336 Aboriginal people (aged 60–92 years) from five urban/regional communities completed structured interviews and clinical assessments. In 2013–2014, participants(n=227) were surveyed to plan the next phase of research and 77–87% nominated to incorporate blood samples, genetic testing and brain scans. KGOWS-II follow-up for incidence of dementia (2016–2018) included 162 participants, with most consenting to optional APOE genotyping. To date, 21 people have also participated in an ongoing neuroimaging sub-study. This longitudinal research provides data on a range of health, biomedical, psychosocial, and cultural factors, to increase understanding of ageing and dementia in this population. Preliminary findings suggest that 6-year cognitive decline is associated with potentially modifiable risk factors including hearing loss, obesity, and unskilled work. This aligns with the priority theme 'Prevention' by strengthening the evidence on primary causes and risk factors relevant to older Aboriginal people disproportionately affected by dementia.

PROFESSOR CHRISTOPHER ROWE

Austin Health

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Theme: Assessment and Diagnosis

NIA/AA Research Framework: Towards a biological definition of Alzheimer's disease. Implications for research and diagnosis.

Christopher C. Rowe
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Published in the April 2018 issue of Alzheimer's and Dementia, this international consensus paper outlines the approach for a more precise diagnosis of Alzheimer's disease (AD) utilizing biomarkers for beta-amyloid and tau. It explains the rationale for the recommendation that AD should only be diagnosed when there is biomarker evidence for these pathological hallmarks. In the absence of biomarker evidence, the clinical phenotype should be referred to as Alzheimer's syndrome. Dementia has many causes and with advanced age, multiple pathologies may be present including incidental amyloid plaques. The new framework differs from the previous NIH/AA classifications for preclinical AD, MCI due to AD and AD dementia by adding the requirement for a positive biomarker for tau. This has been motivated by the recent but very consistent finding that older patients (>75 years of age) with amnestic dementia and positive amyloid scan have negative tau PET or CSF in 20-30% of cases.

MX AMY SHEPHERD

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Theme: Intervention and Treatment

Comprehensive touchscreen cognitive characterisation of APP/PS1 mouse model of Alzheimer's disease reveals subtle and progressive impairments

Winner — Best Individual Presentation

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Lim, J.K.H., Wong, V.H.Y., Nguyen, C.T.O., Bui, B.V.
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Mouse models expressing human gene mutations provide powerful tools to investigate mechanisms underlying cognitive decline in Alzheimer's disease (AD). Touchscreen technology facilitates the assessment of cognitive domains directly relevant to impairments described in AD patients. We examined cognition & vision in mice expressing familial AD mutations in amyloid precursor protein (APP) and presenilin-1 (PS1) using touchscreens in collaboration with the Department of Optometry.
Mice were initially trained to nose-poke a visual stimulus on a touch-sensitive computer screen for a reward. Mice were food restricted to 75% throughout the testing period to facilitate motivation and tested for 1 hr daily. Tasks were scaled in complexity to test cognitive domains relevant to those impaired in human AD. APP/PS1 mice show subtle behavioural inflexibility impairments at 12 months of age, that progressively worsen to severe at 24 months of age. Working and associative memory were assessed in APP/PS1 mice and, unexpectedly, showed no impairments. Mice were assessed in two equivalent maze-based tests at comparable time-points for benchmarking with published findings. Conflicting with published results, no impairments were uncovered in these mice.
The absence of impairment is speculated to be due to several experimental factors known to improve memory, including daily cognitive stimulation, increased physical exercise and chronic food restriction. This is the first cognitive characterisation of APP/PS1 mice using touchscreens. We comment on the validity of this mouse to model AD and also on the approach of utilising clinically relevant modes of assessment to facilitate translation from pre-clinical models to the clinic.

DR CRAIG SINCLAIR

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Theme: Living with dementia

Supported decision-making in the context of dementia: Collaboration at the coalface of human rights and decision-making

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Supported decision-making is a progressive, rights-based approach aimed at enabling a person living with disability to make and communicate decisions about their own life. Supported decision-making has emerged from the disability sector, but has only recently been explored in the context of dementia. This paper reviews a three year research program on supported decision-making, undertaken through the Cognitive Decline Partnership Centre. This research program has examined existing legal frameworks for healthcare and lifestyle decision-making in Australia, and assessed existing policies of aged care providers, seeking to establish the degree to which these frameworks acknowledge supported decision-making. In-depth qualitative interviews with people living with dementia (N=25), their family members (N=32) and professionals involved in dementia care and support (N=31) illustrate the individual, relational, decisional and external factors that influence the use of supported decision-making. The researchers draw on these lived experiences to understand what types of support are helpful, who is best placed to provide such support, and the practical issues and safeguards that would need to be considered. An ongoing process of advisory input from three supported decision-making 'interest groups' (including consumer, industry and advocacy perspectives) has informed the development of practical resources (including videos, consumer guides, policy guidelines and training packages). The findings demonstrate the importance of existing informal networks in maintaining relationships and involvement in decision-making for persons with dementia, as the condition progresses. We conclude with recommendations for flexible, rights-based policies which support the maintenance of existing networks and accommodate different stages of cognitive impairment in dementia.

DR KATE SMITH

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Theme: Care

Good Spirit, Good Life: A quality of life tool for Aboriginal Australians with Cognitive Impairment

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Background: Enhancing quality of life (QoL) is a central goal of aged care services for people living with dementia and a key outcome measure for service providers and researchers. At present, there is no tool to evaluate QoL from the perspective of older Aboriginal Australians. This study aims to develop a culturally meaningful QoL tool for older Aboriginal Australians with and without cognitive impairment. Methods: The study has been conducted in Perth, Western Australia. Participatory Action Research (PAR) approaches were used for tool development to ensure active community collaboration in the research. Aboriginal Australians aged over 45 years were selected using purposive sampling. Data was collected through in-depth interviews and yarning circles. Recommendations to respond to identified needs are being developed in collaboration with participants, community Elders and service providers. Results: The draft Good Spirit Good Life tool was co-developed with 34 Aboriginal participants aged 47–82 years, who were predominantly women (76%). The factors important to participants having a good life were: community; cultural activities; eldership; supports and services; beliefs and practices; family and friends; country; hobbies and interests; health and wellbeing; and future planning. The Good Spirit, Good Life tool comprises 10 items reflecting these 10 factors, with a total possible score of 30. Conclusion: Aboriginal community collaboration and engagement is essential to develop an effective measure of Aboriginal QoL. Validation is underway in Perth and Melbourne to ensure the tool is culturally meaningful and appropriately identifies the quality of life needs of older Aboriginal people with cognitive impairment.

DR EDWIN TAN

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Theme: Care

The effect of xerostomic medication on oral health in persons with dementia: findings from the Swedish Dementia Registry (SveDem)

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Objectives: Medication-induced hyposalivation can increase the risk for oral complications including dental caries and tooth loss. This problem is particularly important in people with dementia due to declining ability to maintain oral care. The objective of this study was to investigate the association between chronic use of xerostomic medications and tooth loss, restorations and preventive treatment in a population of persons with dementia. Methods: This was a longitudinal, population-based study of 34,037 people with dementia registered in the Swedish Dementia Registry (SveDem) from 2008–2015. Data were linked to the Swedish Prescribed Drug Register, the Swedish National Patient Register, and the Dental Health Register. Poisson regression models were used to estimate incidence rate ratios (IRRs) for the association between continuous xerostomic medication use and the incidence of tooth extractions, tooth restorations, and dental preventive procedures over a three-year period. Results: A dose-response relationship was observed with the risk for having tooth extraction increasing with increasing number of xerostomic medications used (IRR=1.03, 1.11, and 1.40 for persons using up to one, one to three and more than three xerostomic medications, respectively). However, the risk for having new dental restorations and receiving preventive procedures did not differ between groups. Conclusion: Chronic use of xerostomic medications can increase the risk for tooth extraction in people with dementia. This study highlights the importance of careful consideration when prescribing xerostomic medications in people with dementia, and the need for regular and ongoing dental care.

DR RACHEL TAN

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Theme: Assessment and Diagnosis

Distinct TDP-43 inclusion morphologies in Frontotemporal lobar degeneration with and without amyotrophic lateral sclerosis

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The identification of the TAR DNA-binding protein 43 (TDP-43) as the ubiquitinated cytoplasmic inclusions in frontotemporal lobar degeneration (FTLD) and amyotrophic lateral sclerosis (ALS) confirmed that these two diseases share similar mechanisms, likely to be linked to the abnormal hyperphosphorylation, ubiquitination and cleavage of pathological TDP-43. Importantly however, a quantitative analysis of TDP-43 inclusions in predilection cortical regions of FTLD, FTLD-ALS and ALS cases has not been undertaken. The present study set out to assess this and demonstrates that distinct TDP-43 inclusion morphologies exist in the anterior cingulate cortex, but not the motor cortex of FTLD and FTLD-ALS. Specifically, in the anterior cingulate cortex of FTLD cases, significant rounded TDP-43 inclusions and rare circumferential TDP-43 inclusions were identified. In contrast, FTLD-ALS cases revealed significant circumferential TDP-43 inclusions and rare rounded TDP-43 inclusions in the anterior cingulate cortex. Distinct TDP-43 inclusion morphologies in the anterior cingulate cortex of FTLD and FTLD-ALS may be linked to heterogeneity in the ubiquitination of pathological TDP-43 inclusions, with the present study providing evidence to suggest the involvement of distinct pathomechanisms in these two overlapping clinical syndromes.

ASSOCIATE PROFESSOR CHRISTINE TOYE

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Theme: Care

Facilitating family informed hospital care for the person with dementia

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Pam Nichols, Eleanor Quested, Elissa Burton, Keith Hill
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Samar Aoun
Latrobe University, Melbourne, VIC

A hospitalised person with dementia may have limited capacity to communicate needs, preferences, and symptoms to clinicians, compounding risks of distress and other adverse outcomes. A mixed methods study was funded by the Dementia Collaborative Research Centre: Carers and Consumers to address this concern. Family caregivers of people with dementia, hospital staff members, and researchers collaborated to develop a caregiver-staff communication tool, the Focus on the Person form. Items were developed based upon a literature review determining key risks from hospitalisation for the person with dementia. Researchers consulted clinicians and caregivers as topic areas were mapped alongside information to be elicited from the family to inform safe person-centred care. When a draft form had been developed, 31 family caregivers of people with dementia completed and maintained it for one month, providing feedback on the experience during semi-structured interviews. Thirty hospital clinicians were provided with a summary of the information provided by caregivers using the form; they suggested refinements to ensure the accessibility of form data for planning hospital care. The Focus on the Person form is available electronically or in hard copy. It is recommended that family caregivers complete the form at home, in partnership with the person with dementia if appropriate, and keep it updated in case of unanticipated hospital admission. The completed form can then be used by clinicians as a basis for safe, collaborative, person-centred care. This presentation explains caregiver and staff perspectives elicited during the study and components of the form; it also discusses implementation strategies.

MS ALEXANDRA WADE

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Theme: Prevention

The potential of the Mediterranean diet for the prevention of dementia in Australia: Research findings, implementation and challenges

Alexandra Wade, Dr Hannah Keage, Dr Karen Murphy
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The Mediterranean diet (MedDiet) is effective at improving cardiovascular risk factors associated with dementia. Further, Mediterranean countries experience lower rates of dementia and Alzheimer's disease when compared to Western populations like Australia. Rich in extra virgin olive oil, nuts, fish, fruits, vegetables, legumes, and cereals, the MedDiet may be an effective dietary intervention for the prevention of dementia. However, it is currently unknown how well the MedDiet translates to countries outside of the Mediterranean basin, such as Australia. Our research examines the implementation of a MedDiet in non-Mediterranean populations. We review the literature and connect findings from international studies, including three randomised controlled trials conducted by our research group in Australia. We explore sustainability, feasibility and the practical challenges of implementing the MedDiet in an Australian population, including the capacity of the diet to meet key nutrient requirements of older Australians. Our findings suggest that the MedDiet may be effective at improving markers of cardiovascular health in older Australians, which may in turn reduce risk of dementia. However, studies in nonMediterranean populations report mixed findings on the direct effect of the diet on cognitive function. Possible explanations for these inconsistencies are explored, with reference to current methodological approaches in cognitive testing, lifestyle factors, and environmental context.

ASSOCIATE PROFESSOR LILY XIAO

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Theme: Care

Adapting the World Health Organisation iSupport program to the Australian socio-cultural context: A pilot study

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Anne Margriet Pot
Long Term Care & Dementia, Department of Ageing and Life Course & Department of Mental Health and Substance Abuse, World Health Organization

Background: Carers play a crucial role in dementia care, especially those from culturally and linguistically diverse (CALD) groups who have special needs. However, all carers are often not prepared and can feel overwhelmed. One major contributing factor to this situation is the lack of suitable education models to up-skill them throughout their caregiving journey and to eliminate barriers in dementia care. The World Health Organization (WHO) iSupport is an evidence-based, interactive, safe, flexible and scalable online program that enables carers to develop capability, positive thoughts and enablement skills. The iSupport was developed through international collaboration. Aim: The aim of the pilot study is to adapt the WHO iSupport into Australia. Methods: Two phases of study are being undertaken. In phase one, end-users and dementia care service providers were invited to focus groups to discuss their perspectives on the ease of access functionality, feasibility, user-friendliness, barriers and enablers when implementing the program. Findings will inform the revision of the WHO iSupport program. In phase two, a pilot to test the feasibility of the program and an evaluation will be designed for carers and dementia service providers invited to the study. Results: The project team is progressing to complete phase 1 and will report results from phase 1 in the forum.

ASSOCIATE PROFESSOR MARK YATES

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Theme: Care

The Dementia Care in Hospitals Program (DCHP) — Collaboration driving sustainability and national spread

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Ballarat Health Services

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Mary Bronson
Sir Charles Gairdner Hospital, Perth

Frank Nicklason
The Royal Hobart, Hobart

Anil Paramadhathil
ACT Health, Canberra

Deidre Widdall
Top End Health Service, Royal Darwin Hospital, Darwin

The National Rollout and Evaluation of the Dementia Care in Hospitals Program (DCHP) was completed in November 2017. The DCHP including the Cognitive Impairment Identifier (CII) was developed with patients with cognitive impairment (CI) and those who support them. Permission to use the CII was granted by consumers on the basis that the hospital using it would improve its support for patients with CI. The national partner sites were supported by Ballarat Health Services (BHS) to, implement the DCHP and CII, improve hospital culture, develop appropriate hospital guidelines and policy and to become DCHP Leadership Sites for their jurisdiction. The BHS team continues to support the Sites as they bed-in and spread the DCHP and CII to other hospitals. The BHS team is also working with other jurisdictions to develop new program collaborations. Collaboration with the Leadership Sites, consumers representatives, jurisdictional bodies and other hospitals has been required to ensure that implementation of the DCHP and use of the CII is consistent with the philosophy and culture change that consumers were promised. This paper will report on the progress of each of the Leadership Sites both internally and in their jurisdiction. It will explore the challenge of disseminating a philosophy of care. The solutions have included legal protections of intellectual property, DCHP implementation and CII usage guidelines, and both face-to-face and videoconference meetings. Collaborations in progress include Western Australia Country Health, Fiona Stanley Fremantle Hospital Group, Central Adelaide Local Health Network and Top End Health Services, Northern Territory.

MISS FATEME ZABETIANTARGHI

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Theme: Prevention

Association between a dietary inflammatory index and brain MRI biomarkers — The Cognition and Diabetes in Older Tasmanians Study

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Menzies Institute for Medical Research, University of
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Background: Inflammation has been proposed as a mechanism underlying the relationship between diet and poorer cognitive function. However, the underlying brain pathways are unknown. The aim of this study was to examine associations between the dietary inflammatory index (DII®) score and markers of brain volume and small vessel disease in people with and without Type 2 Diabetes (T2D). Methods: Participants were from the Cognition and Diabetes in Older Tasmanian study. The DII (a literature-derived dietary index) score was computed from responses to the Dietary Questionnaire for Cancer Council of Victoria that queried foods consumed in the past 12 months. White and grey matter volume, infarcts, microbleeds and white matter hyperintensity volume were obtained from magnetic resonance imaging (MRI). Logistic and linear regression analyses were performed to examine associations between DII scores and brain measures, adjusting for age, sex, education, energy, T2D and total intracranial volume. Results: The mean age of participants was 67.6 (SD 7.1) years for people with T2D (n=312) and 72.0 (SD 7.1) years for people without T2D (n=315). There were no associations between DII scores and grey, white or white matter hyperintensities (p>0.05). There were significant interactions found between T2D and DII scores for both microbleeds (p for interaction= 0.03) and infarcts (p for interaction=0.04) such that associations with DII scores were stronger in people without T2D. Discussion: This is the first study to investigate the association between DII and MRI variables. Associations between DII and both infarcts and microbleeds, were stronger in people without T2D.

GROUP PRESENTATIONS

DR DARREN LIPNICKI

Theme: Prevention

Three international consortia of cognitive ageing and dementia studies

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There are many population- and hospital-based cohort studies of cognitive ageing and dementia internationally. Bringing such studies together into consortia provides the large sample sizes and enhanced statistical power necessary to address certain research questions, the capacity to validate findings in more diverse samples, and an opportunity to determine risk and protective factors that are universal or different among ethno-regional groups. This can be achieved by harmonising shared non-identifiable data, and performing meta- or pooled analyses of combined, harmonised data sets. CHeBA leads three international consortia (COSMIC, ICC-Dementia, and STROKOG) contributing to efforts to promote successful brain ageing. COSMIC broadly aims to facilitate a better understanding of cognitive ageing and neurocognitive disorders in adults aged 60+ years. There are currently 32 member studies from 24 countries across 6 continents. ICC-Dementia is comprised of 17 centenarian and near-centenarian studies from 11 countries, with a goal to examine extreme longevity through identifying risk and protective factors for age-related cognitive decline such as dementia. STROKOG aims to facilitate a better understanding of the causes of post-stroke cognitive disorders and to improve the diagnosis and treatment of post-stroke dementia and cognitive impairment. STROKOG currently has 28 member studies, representing 17 countries. Each of these consortia has a diverse range of data, including demographic, neuropsychological and diagnostic, medical, genetic, neuroimaging, and lifestyle. The study co-ordinators will elaborate on the scope of their consortia, and on the wealth of harmonised and raw data that researchers from around the world can apply to access.

DR OLIVIER SALVADO, DR PARNESH RANIGA, PROFESSOR CHRISTOPHER ROWE

Theme: Assessment and Diagnosis

Imaging and data platform for dementia research

Olivier Salvado
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Dementia research requires phenotyping of increasingly large cohorts involving collection of medical data. Such collections require seamless data access, collaboration, and quality control across multiple sites. CSIRO has developed a platform allowing the integration of data from various streams such as neuropsychological evaluation, blood and CSF panels, MRI and PET imaging, lifestyle sensors, and questionnaires. Data can be curated, quality controlled, and made available securely and remotely to groups of researchers for further scientific exploration. In addition, a series of medical imaging analysis pipelines are available to automatically quantify biomarkers and provide normative comparison. The currently available imaging biomarkers are: 1) atrophy from anatomical MRI T1w, 2) white matter lesions from MRI FLAIR, 3) QSM and R2* map from MRI GRE, 4) Amyloid uptake from PET, 5) Tau from PET, and 6) Glucose update from PET. Some pipelines have been setup as a cloud computing service for remote secure access and are freely available for research and commercial evaluation. Other imaging biomarkers are under development and the platform lends itself to collaboration by integrating processing pipeline from different centres. During this presentation, we will describe the capabilities of the platform and its advantages for large-scale dementia research. We will also highlight the opportunities for collaboration by sharing the CSIRO infrastructure across the Australian research community.

CONSUMER INVOLVEMENT IN RESEARCH PRESENTATIONS

MS THERESA FLAVIN AND DR CRAIG SINCLAIR

Rural Clinical School of Western Australia, University of Western Australia

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Theme: Living with dementia

Supported Decision Making — the lived experience of consumer impact in dementia research

Interviewed by Dementia Australia CEO Maree McCabe, Theresa detailed her experience participating in a working group looking at ways to promote and implement supported decision making for persons living with dementia. This working group is part of a 3 year project funded by the Cognitive Decline Partnership Centre. Theresa addressed her motivations for becoming involved, her experiences as a consumer in this research project, and the practical strategies employed to bring her voice to the table — what worked and what could be improved. Theresa illustrated how it's possible for people living with dementia to influence the focus and conduct of a research project, and how her lived experiences (as both a person living with dementia and a family member of someone with dementia) have been able to inform the project.

LIVED EXPERIENCE SPEAKER BIOGRAPHIES

MS ISABELLE BURKE

Isabelle is a consumer advisor with Dementia Australia and carer for her mother Chrstine, who has diagnosed with younger onset dementia four years ago.

Through her advocacy work, Isabelle wants to emphasise the need for early diagnosis, and an improvement in services and care for people living with dementia. She believes passionately in the benefits of involving consumers in research.

Winner — Best Presentation by a Person with Dementia or Carer

MR IAN GLADSTONE

Ian Gladstone was diagnosed with Semantic dementia at age 58, following a stroke-like episode.

Following his diagnosis, Ian became involved with Alzheimer's South Australia with his sister and care partner, Anne. I undertook a number of training sessions and became involved in various activities which involved meeting other persons with Younger Onset Dementia.

Recognising his condition relative to his peers, Ian began advocating on behalf of people with dementia. Through his work Alzheimer's SA, Ian met fellow advocate Kate Swaffer and began sharing his story of living well with dementia throughout his community. After filling in for a speaking engagement on Kate's behalf, Iam was introduced to the national and international world of dementia advocacy. Ian is dedicated to spreading the message that dementia doesn't have to be such a sad experience. In particular, he advocates the power of humour in living with dementia and tries to bring a smile to the faces of his friends living with dementia. It is Ian's intention to continue to support those in genuine need, who deserve the encouragement to live a good life, despite their dementia.

MS DANIJELA HLIS

Danijela has been an activist and consumer advocate for people living with dementia and their carers for more than eight years and stresses the importance of the environment.

As a long term member of Consumer Dementia Research Network (CDRN) and CDPC Consumer Representative, Danijela has participated in a number of CDPC Project teams, been on a variety of executive and steering committees, presented at conferences and given workshops to staff in residential care facilities while living in Tasmania.

Danijela worked in the diplomatic service as a Human Resource Manager in London, Paris, Rome, Geneva, Sydney and Melbourne. And later opened a tourist complex in Tasmania.

She is passionate about raising awareness about the need for inclusion for all, in all matters relating to living with dementia.

Now retired, she is a volunteer with COTA — (COTA Ambassador Qld), and a ComLink bi-cultural social support worker for clients from Italian, French, Slovenian and German background who have dementia.

MR JOHN QUINN AND MS GLENYS PETRIE

John is a person living with dementia, believed to be of the Familial Type.

He was diagnosed in his late 50s. With support from his partner Glenys Petrie, John is living well with dementia, and presenting nationally and internationally, on a range of issues about dementia. They are both on 4 different CDPC committees and approximately 6 other research committees, national and local committees about health issues or inclusive communities.

DR RON SINCLAIR

Ron was a carer for his wife who passed away in 2006 from familial Younger Onset Alzheimer's disease.

Dr Sinclair's father succumbed to dementia in 2004, and he now cares for his stepmother who has recently entered residential care with dementia. Dr Sinclair was a member of the Carers Advisory and Advocacy Committee and a Board member of Alzheimer's Australia South Australia for 10 years. He is now a consumer representative on Alzheimer's Australia's National Carers Advisory Committee, the National Cross Cultural Dementia Network, the Minister's Dementia Advisory Group and Chair of the Consumer Dementia Research Network. Dr Sinclair is a research biologist with the South Australian Government and conducts epidemiological studies on myxomatosis and rabbit haemorrhagic disease in wild rabbits.

MS ELAINE TODD

Elaine first joined Alzheimer's Australia after noticing a change in her mother's behaviour.

Interested to learn more, she utilised the library and attended a number of carer education courses. These courses helped Elaine identify and assist in seeking a diagnosis for her mother in 1998. Elaine became very active with Alzheimer's Australia NSW as an inaugural member of the NSW Consumer Reference Group and the CDRN following its establishment in 2010. Elaine supports and advises family members of those with dementia, and helps transports them to education days and support group meetings. Elaine gets a great deal of satisfaction from being involved in the research side of dementia and looks forward to seeing collaborative projects put in to best practice.

RAPID FIRE PRESENTATIONS

MS OLIVIA BRANCATISANO

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Theme: Intervention and Treatment

The "Music, Mind and Movement (MMM)" Program for people with dementia

Winner — Best Rapid Fire Presentation

Olivia Brancatisano, Amee Baird, William Forde Thompson
Macquarie University

Background: Music is an effective non-pharmacological treatment for dementia symptoms. Thompson and Schlaug (2015) proposed seven ingredients of music that have therapeutic value. Specifically, music is engaging, persuasive, emotional, personal, physical, social and facilitates synchronisation. Aim: We devised the Music Mind and Movement (MMM) program for people with dementia (PWD), which incorporates activities that target these seven attributes. Methods: The MMM program involved seven 45-minute weekly group sessions, and 1 weekly individual 15-minute "booster" session. Twenty PWD (mild/moderate) participated in 2 groups of 10, with Group 2 acting as a wait list control. The Addenbrooke's Cognitive Examination (ACE) was completed at baseline, Time 1 (7 weeks) and Time 2 (post treatment Group 2). Results: 5 participants in Group 1 (5 drop outs from illness) and 7 participants in Group 2 (1 deceased, 2 withdrew) completed assessments. A significant difference in ACE pre – post difference scores was found from baseline to Time 1 ($p = 0.045$) between Group 1 and 2 (waitlist control). Differences were present in ACE sub-scores of attention ($p = 0.004$) and verbal fluency ($p = 0.01$). Group 2 showed cognitive decline during the wait list period (significant drop in ACE score, $p = 0.038$). Both groups exhibited stable cognition (no change in ACE scores) after the MMM program. There was a significant increase in attention scores after the MMM in Group 1 and 2 ($p = 0.041$ and $p=0.049$, respectively). Conclusion: Our preliminary findings suggest that the MMM program can stabilise cognition and improve attention in PWD.

MR ALEXANDER CLOUGH

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Theme: Living with dementia

Does statin use affect cognition in older adults? A pilot N-of-1 deprescribing trial

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Introduction: Evidence to support statin use in adults over 80 years of age with no indication of primary cardiovascular prevention is limited. Aims: Primary: To determine the effect on cognition of discontinuation and rechallenge with statins. Secondary: To determine the effects on quality of life and functional status of discontinuation and rechallenge with statins. Methods: Adults over 80 years of age with dementia taking statins for at least 6-months were recruited from a geriatric outpatient clinic at Royal North Shore Hospital, NSW. A pilot N-of-1 study was conducted, with participants randomised to discontinue and restart statins over the course of 4-months. At baseline (0-weeks), recruited participants were randomised to their normal statin or placebo regimen for a period of 5-weeks. Participants were assessed and intervention switched at 5-, 10-, and 15-weeks. Primary outcome was measured using rate of change in Alzheimer's Disease Assessment Score-Cognitive Subscale (ADAS-CoG), and secondary outcomes including patientrelevant, carer-relevant and physical measures. Results: Over 6 months, 81 participants were screened, 14 were eligible, and 4 recruited. Three stopped taking a statin before baseline, with 1 participant (female, 88 years) completing all 4 assessments. Cognitive impairment, as measured by ADAS-CoG score, was unchanged on placebo (15.5/70) compared to statin (15/70). A number of recruitment barriers were identified, including treating physicians being unwilling to deprescribe statins, time constraints, and participant stress after clinical diagnosis of dementia. Discussion: Our pilot study suggests that there are major barriers to recruiting patients with dementia into deprescribing trials from outpatient settings.

MS NICOLE EE

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Theme: Intervention and Treatment

Brain Training: a question of more than just efficacy

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Background: Excessive worrying about cognition and fears of dementia are not uncommon features of later life. The concern or experience of declining cognitive abilities can often lead to distress, anxiety and depression among older adults. While some seek professional help to aid with coping, many others remain undiagnosed and untreated. Little is known about whether such individuals engage in self-help behaviors to alleviate their distress surrounding cognitive decline. This study sought to examine impact of psychological distress on brain training. Methods: A nationally representative sample of 900 English speaking Australian residents (59% males) was recruited through random digit dialling. Participants were highly educated with more than 65% having attained secondary or higher qualification. A standardised telephone survey was administered to each participant, including questions about demographics, status of engagement with brain training, worries about cognition, fears of Alzheimer's disease (AD) and depression. Results: A small minority (6.8%) of participants were actively engaged in brain training during study. They had a mean age of 51.34 (SD = 15.64) with more than 75% having been engaged for a 6-month period or longer. A logistic regression was performed to ascertain the effects of worry about cognition, fear of AD and depression on brain training. While the logistic regression model was not significant, 2 (8) = 3.66, $p = .89$, there were trends towards associations between frequent worrying about cognition (at least once a week) and active engagement with brain training, OR = 2.01, 95% CI [1.00, 4.01], $p = .05$. The frequent worriers were age 55.49 SD = 16.814. Conclusion: These results suggest that distress related to cognitive decline is not a strong driver of self-improvement behaviors in older adults. Given there are trends that worriers are more likely to work their brain, dispositional factors and personality may be possible determinants of brain training.

DR DAMIAN HERNANDEZ

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Theme: Intervention and Treatment

Isogenic induced pluripotent stem cells to model of Alzheimer's disease

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The APOE gene allele has been identified as a major genetic risk factor for late-onset Alzheimer´s Disease (AD) that appears to be associated with defective clearance of beta amyloid (Aβ in the brain. The APOE4 allele represents an increased risk of developing AD, whilst the APOE2 allele is protective compared to the most common APOE3 allele. However, the exact mechanisms of action of APOE in AD are still not fully understood. The APOE3 and APOE4 isoform differ only in one single nucleotide polymorphism (SNP), located in the fourth exon of the APOE gene that affects an amino acid at the position 130 of the protein. Here, we generated isogenic induced pluripotent stem cell (iPSC) lines with various APOE genotypes using CRISPR/Cas9 gene editing by oligonucleotidemediated homology-directed repair. iPSCs homozygous for the APOE allele 4 (APOE4/4) were nucleofected with the Cas9/gRNA ribonucleoprotein complexes and single strand DNA template targeting the necessary SNP to generate isogenic iPSCs with the heterozygous genotype of APOE alleles 3 and 4 (APOE3/4) and homozygous genotypes of APOE allele 3 (APOE3/3). Nucleofected iPSCs were isolated into single cells for clonal maintenance and assessed for APOE genotype by TaqMan SNP Genotyping and Sanger Sequencing. The isogenic iPSCs have been extensively characterised and demonstrate expression of pluripotency markers by qRT-PCR and the ability to differentiate into the three germ layers (a key feature of iPSCs), as demonstrated by immunostaining. Together, these lines will provide a novel tool for the study of AD in vitro.

DR KAREN MATE

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Theme: Intervention and Treatment

Anticholinergic burden is associated with negative health outcomes in elderly Aboriginal people

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Dementia is often associated with multiple co-morbidities necessitating the use of numerous medications, which increase risks of adverse reactions, drug-drug interactions and exacerbation of cognitive impairment. Indigenous Australians may be at increased risk due to their higher prevalence of chronic conditions. This study examined the anticholinergic burden among a cohort of elderly Aboriginal people and its associations with several health outcomes. Urban and regional community dwelling Aboriginal people aged over 60 years (n=336) completed an interview that covered life background, social, demographic, health and wellbeing, cognitive status and medication use. Anticholinergic burden was calculated using anticholinergic burden (ACB) and anticholinergic drug (ADS) scales, updated by an expert panel. Approximately 40% of participants were taking 5 or more medications, and 47% were taking at least one anticholinergic medication. After adjusting for sex, education and living circumstances, anticholinergic medication use was associated with dementia or mild cognitive impairment (OR 1.77; 95% CI 1.05-3.01), hospitalisation in the past year (OR 1.70; 95% CI 1.08-2.69), and being dependant on assistance with daily living (OR 2.53; 95% CI 1.58-4.06). Health outcomes for Aboriginal people with dementia may benefit from reduction in use of anticholinergic medicines. This study confirms the importance of a collaborative team-based approach for managing the complex care of older people with dementia and co-morbidities. The inclusion of a pharmacist, with expertise in medication reviews, as part of a multi-disciplinary care team can play an important role in improving overall health and quality of life outcomes for Aboriginal people.

DR OLGA SHIMONI

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Theme: Assessment and Diagnosis

Detection of dopamine using fluorescent nanosensors

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Carlos M. Opazo
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Schizophrenia is a debilitating mental illness that disrupts the functioning of the human mind, with onset typically occurring in young adulthood. An overwhelming body of evidence from multiple studies has linked hyperactive dopaminergic neurotransmission to the psychotic symptoms of schizophrenia. These symptoms are associated with excessive dopaminergic neuronal firing, primarily within the midbrain, accompanied by increased dopamine synthesis and release, and increased activation of dopamine D2 receptors in limbic structures [Schwartz et al., Front Pharmacol 2012]. In clinical research dopamine levels are usually tested using the well-established enzymelinked immunosorbent assay (ELISA). However, this assay costs around $1000 per assay plate. This is a significant barrier to schizophrenia testing and research. Nanoscience and nanotechnology are poised to generate novel approaches and tools for the measurement and manipulation of changes in the brain [Alivisatos et al., ACS Nano 2013]. We developed novel highly sensitive nanosensors that are suitable for a selective and non-invasive detection of dopamine levels in biological samples from schizophrenia patients and in vitro and in vivo models of this mental disorder. We utilise an emerging field of upconversion nanoparticles with high doping of lanthanides that can indicate output through fluorescent signal. These particles offer precise control of shape, light-emitting rare earth ion doping, biocompatibility, photostability, and the ability to absorb light in the near-infrared area and emit it in the visible range. That results in higher signal-to-noise, sensitivity and access through the biological ‘tissue transparency window’ for optical imaging [Zhou et al., Nature Nanotech. 2015]. This nanosensor provides a new tool to evaluate changes in dopamine levels in biological samples from schizophrenia patients and schizophrenia experimental models.

POSTER ABSTRACTS

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Theme: Assessment and Diagnosis

Influence of Mutation Knowledge on Clinical and Cognitive Outcomes in the Dominantly Inherited Alzheimer Network (DIAN)

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Autosomal dominant Alzheimer disease (ADAD) is due to specific genetic mutations that have near 100% penetrance. While some members of families with ADAD mutations choose to learn their mutation status, many do not. The extent to which knowledge of mutation status might affect clinical disease progression is currently unknown. The aim of this study was to quantify the influence of mutation awareness on rates of clinical and cognitive decline. Mutation carriers and noncarriers from the Dominantly Inherited Alzheimer Network (DIAN) were stratified based on knowledge of mutation status. Groups were statistically matched on estimated years to symptom onset using propensity scores. Rates of change on standard clinical, cognitive and neuroimaging outcomes were examined. Mutation carriers aware of their status scored worse on CDR Sum of Boxes (CDR-SB) and a cognitive composite score at baseline. They also showed accelerated change on CDR-SB but similar cognitive trajectories as carriers without knowledge of mutation. No differences were observed on baseline levels or rates of change in amyloid. Having knowledge of mutation in carriers is associated with baseline differences in clinical and cognitive measures and with increases in rate of clinical decline. However, rates of change on objective cognitive measures are unaffected. The cause of differences at baseline may be because participants seek genetic testing when symptoms are worsening or knowledge of mutation may alter the behavioral presentation of ADAD. Either way, mutation knowledge does not appear to impact quantitative assessments of disease progression. Future analysis to account for causal effects will be explored.

DR AMEE BAIRD

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Theme: Care

‘Music and Dementia: From Cognition to Therapy’ — An edited book accepted by Oxford University Press and a collaboration between 3 NHMRC-ARC Dementia Research Development Fellows

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Jeanette Tamplin
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Sandra Garrido
MARCS Institute for Brain, Behaviour & Development Western Sydney University

There is accumulating evidence that music is an effective non-pharmacological treatment for various symptoms of dementia. This edited book provides an overview of current music-based research and clinical practice in the dementia field from the perspective of three disciplines, namely neuropsychology, music psychology and music therapy. The three editors and NHMRC-ARC Dementia Research Development Fellows represent each of these fields (Amee Baird — clinical neuropsychology, Jeanette Tamplin — music therapy and Sandra Garrido — music psychology). Collectively the editors provide a unique interdisciplinary perspective on the current and emerging research on music and dementia, with invited contributions from internationally renowned experts.

The book comprises 13 chapters and is divided into three parts, reflecting the main themes of the research in this field to date; (1) Why music for people with dementia? (2) Music skills, cognition and emotion in dementia, and (3) Music Therapy in dementia care. This will be the first book to address this topic in depth and from a range of discipline specific perspectives. It will serve as a unique reference for researchers, health professionals, and carers who are working with people with dementia. By providing a review of our current knowledge of music and dementia from these three interrelated disciplines we hope this book will promote further research on this important topic to advance our understanding of the therapeutic applications of music in dementia care.

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Theme: Intervention and Treatment

AMPK activator PRKAG2 is elevated in AD and is associated with increased autophagy and Aß accumulation in the brain

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Previous studies of AD brain shows a marked up-regulation of lysosomal activity, including extensive involvement of various acid hydrolases such as cathepsins B and D with Aß protein deposits. In addition, The AD brain also shows abnormal activation of nutrient sensing kinase AMP-activated protein kinase (AMPK), which is an important regulator of autophagy. AMPK is a heterotrimeric protein complex composed of a 3 subunits including a noncatalytic regulatory gamma subunit PRKAG2. Recent findings show that PRKAG2 has an important role in regulating stress induced autophagy by AMPK and polymorphisms in PRKAG2 are associated with cognitive impairment and metabolic dysfunction in old age. The main aim of this study was to determine the expression levels of PRKAG2 and whether it correlates with increased autophagy and Aß levels in the AD brain.

Gene and protein expression analysis of PRKAG2 was conducted in post-mortem brain tissues of patients with AD, FTD (Frontotemporal dementia), LBD (Lewy body dementia) and in healthy controls. Autophagy markers LC3B-I, BECLIN1 and ULK3 were significantly elevated in the AD brain as compared to healthy control and other dementias showing the abnormal activation of autophagy. Gene transcription and protein levels of PRKAG2 was significantly increased in hippocampus and frontal cortex in AD. More importantly, PRKAG2 protein levels were associated with increased Aß accumulation and BECLIN1 in all brains. In summary, our findings suggest that increased PRKAG2 may be an important contributing factor to lysosomal dysfunction and Aß accumulation in AD brain.

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Theme: Intervention and Treatment

IU1, a selective inhibitor of deubiquitinating enzyme USP14 inhibits Aß toxicity in neuronal cells

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Autophagy is a vital intracellular catabolic pathway for misfolded proteins and an attractive therapeutic target for neurodegenerative diseases including Alzheimer's disease (AD). We have previously shown that enhancing autophagy reduced Aß accumulation and toxicity in cells and improved cognition in an AD mouse model. A wide range of small molecules targeting multiple cell functions have now been developed to modulate autophagy. Assessing the neuroprotective effects of modulators against Aß toxicity would further our understanding of their protective mechanisms and aid development of novel treatments for AD. Therefore, the main aim of this project is to identify potent autophagy modulators that protect against Aß induced neuronal cell death.

In this study, we used the MC65 cell line to model Aß accumulation and toxicity. MC65 is a well-established human CNS derived cell line that generates Aß by ß-secretase cleavage from a stably transfected C99 fragment of the amyloid precursor protein (APP). Using this cell line as a platform, we screened an autophagy compound library containing 156 small molecules for inhibition of Aß toxicity. We observed inhibition of Aß induced cell death by the ion channel blockers carbamazepine, omeprazole and IU1, a selective inhibitor of deubiquitinating enzyme USP14. Overall, IU1 was identified as the most potent compound showing a marked 40% increase in cell survival in MC65 cells producing Aß. Recent studies show that IU1 regulates autophagy and degradation of prion aggregates in cells. This suggest that its protective effect in MC65 cells is possibly through the upregulation of Aß protein clearance. Our findings demonstrate a novel role for IU1 in reducing Aß induced toxicity. Further investigation of its protective effects will be essential in determining its therapeutic potential in AD.

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Theme: Intervention and Treatment

Differential expression of apolipoprotein D in Alzheimer's disease and frontotemporal dementia brain

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Apolipoprotein D (apoD) is a protective, glial expressed lipocalin known to be upregulated during aging, oxidative stress and in neurodegenerative disorders, such as Alzheimer's disease (AD), Parkinson's disease and Niemann-Pick disease. ApoD is known to protect against oxidative stress and inflammation. Hence, it can be a potential therapeutic target for oxidative stress induced neurodegeneration. Frontotemporal lobar degeneration (FTLD) is a neurodegenerative condition in which oxidative stress markers are elevated and oxidative stress is also known to induce changes in cellular proteins like TDP43 to mimic their pathological forms. The expression of apoD in FTLD and its effect on FTLD pathological molecules are unknown. Following ethics approval, tissue samples from 18 FTLD (10 FTLD-TDP43, 8 FTLD-tau), 7 AD and 10 controls were obtained from the NSW brain banks and the levels of apoD protein assessed using western blotting. Unlike AD, apoD was not increased in either of the two main pathological forms of FTLD (FTLD-TDP43 and FTLD-tau). Using an apoD overexpressing cell model, we showed that apoD had no effect on either APP or TDP43 expression (responsible for pathological inclusions in AD and FTLD respectively), and that under oxidative stress apoD decreased APP expression but had no effect on TDP43 expression. These data suggest that apoD may have a differential effect on neurodegenerative process in FTLD compared to AD.

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Theme: Intervention and Treatment

L1 retrotransposon involvement in neurodegeneration and Parkinson's disease

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Parkinson's disease (PD) is a complex neurodegenerative condition characterized by both motor and non-motor symptoms. About one-quarter of affected individuals experience PD associated dementia. The main hallmark of PD is the selective degeneration of dopaminergic (DA) neurons, which control voluntary movement. Despite recent advances, current PD treatments only ameliorate symptoms but do not prevent neuronal loss and cannot cure the disease. PD aetiology is multifactorial, with genetic and environmental neurotoxins interacting to induce PD pathology via mechanisms that are still unclear. Recent studies have proposed that environmental neurotoxins may trigger hyperactivation of the L1 (Long interspersed element-1) retrotransposon in DA neurons, potentially leading to DA neurodegeneration. The L1 retrotransposon can mobilise or "jump" from one place in the genome by first copying itself into RNA and then reverse-transcribing and inserting itself in a new genomic location. As a result, L1 mobilisation can alter the genome by insertional mutagenesis, recombination and deletion, potentially contributing to neurodegeneration. We are currently investigating whether L1 activation is a key driver in DA pathology associated with PD or a consequence of an already altered DA neuronal phenotype. We will further test whether chemical modulation of L1 activity could ameliorate DA neurodegeneration.

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Theme: Prevention

Preliminary findings from the Intense Physical Activity and Cognition (IPAC) Study

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Although increasing evidence supports the notion that physical activity maintains cognitive function, the specific intensity that provides the greatest benefit to the ageing brain remains to be elucidated. The Intense Physical Activity and Cognition (IPAC) study aims to address this void in the literature, by assessing the impact of a six month high-intensity exercise intervention on cognitive function and biomarkers of dementia risk, compared with a six month moderate-intensity exercise intervention and control group (no study-related exercise).

One hundred and five cognitively healthy men and women aged between 60 and 80 years were randomised into either a high-intensity exercise, moderate-intensity exercise or control group (n=33 in each group). Individuals randomised to an exercise intervention undertook six months of cycle-based exercise twice a week, at 50 minutes per session. Comprehensive neuropsychological testing, blood sampling, brain magnetic resonance imaging, and fitness testing were completed at baseline and at the conclusion of the training intervention (six months).

To date, 99 participants have completed baseline assessments (6 withdrawn before baseline completion), and 47 have completed post-intervention assessments. It is anticipated that all post-intervention assessments will be completed by June 2018. Observational data from baseline assessments, including evaluation of the relationships between fitness and cognitive function, hippocampal volume and default mode network connectivity will be presented. Furthermore, preliminary findings from post-intervention data will be presented, including the effect of the high-intensity exercise intervention on cognitive function, hippocampal volume and default mode network connectivity, compared with the moderate-intensity intervention and our control group.

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Theme: Assessment and Diagnosis

Profiling the genome regulatory landscape of Alzheimer's Disease at single-cell resolution

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Alzheimer's disease (AD) is a progressive neurodegenerative disease with no effective treatments. Epigenomic approaches have provided new insights into the role of epigenetics in AD, revealing differences in gene regulation in AD. However, due to high levels of cellular heterogeneity, defining the roles of different brain cell-types in AD has been challenging. Recently, the landscape of possibilities in genomics has changed dramatically, with the emergence of high-throughput single-cell techniques. These methods will allow researchers to overcome the confounding effect of cell-type heterogeneity, which will be critical for understanding how the brain changes during ageing and AD.

We are currently working towards obtaining single-cell gene expression profiles from healthy and AD affected brains to identify the cell types that exhibit the greatest differences in gene regulation. We have optimized isolation of high quality nuclei from archival frozen brain, a prerequisite for high quality data. Recently, we obtained our first human single-cell gene expression datasets for controls allowing us to begin identifying molecular markers of distinct cell subpopulations.

Additionally, recent advances in stem cell technologies have enabled the generation of human brain organoids from pluripotent stem cells. In parallel, we are developing novel 3D organoid culture systems to generate functionally mature neurons that will mimic the complex extracellular environment necessary to test the findings derived from our in vivo data.

We anticipate our results will allow the definition of neuronal and glial subpopulations, identify which cell populations show abnormal gene regulation in AD, and identify distinct cellular subtypes in AD affected brains.

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Theme: Assessment and Diagnosis

Sex and APOE genotype influence the association between amyloid and longitudinal tau pathology in clinically normal older adults: findings from the ADNI study

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Background: The biological mechanisms underlying sex differences in AD risk remain unclear. Women with MCI have greater tau, but clinically normal (CN) women have similar tau levels than men (Altmann, 2014) at the cross-section We hypothesized that CN female APOEe4 carriers would show greater CSF total-tau accumulation in comparison with their male counterparts.

Methods: We analyzed longitudinal CSF data in 239 CN participants from ADNI using Roche Elecsys® assays (2.6 observations per participant [min=2, max=8], follow-up duration=2.8±1.7years). We ran a series of linear regressions on baseline CSF total-tau by sex-APOE, after adjusting for age and Aß. Next, we conducted a series of linear mixed-models on change in CSF total-tau by sex-APOE, after adjusting for age and baseline Aß.

Results: We found no baseline sex-APOE differences in CSF total-tau, regardless of age, e4 status, or A. Older age, APOEe4+, and lower Aß were independently associated with higher tau levels. Longitudinally, female CN APOEe4 carriers with lower baseline A showed greater rates of total-tau accumulation in comparison with all other CN (male-APOEe4+, p=0.05; female-APOEe4-, p=0.003).

Conclusion: Total tau accumulation was apparent in CN female APOEe4 carriers with abnormal levels of CSF Aß at baseline. No sex-APOE differences existed in baseline levels in CN. Mounting evidence implicates female-APOEe4 vulnerability to tau in MCI at the cross-section, however, our findings suggest an early emergence of sex-APOE differences in preclinical AD.

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Theme: Assessment and Diagnosis

Amyloid-beta impairs Tom1-mediated receptor internalization and promotes Alzheimer's disease progression

Alterations that affect the immune system are among the factors associated with aging that reduce the quality of life for the elderly. As we age, the innate immune system becomes dysregulated and is characterized by persistent inflammatory responses. Age-related changes in the immune system contribute to the increased susceptibility of the elderly to several diseases including Alzheimer's disease (AD). A crucial aspect of this process is a failure to resolve inflammation, which normally involves the suppression of inflammatory cell influx, effective clearance of apoptotic cells and promotion of inflammatory cell egress. The chronic inflammation mediated by interleukin-1 receptor 1 (IL-1R1) represents a key mechanism by which amyloid-beta (Aβ drives the development of tau pathology and cognitive decline in AD. The potent pro-inflammatory activities of this receptor are counter-regulated by target of Myb1 (Tom1) and its interaction partner toll-interacting protein (Tollip) via endocytosis and lysosomal degradation mechanisms to ensure proper resolution of immune responses. Nevertheless, the dysfunction in Tom1 as a potential causal role in contributing to the excessive inflammatory response in AD remains largely unexplored. We hypothesize that changes in Tom1-mediated endocytosis are early A-triggered events leading to exacerbated inflammatory response, which in turn elicits synaptic dysfunction and cognitive decline. In this collaborative proposal, we will determine the molecular effects of Aβon Tom1-mediated trafficking of IL-1R1. We will use cutting-edge in vitro approaches to complement our study and deepen our understanding of the connection between A pathology and changes in Tom1-mediated endocytosis.

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Theme: Living with dementia

The impact of cognitive impairment on markers of community ambulation

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Aims: The aims of this study were to: 1) determine if older people with cognitive impairment are able to reach the speed required at pedestrian crossings (>1.2 m/s) and 2) determine the role of cognitive impairment on the ability to alter speed and walk quickly. Methods: Participants were recruited from a Memory Clinic in France. Gait speed was assessed at preferred (PWS) and fast walking speed (FWS) using an electronic GAITRite walkway. Walking speed reserve (WSR) was calculated as the difference between FWS and PWS. Participants were classified into cognitive stages (cognitively healthy, mild cognitive impairment, mild and moderate dementia) based on neuropsychological evaluations. The association between cognitive stage and PWS, FWS and WSR was assessed using multivariable regression, adjusting for covariates. Results: The mean age of the sample (n = 681) was 73.3 (SD 5.8) years. Nearly all (98.1%) participants with mild or moderate dementia had a PWS slower than 1.2 m/s. Fifty percent of women with mild dementia, and over 65% of men and women with moderate dementia could not reach 1.2 m/s at their FWS. Greater cognitive impairment was associated with slower PWS (ß −0.08, 95% CI −0.10, −0.06), FWS (ß −0.13, 95% CI −0.16, −0.10) and also with smaller WSR (m/s) (ß −0.05, 95% CI −0.07, −0.03). Conclusion: In older people, greater levels of cognitive impairment were associated with reduced ability to increase speed and walk quickly. Such limitations may impact the ability of people living with cognitive impairment and dementia to access the community.

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Theme: Care

Hospitalisation patterns for older Australians in the five years prior to an index admission for dementia

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Introduction: Analysis of hospitalisation over time for people with dementia may enhance understandings of the disease trajectory and highlight opportunities for earlier recognition. This study described patterns of hospitalisation in the five years prior to index, and the index (i.e., first) admission for dementia.

Methods: A longitudinal linked admitted patient and emergency department (ED) dataset was used to identify index dementia admissions, and examine patterns of utilisation in a regional local health district in NSW Australia. This data was available because of a collaborative research partnership between the Illawarra Shoalhaven Local Health District and the University of Wollongong.

Results: 7,920 persons with dementia were identified with 34,635 admissions and 27,323 ED presentations. An increasing frequency of hospitalisation was observed, particularly in the year prior to index, where a 15.8% and 13.6% rise per person occurred in ED visits and admissions respectively. Main reasons for admission at index and prior were for nervous system (25% and 10.9%), musculoskeletal system (13.7% and 11.6%), and circulatory system (11% and 17.9%) illnesses. Main reasons for ED visits were for respiratory system (18.4%), circulatory system (16.5%), and neurological system (12.0%) illnesses. There was a steep increase in visits for falls and urinary tract infections in the year prior to index, with these conditions accounting for 39.5% of all visits.

Conclusion: This study addresses a gap in evidence regarding hospital utilisation in the years leading up to an index dementia admission. Findings can be used to inform strategies to improve dementia identification in the hospital system.

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Theme: Living with dementia

Autobiographical Memory in Huntington's disease

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Huntington's disease (HD) is a progressive autosomal dominant neurodegenerative disorder characterised by motor, psychiatric and cognitive dysfunctions. Cognitive decline can be detected in group studies ten or more years before motor onset. Autobiographical memory, which refers to the memory of personally experienced events or information, has not been well-characterised in HD. The current study investigated episodic and semantic autobiographical memory recall across the lifespan in pre-manifest and early Huntington's disease. Participants genetically confirmed to have HD (pre-manifest and early HD) and healthy control participants completed the Autobiographical Interview (Levine et al., 2002). Participants were required to recall a memory of an event from five different life periods. Interview details were scored according to a standard scoring protocol to determine the nature of information recalled (semantic, episodic) across free recall, general probe, and specific probe conditions. Participants with HD recalled significantly fewer episodic details, including happenings, locations, emotions, perceptions from a specific time and place. Our findings provide evidence of a deficit in episodic autobiographical memory recall in HD, with a relatively spared semantic autobiographical memory. These findings extend our knowledge of memory in HD, and lend evidence to cognitive changes that occur in both manifest HD, as well as prior to clinical 'motor' diagnosis.

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Theme: Intervention and Treatment

Effectiveness of Cognition Support Formula® on cognitive function in older adults with subjective cognitive impairment: protocol for a randomised placebo controlled trial

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Subjective Cognitive Impairment (SCI) is a concern that an individual has about a decline in their cognitive functioning. SCI is conceptualised as preclinical dementia as it has been found to be associated with an increased risk of Mild Cognitive Impairment (MCI) and Alzheimer's Disease (AD). Due to Australia's ageing population, SCI is becoming more prevalent. Current treatments and clinical trial data are limited, with most utilising nutraceuticals over short trial periods. Cognition Support Formula® (BioCeuticals Pty Ltd) is a herbal and nutritional supplement that promotes improvements in cognitive function containing clinically trialed extracts: Bacopa monniera (brahmi), Ginkgo biloba, Panax ginseng and alpha-lipoic acid. As Cognition Support Formula® is a commercially available product approved by the Therapeutic Goods Association with the potential to improve cognition, its efficacy and safety requires testing in a population that has an increased risk of developing MCI and AD. One-hundred and twenty participants will be randomised into one of the treatment groups (active or placebo) at a ratio of 1:1. Participants will complete a series of cognitive (CogState®), mood (DASS-42, SHAI), and fatigue measures (FACIT-F), at three timepoints: baseline (0 months), midpoint (3 months) and endpoint (6 months). Changes in neurocognition will be measured by electroencephalography (EEG) at baseline and endpoint by half of the participants. This is the first study to test the effectiveness of Cognition Support Formula® in older adults with SCI. Recruitment for this study began in September 2017 and is currently ongoing.

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Theme: Living with dementia

Getting outside: an under-utilised tool for reducing BPSD for people with dementia in residential care?

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There is a growing body of evidence and clinical opinion that getting outdoors is critical for wellbeing and quality of life for people living with dementia in residential aged care. Being outdoors has been associated with beneficial light exposure to help normalise circadian rhythms, improving Vitamin D levels through sunlight on skin, providing opportunities for incidental exercise, managing mood and behavioural and psychological symptoms of dementia (BPSD), as well as the resident deriving pleasure from familiar activities in the garden, such as gardening, picking flowers or hanging washing on the line. However, with increasing population densities in Australian metropolitan areas, there has been an increase in building to open space ratios and an increase in multi storey aged care homes, limiting the potential of outdoor space to be used as a therapeutic tool. Over the last 9 months, it was indicated that lack of access to outdoor spaces was a contributing factor in BPSD of 299 clients referred to Dementia Support Australia (DSA), a national behaviour management advisory service. While spending time outdoors is considered beneficial, little is understood about what the barriers and enablers are to getting residents outdoors in busy aged care homes, especially for residents who have poor mobility or are immobile. This poster will present interim results from a qualitative study using in-depth interviews with staff from ten Australian aged care homes to identify key aspects that limit or enhance residents experience of outdoor spaces.

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Theme: Care

Managing expectations in the age of choice. Will consumer directed care deliver?

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The goal of consumer directed care (CDC) is to promote better health outcomes by allowing individuals to have purchasing control over their care packages. By way of the invisible hand of the market, CDC should improve efficiency and create pressure on care providers to improve the quality of their services. CDC fundamentally shifts the nature of relationships within the care triad (care recipient, family carer and formal care staff) in which market information and knowledge, mutual trust, and collaboration affect the demand and supply of community care services. This is particularly relevant in dementia care where the decision making power gradually transfers to the family carer as the cognitive impairment of the care recipient changes.

Questions arise that require further consideration. For example, does CDC change the type of care provided? What is the cost for the provider? How is information about care choices provided to consumers? Is there any discrimination in information delivery? Is the information provided in a basic or comprehensive way? Is this information able to be used effectively in the decision making process by the dementia dyad? Our panel consists of an industry provider, consumer representative, geriatrician, and a health economist. We will discuss how collaboration, open dialogue, knowledge exchange, balance of decision-making power, agreement of goals and incorporation of transparency and accountability mechanism, between people with dementia, family carer and formal care provider, could improve the processes applied and thereby actually realise the potential benefits of CDC.

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Theme: Living with dementia

Enhancing Dementia Knowledge: Community insights related to the role of experience informing understanding

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Improving knowledge and awareness of dementia is a primary focus of dementia strategies that aim to support those with the condition to live well within communities. In order to inform future education needs, in this study participants from different regions of Tasmania came together via focus groups to explore how they had acquired their existing dementia knowledge and their preferred ways of learning more about dementia. A total of 32 participants with a mean age of 62 years attended one of six groups; although male/female balance differed within the six groups, overall the gender split was even.

Thematic analysis of transcribed data revealed personal and/or professional experience as the primary source of existing dementia knowledge. Popular media such as radio, television, Google, and other forms of online learning were also identified as sources. A wide range of dementia-education needs was expressed as important, with particular focus on knowledge that enables effective engagement and communication with families and the person experiencing dementia. Consistent with their initial sources of knowledge, participants preferred future information to be accessible, interactive, practical and relationship-focused, with less emphasis on 'expert'—driven education models. Health providers, in particular the general practitioner, were recognised as important information providers, but participants noted that both access to them and the extent of their dementia knowledge could impact on trust and usefulness. Implications for contemporary dementia education responsive to community need are discussed.

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Theme: Care

Community Gardens and the landscape of dementia inclusivity

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DIGnity Supported Gardening is a wellbeing project that has been running in three Community Gardens in South Eastern Tasmania, Australia since 2016. The project aims to facilitate inclusion of people who for whatever reason do not normally participate in community gardens. Over time the program became appealing and therapeutically beneficial to people living with the impacts of dementia and their carers, despite not specifically targeting either cohort. To explore this further, participants (4), staff and volunteers (5), and DIGnity team members (10) participated in semi structured interviews. Thematic analysis of participant responses situated the gardens as spaces comprising positive risk-taking opportunities, respectful intersubjectivity and active citizenship. Our research findings indicate that building upon existing social and geographical attributes of community spaces is one possible means to enhance a landscape of dementia inclusivity. Recognising and accommodating the multifaceted nature of this landscape can enable authentic engagement with, and rights-based support for, people living with the impacts of dementia.

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Theme: Intervention and Treatment

Deprescribing Potentially Inappropriate Medications in Memory clinic patients (DePIMM) — preliminary results of a feasibility study

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There is a high prevalence of medication related problems and inappropriate medication use in people attending memory clinics. Pharmacists are not typically involved in the multidisciplinary memory clinic team and there has been no deprescribing intervention studies in this setting.

This study will explore the feasibility of a patient-centred, pharmacist-led, multidisciplinary deprescribing intervention in an Australian memory clinic. The study will involve a single group (pre-comparison and post-comparison) design and will investigate feasibility of recruitment, suitability of outcome measures, health professional engagement and acceptability of study procedures.

Participants will receive a comprehensive pharmacist medication review in their own home in addition to standard memory clinic services. The intervention pharmacist will obtain a complete medication history and identify medication related problems. The intervention will particularly focus on identifying medications considered potentially inappropriate for a person with cognitive impairment, including anticholinergics and sedatives. The pharmacist will collaborate with the patient, carer, memory clinic staff, general practitioner and community pharmacist, as appropriate, to determine if medications can be ceased and to help plan withdrawal. Participants will be followed up at three and six months. Surveys, focus groups and one-on-one interviews will be used to assess health professional feedback on the intervention.

Results of this study may be used to design a larger, multi-centre randomised-controlled trial. If feasible and effective, this intervention could be implemented in memory clinics across Australia and has the potential to improve medication use and health related quality of life for thousands of people living with cognitive impairment.

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Theme: Living with dementia

Putting consumers in the driver's seat: an exploration of the dementia journey using the consumer voice

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To inform dementia research it is imperative to know the beginning-to-end journey as told by people who are living with dementia and their carers (consumers). We engaged with 24 people across 3 states of Australia and asked them to voice their opinions on opportunities for improvement to current models of care. This resulted in an aggregated 'ideal state' dementia journey model created and endorsed by consumers.

At first participants were unsure of what they could expect participating in this research. Following explanation and examples of the patient journey modelling approach, there was significant interest in seeing the picture of their dementia journey, illustrating the pain-points.

Using their own voices to drive this visual story-telling approach to gathering data, quickly opened communication lines and built trust between them and the researchers. The researchers understood that story telling was an emotional experience, which required advanced facilitation skills. We included plenty of workshop intermissions to allow participants to steady their emotions.

Comments from participants strongly supported the visual dementia journey approach-"it was the first time our voices were respected and heard". The production of personal experience models, which were given to each participant, was a tangible product that participants could add to their personal records and/or show family and friends.

From an implementation perspective, the 'ideal state' dementia journey, based on consumer-driven recommendations, will have a real impact for both policy makers and future researchers.

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Theme: Living with dementia

Effectiveness of Virtual Reality for relaxation and reminiscence in people within Residential Aged Care: A Mixed Methods Pilot Study

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With increasing use of technology within long term care providers, platforms such as virtual reality (VR) are more likely to be adopted in the hope of improving resident and client mental wellbeing. Recently collections of VR videos have been developed for use within the residential aged care (RAC) setting. A collaborative project was undertaken to measure and describe the effectiveness of VR on engagement and apathy in residents with and without dementia and to explore the feasibility of implementing such technologies. A mixed methods pilot study was conducted with 13 residents of varying cognitive capacity in a RAC facility in Brisbane. Residents participated in one facilitated VR session. Residents' mood and apathy were measured by the Observed Emotion Rating Scale (OERS) and the Person–Environment Apathy Rating Scale (PEARS), respectively. Residents also completed a qualitative interview to provide their feedback. The VR experience significantly reduced apathy in residents ($t(12)=4.421$, $p=0.001$), through observations of increased facial expression, eye contact, physical engagement, verbal tone and expression. VR did not significantly impact measures of the OERS; no significant increase in fear/anxiety was observed. Six of the nine residents with the ability to clearly verbally communicate recounted memories from their childhood associated with the VR experience. At the completion of this study, VR has now been implemented by the Leisure and Lifestyle coordinator in an on-going fashion at the participating site. A larger scale controlled trial of VR in RAC will be conducted at a different location, based on the findings of this study.

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Theme: Care

Use of health and aged care service in their last two years of life by women with dementia

There were 12,432 participants in the Australian Longitudinal Study on Women's Health (ALSWH) who were born in 1921–26. They were a nationally representative sample selected from the Medicare database in 1995 and have been followed up with regular surveys since then. Through collaboration with data custodians and data linkage authorities throughout Australia, record linkage was used to identify all women who had any record of dementia. The data sources were hospital admissions, Medical Benefits Schedule, Pharmaceutical Benefits Scheme, Aged Care services, death certificates and ALSWH surveys (including proxy respondents). We compared the use of services in the last two years of life for women with dementia who died (index cases), with two age-matched groups of women, with or without dementia, who did not die for at least two years after the index case died.

During 1996-2014, 28% of women (n=3,482) had a record of dementia. In the last two years of life, 82% of the index cases used permanent residential aged-care, compared with 56% of women with dementia who did not die, and 6% of women without dementia. Permanent residential aged care use increased steadily over time, and use of other aged care and support services declined, especially near death. Admissions to hospitals and visits to general practitioners increased steeply in the last 3–4 months before death for the index cases but remained steady for women in both control groups.

The greatest impact of dementia in the last two years of life is on permanent aged care.

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Theme: Assessment and Diagnosis

Validation of CapAIBL®: a widely accessible tool for quantification of tau and amyloid PET Scans

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PET imaging allows the detection of the pathology of Alzheimer's disease decades before the onset of clinical symptoms and provides invaluable insight into the development of the disease. Amyloid and tau PET scanning is thus in use as a research tool for most of the dementia research studies. Unfortunately, due to the poor anatomical information provided by a PET scan, visual reading and cortical quantification are difficult tasks that must be performed manually by a trained expert.

To address this, our collaboration between CSIRO and Austin Health yield to the successfully development of an automated biomarker reporting tool designed to display the semi-quantitative PET signal on brain cortical surface maps while providing a comparison with a normal elderly population. Our collaboration with other research groups provided us with a large variety of PET scans (radioactive tracers, cameras, scan reconstructions, ...) to robustly test our software. In our recent validation, CapAIBL® had 90% sensitivity, 92% specificity, 91% accuracy against histopathological scores. A Centiloid threshold band of 21±7 CL was then derived and can be used on 18F-florbetaben scan to reliably distinguish high from low Aß burden. On a different cohort and compared with expert visual reads, a similar optimal Centiloid threshold of 25.5CL was also identified for CapAIBL® (sensitivity:1.00, specificity:0.95, accuracy:0.98, AUC:0.99). We finally showed that the addition of CapAIBL® reports alongside visual Aß image inspection improved scan interpretation as well as inter-reader reliability among non-expert readers.

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Theme: Intervention and Treatment

Targeting sleep spindles to optimise sleep quality and improve memory in mild cognitive impairment

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Background: Accumulating evidence has shown sleep spindles increase during sleep following new learning, and are correlated with improved memory. Sleep spindles significantly decrease with ageing and, in Alzheimer's disease sleep spindle deficits are related to episodic memory impairment. Promising research has identified how selective manipulation of sleep spindles through GABA agonists improves memory in healthy adults and in schizophrenia. No studies have examined this therapeutic approach in mild cognitive impairment (MCI).

Objectives: This proof of concept study will deliver an early pharmacological intervention to enhance sleep spindle EEG features to optimise sleep quality and improve memory in MCI.

Methods: This randomised, double-blind, cross-over design study will recruit 24 older adults (65–75 years) with MCI and 12 age-matched controls. Participants will be administered a short-acting, non-benzodiazepine zolpidem (5mg dose), which acts on GABA neurons in the thalamic reticular nucleus where spindles are generated, and a placebo immediately prior to napping in a randomised order. Participants' sleep will be monitored in a daytime nap using high-density EEG following an MRI to assess markers of brain degeneration. Changes in sleep spindle density will be correlated with memory performance post-nap relative to pre-nap.

Significance: This multi-disciplinary collaborative project has the potential for discovering novel ways of enhancing memory in MCI by manipulating sleep features. Sleep disturbance is a significant and prognostic feature of MCI and is a potentially modifiable risk factor. Research examining the neuroprotective role of sleep is of major importance to Australian health and offers new therapeutic targets for early disease prevention.

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Theme: Intervention and Treatment

Investigating the synergistic role of brain-derived neurotrophic factor (BDNF) and estradiol on parvalbumin-mediated cognitive function: relevance to dementia

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Women are disproportionately represented in the dementia population. As the female sex hormone estrogen is neuroprotective, its decline at menopause may increase the risk of women developing dementia. A mediator of estrogen's beneficial effect is brain-derived neurotrophic factor (BDNF), a neurotrophin significantly reduced in patients. Both BDNF and estrogen affect the growth, development and function of parvalbumin (PV)-expressing interneurons, which is vital in mediating cognitive functioning. PV loss has been found in the brains of dementia patients, particularly in the hippocampus. However, whether estrogen and BDNF operate on PV independently or in synergy in relation to cognition is unclear. To examine this, we used a transgenic mouse model (PV-cre/TrkB-fl) where the BDNF receptor TrkB is knocked out of ~50% of PV neurons via the cre-lox system and submitted mice to a battery of behavioural paradigms in adulthood. Both wild-type and PV-cre/TrkB-fl mice of both sexes exhibited similar baseline locomotor activity and anxiety levels. Cognitively, in the Y-maze, a test of hippocampal-dependent short-term working memory, disruption of BDNF signalling in PV cells caused a memory deficit in male mice but not female mice. The Cheeseboard maze measures spatial/reference memory and male PV-cre/TrkB-fl mice exhibited differences in cognitive flexibility/search strategy compared to wild-type mice. Our novel model shows a subtle cognitive phenotype with a male bias — suggestive of estrogen compensation in female mice. The model invites further examination of PV neuron function in conjunction with risk factors such as ageing, endocrine changes, and stress.

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Theme: Prevention

Healthy Gums and Muscles for a Healthy Brain — Think Dental, Be Active!

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Background: The need for interventions to improve quality of life, manage oral disease and prevent cognitive decline in the ageing population are clear. Physical inactivity and cardiometabolic disease are established risk factors for dementia, and emerging evidence suggests poor oral health may also be linked to cognitive decline. Oral health status is often poor in the ageing population, especially in older adults who live within aged care facilities. In addition, new evidence suggests that the benefits of exercise in. previously sedentary individuals may be attenuated in the presence of periodontitis.

Aim: To assess the effect of a 12-week combined psychoeducation, exercise and oral health program ('Think Dental, Be Active!') on quality of life, wellbeing and markers of inflammation/oxidative stress in older adults.

Methods: This study is a pilot randomised controlled trial. Overall, 120 participants aged >50 years will be recruited across four Royal Freemason Benevolent Institute Aged Care Facility sites. All participants will undergo medical, neuropsychological and physical assessments as well as an assessment of oral health status. Participants will be randomised to A) a group-based exercise and psychoeducation program with immediate dental intervention, or (B) workbook exercise and psychoeducation program with waitlist dental intervention. Follow-up assessments will be completed immediately (Week 13) and 12-weeks post-intervention (Week 27).

Results: Recruitment will commence in June 2018.

Conclusion: This innovative program represents a new collaboration between dentistry, medicine, psychology and health sciences with the view to develop a holistic health promotion program that can be implemented in aged care facilities throughout Australia.

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Theme: Care

Higher consumer quality rating for clustered models of residential aged care

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Background: Quality of residential care is usually assessed from a staff or assessor viewpoint focusing on clinical outcomes or processes of care.

Aim: to evaluate the quality of different models of residential care from a consumer perspective.

Methods: The Consumer Choice Index-6 Dimension (CCI-6D) is a tool for rating the quality of care, developed in collaboration with consumers and informed by interviews, focus groups and a discrete choice experiment involving residents and their family members. Within the INSPIRED cross-sectional study of 541 participants of 17 Australian RACFs, we examined associations between providing care in a clustered domestic or standard Australian model of care; quality of care was measured with the CCI-6D. We also assessed social care related quality of life (QoL) in a subsample of residents using the ASCOT (n=247).

Results: Resident mean age 86 years, 84% with cognitive impairment. In standard care facilities, care related QoL (measured with the ASCOT) was high: 85% felt as safe as they wanted, 74% always felt clean and presentable, 75% got all the food and drink they liked when they wanted. However, only 29% had as much control over daily life as they wanted. After adjustment for potential confounders, overall quality of care was even higher in clustered models than standard care (CCI-6D Mean Δ: 0.138, 95% CI 0.073-0.203 P<0.001, n=541).

Conclusion: Quality of care was high in standard Australian care facilities but consumer-rated quality of care was higher in clustered domestic models of care, indicating it is a consumer-preferred model of care.

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Theme: Care

Mental health in family carers of people with intellectual disability with and without dementia: the need for cooperation across service sectors

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People with intellectual disability (ID) are living longer than previously and may be at increased risk of developing dementia. The impact on carers' mental health of age-related problems such as dementia in a loved one with ID is not well understood. This is important as family carers may face additional challenges relating to both their own health and that of the person with ID for whom they care. The current study explored the carer and care-recipient factors associated with mental health in a group of 72 family carers of people with ID aged 40+. Questionnaire data was collected as part of a larger study, which also included telephone interviews and in-person assessments for a subsample with ID. Dementia status of participants with ID was determined through case consensus using all available data. Multiple linear regression examined predictors of caregiver psychological distress (as measured by the GHQ-28), including demographic factors relating to the person with ID and those relating to carers, carers' subjective experience of burden (Zarit Burden Interview) and social supports (SSQS6). The relationship between the dementia status in the person with ID and carer distress was moderated by carers' satisfaction with their social supports. Other significant predictors of distress included poorer carer physical health, caring for another person, and carers' appraisal of burden. These findings highlight the potential benefits of multifaceted interventions for family carers of people with both an ID and dementia. This would best be achieved with cross sector cooperation between aged care, health, and disability services.

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Theme: Assessment and Diagnosis

Cerebral Blood Flow in Cognitively Normal Subjects is directly correlated with high brain Amyloid

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The presence of cerebral Aß-amyloid (Aß) plaques and change in cerebral blood flow (CBF) are linked to the development of Alzheimer's disease. The aim of this study is to investigate the associations of and Aß burden in AIBL study.

For this study, 3D multi-phase pC-ASL and 11C-PiB-PET data from 44 CN subjects, and 7 AD were collected as part of the AIBL study. Participants were classified as being Aß+ (vs Aß-) when above 1.4 SUVR leading to 30 CN Aß-, 14 CN Aß+, and 7 AD Aß+ subjects. The analysis was conducted using a GLM to investigate the association of CBF with neocortical SUVR, controlling for age, gender, and APOE ε4 carrier status.

While there were no significant differences in cognitive performance between CN Aß- and CN Aß+, in the CN Aß+ group, a positive correlation between CBF and Aß burden was observed in the frontal (ß=3.7±1.6, p = 0.05), parietal (ß=4.3±1.9, p = 0.05), lateral-temporal (ß=5.1±1.7, p = 0.02), and hippocampus (ß=6.4±2.8, p = 0.05), but not in PCP (ß=1.9±2.8, p = 0.51). There was no significant associations in the CN Aß- and AD Aß+ groups. This may suggest a potential compensatory mechanism against AD pathology.

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Theme: Care

Improving the Day Respite Centre Experience for People with Dementia: the Opinions of Centre Managers

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The Australian government, partly to enable people with dementia to stay living in the community longer, subsidises day respite centre (DRC) attendance. An earlier phase of this DCRC funded project found that many Australian DRCs provide good quality services to people with dementia and their carers, but there is room for improvement. To elicit suggestions for improving the experience of attendees with dementia, in this phase, in-depth face-to-face interviews (range= 25-100 minutes, median length= 39 minutes) were conducted with managers at seven DRCs in two states. The dementia-friendliness of each setting was assessed using the Environmental Audit Tool (EAT). Thematic analysis of interview responses revealed three principal themes:

- Importance of relationships between clients, family carers, staff, volunteers and the community—e.g. vital to communicate with client/carer about their needs and experiences. Staff and volunteers need dementia-specific training to improve communication and relationships.
- Constraints for services in offering ideal support to people with dementia—primarily financial, environmental and the inability to cater for all potential clients (e.g. those with high care needs).
- Future concerns—focused on funding (e.g. moving to the user pay system) and inability to provide activities desired by the incoming baby boomer generation.

Although EAT scores were moderately high overall (indicating dementia friendliness), the audit revealed some concerns in specific areas and facilities, e.g. lack of comfortable or age-appropriate furniture, unsuitable décor. Centres that were not purpose-built as day centres struggled most with environmental issues, with managers indicating that solutions would require considerable monetary investment or relocation.

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Theme: Assessment and Diagnosis

Analysis of genetic variation and pathology of CHCHD10 in cases of Australian amyotrophic lateral sclerosis and frontotemporal dementia.

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Amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD) are believed to belong to a common disease spectrum. Our research seeks to better understand the shared clinical, pathological and genetic features characterising ALS and FTD to shed light on their pathogenesis. Approximately 20% of ALS patients exhibit co-morbid FTD, and up to 50% of patients will develop some degree of cognitive impairment. To date, the only proven causes of ALS and FTD are gene mutations. Recently, variants in CHCHD10 have been identified as a cause of, or associated with, pure ALS, FTD and ALS-FTD in families and sporadic patients of European ancestry. We sought to uncover the prevalence of CHCHD10 mutations among 81 Australian familial ALS (FALS) patients negative for known ALS gene mutations, 628 sporadic ALS (SALS) and 108 FTD patients. We also examined whether any common polymorphisms showed association with disease. No pathogenic or associated variants have been identified among FALS or FTD patients. Two known CHCHD10 variants (p.P34S and p.P80L) were identified in six and two SALS patients respectively. Additionally, the p.P80L variants was found to be significantly more common in the SALS cohort compared to controls. Preliminary immunopathological analysis of CHCHD10 in ALS patient spinal cord tissue has identified a potential decrease in CHCHD10 levels compared to control, while analysis of FTD patient tissue is underway. Our preliminary findings suggest that CHCHD10 mutations are not a common cause of ALS or FTD in Australian patients of predominately European ancestry. However, pathological changes in CHCHD10 suggest a role in these neurodegenerative diseases.

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Theme: Assessment and Diagnosis

Prevalence of cortical ageing-related tau astrogliopathy (ARTAG) in a European community-based ageing cohort

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Ageing-related tau astrogliopathy (ARTAG) describes a spectrum of glial tau-immunopositive pathologies commonly found in the ageing human brain and in a variety of neurodegenerative disorders. Based on the morphology and distribution of astrocytic inclusions ARTAG can be differentiated from other tauopathies, including frontotemporal lobar degeneration with tau-immunopositive inclusions (FTLD-tau) and chronic traumatic encephalopathy, but may also co-exist and have overlapping cortical distributions. Characterised by granular fuzzy and/or thorn-shaped astrocytes, a number of ARTAG types are recognised: grey and white matter-type, subpial, perivascular and sub-ependymal. A recent study proposes that these astrocytic inclusions might represent the earliest stages of astrocytic tau accumulation in FTLD-tau. While ARTAG has been described in cognitively normal individuals, little is known about its prevalence in the general community. This study investigated the prevalence, distribution and type of cortical ARTAG in a large European community-dwelling population collected from the Vienna Longitudinal Ageing Study (n=310; 76-91 years; 181 female). Sections from the frontal, parietal and temporal cortices were immunostained with phosphorylated-tau and screened for ARTAG. Cortical ARTAG was present in 38% of cases and is associated with age at death, Braak neurofibrillary tangle and CERAD stage ($p<0.01$). ARTAG was not influenced by gender. Although a similar prevalence of ARTAG was found in all three regions, unique regional patterns of ARTAG were identified with grey matter-type the most common. Importantly, grey matter ARTAG exclusively in the sulcal depths was rare. This study illustrates that ARTAG is common in the general population, providing important insights into brain ageing and FTLD-tau.

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Theme: Intervention and Treatment

Mirror Neuron and Motor Activity in Dementia

The mirror neuron (MN) system functions as a coupling link of perception representations and action in cognitive process of motor activity known as "Embodied Cognition". Lower level motor (physical) activity results in decline of cognitive processes is considered to be well recognized risk factor of Dementia. The stimulation of MN to activate motor functions at early stage of Dementia can be possible considering these factors: (i) Movements learned from activity of mirror neurons based on understanding intention or goal of the action (coupling of action-perception representations) instead of recall of movement patterns. (ii) The visual inputs can activate mirror neuron clusters where the imitation is observed from others action. (iii) Absence of fronto-parietal network of classical MN system can be compensated by activation of cerebellar neurons. (iv) Hand movements stimulate areas of frontal lobe to engage sensorimotor and cognitive processes.

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Theme: Intervention and Treatment

Cyclic stretch of human brain microvascular endothelial cells and regulation of amyloid processing and expression: evidence for contribution of vascular pulsatility in Alzheimer's disease

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Amyloid-ß (Aß) plaques arising from amyloid precursor protein (APP) processed by ß secretase-1 (BACE-1), characterises Alzheimer's disease (AD). Vascular contributors towards AD include hypertension, elevated pulse pressure and arterial stiffness, all of which introduce vascular pulsatility imposing mechanical stretch on endothelium. This study aimed to investigate cyclic stretch on human cerebral microvascular endothelial cells (HCMECs) in expression and processing of APP, and to investigate effect of high salt diet on APP processing in rat brains, given associations of high salt diet and cognitive impairment. HCMECs were subjected to 0%, 5%, 10% or 15% stretch (18 hours, 1 Hz) and protein and RNA expression, and Aß levels were analysed. Rats were treated with a high (8% NaCl, HS) or a low (0.26% NaCl, control) for 10–13 weeks and brain tissue was examined. APP expression and Aß secretion were altered in response to HCMECs stretch, and this was differentially mediated in early and late passage HCMECs. In late passage HCMECs, APP and BACE-1 expression increased 2-3-fold with 10-15% stretch compared to 0%, with proportional increases in Aß42/Aß40 with % stretch (R2=0.21). In early passage HCMECs stretched at 15%, APP expression, BACE-1, Aβ42 levels were decreased 2-3-fold compared to late passage HCMECs. Evidence of altered APP processing in HS rats compared to controls parallel with increases in markers of arterial stiffness was obtained. Results suggested a role of arterial stiffness and vascular pulsatility strengthening evidence of vascular contributions to AD. Future studies identifying associated molecular mechanisms will provide novel therapeutic targets for AD.

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Theme: Prevention

The impact of physical activity and sitting time on dementia-free life expectancy

Introduction: Low physical activity (PA) is an established risk factor for dementia with emerging evidence suggesting that high sitting time (ST) may also be a risk factor. This study estimates their impact on dementia-free life expectancy.

Method: Six waves of data were collected over 15 years from 6,289 participants in the 1921-26 cohort of the Australian Longitudinal Study on Women's Health. Dementia status was from self-report and linked data (PBS, aged care, and NDI). Self-report data were collected on PA (low=0-599, high=600+ MET minutes/week) and ST (low=0-7.99, high=8+ hours/day). Mortality was determined by linkage to the National Death Index. Total life expectancy and dementia-free life years at age 80 were estimated using continuous-time multi-state survival models.

Results: Life expectancy was higher in high PA women (8.6 [95% CI: 7.9, 9.7] and 10.6 [9.8, 12.2] years for high and low ST respectively) than low PA women (7.7 [7.2, 8.5] years and 9.6 [9.0, 10.8] years for high and low ST respectively). The proportion of remaining years that were dementia-free was similar across categories of PA, e.g. 80.4% for low PA/high ST and 79.1% for high PA/low ST but varied by ST category, e.g. 74.0% for high PA/high ST and 79.1% for high PA/low sit.

Conclusion: ST had a greater impact on total life expectancy and years lived without dementia than PA. Health promotion messages on sitting time, in conjunction with those for physical activity may promote longer and healthier lives for older women.

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Theme: Living with dementia

Reflecting on Collaborations in Developing "Music Use for People with Dementia: A Guide for Carers, Health Workers and Family"

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Documentaries and reports in the media have stimulated much interest in the use of music with people with dementia. However, contrary to popular perceptions, music is not the universally positive 'cure-all' that many believe it to be. People with dementia are particularly vulnerable to negative effects from listening to music, such as increased agitation or depression, particularly if they have a history of mood regulation disorders. In a series of experiments we were able to identify how particular features of music such as the tempo and mode (key) influence affective states of people with dementia. In collaboration with aged care workers, home based carers, and other stakeholders, we have developed a set of guidelines based on our findings to help carers of people with dementia select music in more strategic ways. With the input of our collaborators these guidelines are currently being refined and tested in real-life settings.

Our consumer collaborators have at times provided valuable insights that could not have been obtained elsewhere. They have also provided crucial information to us as researchers about how to adapt study designs to the needs of participants when working with vulnerable populations such as people with dementia, illustrating the importance of taking a flexible approach. The input of people who care for people with dementia everyday into the development of these guidelines will also assist in maximising the usability and practical value to carers of the final product to be developed.

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Theme: Assessment and Diagnosis

Translating cognitive outcomes from mouse preclinical testing to human clinical trials in the search for Huntington's disease treatments

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Background: Preclinical testing of candidate treatments in mouse models of Huntington's disease (HD) provides the basis to inform clinical trials in humans. Yet, positive results from HD mouse models rarely translate to successes in humans. A key limitation for translation is the misalignment between measures used to demonstrate treatment efficacy in mice and cognitive outcomes used in humans. In mouse preclinical studies, cognitive outcome measures are based on visual or spatial cognition. In contrast, cognitive outcome measures in HD clinical trials are selected for their sensitivity in detecting impairments rather than maintaining fidelity to methods used in preclinical testing.

Aim: Using the domain of spatial memory, we aim to close the gap in HD clinical trial cognitive assessment methodology. Spatial memory can be readily tested in preclinical HD models and in humans, and current clinical trials are focusing at regenerating neurons in brain areas critical for spatial memory and HD.

Method: We studied premanifest HD (N=24), early HD (N=14), and matched controls (N=33) with several spatial memory measures, and across navigation, object-location, map drawing, and complex constructional praxis.

Results: HD participants performed significantly worse relative to controls on all spatial memory variables. Premanifest HD performed better than early HD, but overall showed impaired function. Object-location was the spatial memory component most notably impaired in premanifest HD (p=0.009).

Significance: Delineation of spatial memory impairments in people with HD has important implications for testing treatments for HD as it provides a cognitive basis that is translatable from preclinical testing to human trials.

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Theme: Prevention

Dementia prevention: views, attitudes and beliefs of general practitioners and practice nurses

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To promote dementia prevention in primary practice, researchers need to collaborate with primary care practitioners (PCPs). First, however, researchers need to understand PCPs' views about using inconclusive evidence to cooperate with patients to reduce dementia risk factors. For this narrative synthesis, we searched MEDLINE, PsycINFO, CINAHL and Embase for English-language articles published between 1995 and December 2017, focusing on search terms based on the concepts of "dementia" and "prevention", and on outcomes such as "views", "attitudes", and "beliefs". The search strategy identified six survey studies and one qualitative study. Thematic synthesis of the limited data suggested a justifiably cautious approach to dementia prevention in primary care. Many PCPs (i) do not view dementia as preventable; (ii) hold beliefs about dementia risk factors that are not evidence-based; (iii) advise patients to increase activity rather than take medication; (iv) are reluctant to initiate a discussion about dementia risk reduction, and (v) want better evidence for dementia prevention. There were few aspects of dementia prevention in which the views, attitudes and beliefs of PCPs clearly converged. A local qualitative study is planned to contextualise these findings. Future attempts to collaborate with PCPs in dementia prevention efforts will need to consider the variety of views, attitudes and beliefs of the PCPs concerned.

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Theme: Assessment and Diagnosis

Fragility and volatility of structural hubs in the elderly connectome

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Connections between cortical regions in the human brain are not homogeneous and a minority of hub regions has much more connections than others. These hub regions incur a high biological cost owing to larger wiring costs and higher metabolic demands. Despite this overall higher cost, the topological centrality of hubs is considered essential for integration of segregated activity taking place at different and specialized modules. In addition, lesions in patients with Alzheimer's disease are more frequently found in brain hubs. Here we quantify the fragility of hubs to progressive perturbations of the connections in the healthy elderly connectome and compare it with the fragility of hubs obtained from a connectome of healthy young adults. These perturbations yield a transition from the empirical connectomes to a randomized brain via a volatile regime of large network susceptibility, and reduces the density and wiring cost of inter-hub connections. We also identify hubs that are more fragile in the elderly than in the young-adult connectome. These differences in hub fragility are consistent with the age-dependent vulnerability of hubs across brain disorders.

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Theme: Assessment and Diagnosis

A longitudinal assessment of retinal function and structure in APP/PS1 mice

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Current evidence suggests that "signs" of pre-symptomatic Alzheimer's disease (AD) may be detected in the eye. While previous studies have shown AD-related histopathological changes in the retina, however, retinal structural and functional changes associated with progressive AD has not been studied. Here, we report our preliminary findings on these changes in APP/PS1 and wild type control mice (30WT, 35Tg) aged 3 to 6 months. The amplitude of scotopic threshold response (STR), a-and b- wave of the Electroretinogram (ERG) were measured following overnight dark adaptation. Total retina (RT) and the ganglion cell /inner plexiform layer (GCL/IPL) thickness was measured using optical coherence tomography (OCT). Overall, there was a decrease in all parameters measured, however, only the ERG a-wave of the APP mice showed a significant decrease ($p<0.01$). This suggests a possible dysfunction in the cones and rods of the outer photoreceptor layer. The non-significant findings in other measurements may not be reflected to date in this age range, however, further evaluation at 9–12 months coupled with histopathology results will provide further insight into potential retinal degeneration associated with AD.

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Theme: Intervention and Treatment

The Alzheimer's disease associated Presenilins regulate lipid peroxidation

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Lipid peroxidation contributes to synaptic dysfunction and neuronal degeneration, both upstream and downstream of Aß pathology. A key enzyme that protects cells from lipid peroxidation is Glutathione Peroxidase 4 (GPX4), which requires selenium to function. Mutations in the presenilin genes (PSEN1 and PSEN2) account for the majority of familial Alzheimer's disease cases. In cultured cells that have inhibited γ-secretase function by pharmacological inhibition, or genetic ablation of the PSEN1/2 genes, we found lower levels of selenium and GPX4 and a concomitant elevation of lipid peroxidation. Moreover, cells with inhibited PSEN/ γ-secretase function are acutely susceptible to ferroptosis, an iron-regulated form of cell death that is triggered by lipid peroxidation and can be induced in cell culture and in vivo using small molecule inhibitors such as RSL3 which directly inhibits GPX4. One of the substrates of PSEN/γ-secretase is the membrane receptor APOER2, which can import selenium into cells. We propose a novel pathway that contributes to Alzheimer's disease pathogenesis whereby altered γ-secretase function reduces selenium import into neurons and compromises the selenoenzyme GPX4, promoting ferroptotic cell death. Our group has just begun the 'Deferiprone to Delay Dementia — The 3D Study', a human trial of the iron chelator deferiprone (which also inhibits ferroptosis) to test whether it can slow Alzheimer's disease progression. We have initiated collaborative studies with several Dementia Research Fellows to investigate the proposed pathway in other models and are working closely with key collaborators in China on this project.

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Theme: Care

Reducing staff toileting workload in aged care homes using assistive technology

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Ability to self-toilet declines during the course of dementia. Toileting is the most common task undertaken by staff in residential care settings, comprising 21% of daily care activities. Assisting a dependent person with dementia (PWD) with toileting is frequently physically and emotionally stressful and has been associated with low occupational status for care staff. Post-voiding cleaning can be a source of embarrassment and indignity for the PWD and for some, cleaning assistance may be interpreted as invasive and reacted to with distress, agitation or aggression. The electronic toilet-top bidet is a novel assistive technology that provides an automated wash of the perineum and perianal areas that may be an improvement in the toileting experience for PWD and staff.

As part of a 12-week, mixed-methods, clinical utility study of the bidet in 2 Australian aged care homes, we compared workload associated with bidet assisted and usual, manual toileting care of 32 residential aged care staff using the NASA Task Load Index (TLX). The TLX conceptualises workload as a multi-dimensional and captures subjective ratings of 6 elements of workload on a 21-interval bi-polar scale. Related samples Wilcoxon signed-rank tests indicated a significant reduction in overall workload when using the electronic bidet (Z=148.50, p=.03), as well as significant reductions in effort, mental, physical and time demands. Staff focus groups indicated the bidet was a useful technology capable of being incorporated in to daily routines. However, care must be taken to prescribe bidet compatible equipment for transferring of non-ambulant residents.

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Theme: Care

Care Staff in Australian Residential Aged Care Facilities and Associations with Resident Outcomes

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Objectives: Home-like models of residential care offer different services including more personal care attendants (PCAs) to implement culture change compared to standard models. This study examines associations between staffing structures and quality of life and hospitalisations for the residents.

Methods: The Investigating Services Provided in the Residential Environment for Dementia (INSPIRED) study investigated questions prioritised in a collaborative between researchers, aged care providers and consumers. These were to examine models of care and quality of life in older Australians. Residents (n=541) from 17 non-for profit residential facilities in Australia participated.

Results: Within these high-quality facilities, direct care hours per-resident-per-day were significantly higher in home-like models compared to standard models (0.08 higher (5 minutes), p=0.006). Home-like models had a significantly higher staffing ratio for PCAs to nursing staff (registered nurses and enrolled nurses) compared to standard models (mean (SD) 91.6 (3.6) vs. 66.3 (8.4) p<0.001) and significantly higher staff training costs per resident (mean (SD) $1492.45 vs. $988.99 p<0.001). Direct care hours or a higher ratio of PCAs to nurses were not significantly associated with quality of life (measured with the DEMQOL and EQ-5D-5L) or hospitalisations. However, a higher PCA ratio was associated with fewer emergency visits (with admission: IRR 0.60 95%CI 0.43-0.84, p=0.003 and without admission: IRR 0.40 95%CI 0.25-0.67, p<0.001), after adjustment for potential confounding factors.

Conclusions: Higher direct care hours, similar quality of life and positive hospitalisation outcomes for residents can be achieved with higher PCA:nurse ratios coupled with high staff training, but further research is needed.

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Theme: Prevention

Maintain Your Brain (MYB): An internet based intervention to prevent cognitive decline.

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MYB Collaborative Team

Maintain Your Brain (MYB) is the largest fully online randomised controlled trial aimed at positively changing lifestyle choices reported to be related to dementia and cognitive decline. By changing these behaviours, MYB aims to reduce risk for future cognitive decline, Alzheimer's disease and other dementias. MYB will invite up to 15,000 individuals aged 55–77 years to participate. Participants will be invited from the 45 and Up Study whose baseline sample (collected between January 2006 and December 2009) comprised 1-in-10 persons aged 45 and over residing in New South Wales. Participants will receive activities or information tailored to their individual risk factors through online modules. Modules are designed to reduce risk factors in the areas of physical activity, nutrition, mental activity/brain training and depression. The MYB Pilot study aimed to test the usability of the MYB system and other study procedures. Invitations were sent to 2,000 people to participate in the 3-month Pilot. Enrolled (n = 144) participants were randomised to one of five groups (control and the four modules). Of the 144, 55 were aged 55–64 and 89 were 65-75 and 56% were female. All participants were eligible for at least one intervention module and over 90% of the sample reported characteristics related to at least two risk factors. Participants were prepared to engage with an online health intervention broadly aimed at these risk factors. However, the Pilot identified scope for improving delivery of the screening phase and common areas for participant queries when engaging with the online system.

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Theme: Intervention and Treatment

Generation of zebrafish models based on an ALS-FTD linked mutation in CCNF

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Frontotemporal dementia (FTD) is clinically, pathologically and genetically linked to amyotrophic lateral sclerosis (ALS), a disease characterised by the progressive loss of motor function. Gene mutations remain the only proven cause of both diseases and multiple mutations common to both FTD and ALS have been identified. Our laboratory recently identified novel ALS-FTD linked mutations in CCNF. Cyclin F, encoded by CCNF, is involved in regulating protein degradation through the ubiquitin proteasome system. Evidence suggests that disruption to protein homeostasis is a key feature of the biology of FTD and ALS. The identification of disease-linked mutations in CCNF provides an opportunity to develop novel disease models with which to investigate dysfunction in this pathway.

Multiple assays have been established which enable assessment of motor function and cognitive function in zebrafish. Consequently, zebrafish have emerged as useful models with which to study both ALS and dementia. We have established two CCNF-based zebrafish overexpression models — a transient model, to provide a tool for rapid analysis and preliminary testing of potential therapeutics, and an inducible transgenic model to allow longitudinal studies in an adult animal. Transient overexpression of mutant CCNF was shown to induce cell death, lead to a motor neuron axonopathy and impair motor function. Persistent expression of mutant CCNF in adult zebrafish induced progressive loss of motor function and a reduced number of spinal motor neurons. This data suggests that the CCNF-based zebrafish models will provide useful tools for investigating the pathogenesis of CCNF-linked neurodegeneration.

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Theme: Prevention

The effect of Melatonin supplementation in mild cognitive impairment on brain oxidative stress and sleep — A Randomised-Placebo Controlled Pilot Study Protocol

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Background: Melatonin has multiple known therapeutic benefits. It has anti-oxidant properties, synchronises the circadian system and also promotes sleep. These are all pathways that could be targeted to slow cognitive decline associated with ageing. Previous randomised controlled studies have targeted patients with established dementia/Alzheimer's disease in whom changes to brain structure and function may be too advanced to elicit a significant benefit. We therefore propose using Melatonin in participants with Mild Cognitive Impairment (MCI) to target modifiable risk factors in this population at risk for further cognitive decline. This study aims to determine the feasibility of a randomised controlled trial of 6 months of daily Melatonin supplementation (25mg) in older adults with MCI.

Methods: Forty older adults (aged 60–80 years) with multi-domain MCI (either amnestic or non-amnestic) will be recruited into this randomised placebo controlled, double-blind trial. Participants will be randomly allocated to Melatonin (25mg) or placebo for six months. The primary outcome is brain oxidative stress (using Magnetic Resonance Spectroscopy) as assessed by Glutathione concentration. Secondary outcomes include sleep (wrist actigraphy and questionnaires), mood and melatonin levels.

Significance: As no cure for dementia currently exists, it is clear from a clinical and financial perspective, that early intervention strategies to slow cognitive decline are urgently required. The ability to delay the onset of dementia by 5 years is estimated to reduce the overall prevalence by nearly 50%. Therefore novel interventions administered early provide the greatest chance to delay and ultimately prevent the progression of cognitive decline that leads to dementia.

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Theme: Assessment and Diagnosis

Gait variability, cognition and dementia risk factors: A longitudinal population-based study

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Background: Intra-individual gait variability is an emerging predictor of dementia. However, it is unknown whether gait variability predicts decline in all cognitive domains. Therefore, the aim of this study was to determine whether baseline gait variability was associated with decline in 4 different cognitive domains. Methods: Participants (n=410; mean age 72.0±7.0) were randomly selected from the Southern Tasmanian electoral roll. Measurements were taken at baseline, 2.6 and 4.6 years. Gait variables (step time, step length, base of support and double support time (DST)) were measured using an electronic GAITRite walkway. Gait variability was the standard deviation of all steps for each gait measure. Memory, processing speed, executive and visuospatial function were measured using a battery of neuropsychological tests. Covariates included age, sex and education. Multivariable mixed models were used to examine associations between baseline gait variability and cognitive domains over time. Results: Over an average of 4.6 years there was a significant decline in all cognitive domains ($p<0.001$). Higher variability in step length and DST were associated with greater decline in executive function (p for interaction=0.04) and memory ($p=0.02$). None of the gait variability measures were associated with processing speed ($p>0.05$) or visuospatial function ($p>0.05$). Conclusion: Step length variability and DST variability appear to be markers of decline in executive function and memory, and may assist in the early detection of future dementia.

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Theme: Living with dementia

Towards building a citizen science community: An Australia-wide dementia research participation and public engagement platform

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There is no systematic way for people with dementia to get involved in research, and limited support is available to facilitate a broader public engagement in dementia research. Recruiting participants in dementia research is costly and time consuming. Delays in finding the right people for studies can result in studies taking longer to deliver, often requiring funding extensions and ultimately limit the effectiveness of research and evaluation when study samples are insufficient for robust analysis and generalisation of findings.

The UK's public engagement platform, Join Dementia Research, aims to address such challenges associated with public engagement in dementia research. Since 2015 JDR has attracted over 34,000 volunteers, facilitating 9,377 instances of volunteer study recruitment, into 201 studies across more than 100 locations. Leveraging the experience and knowledge of JDR, in partnership with University College London and University of Exeter, we are creating and implementing a new national service to tackle the challenges in Australia.

This presentation will report on the most up-to-date progress made through JDR in improving public engagement in dementia research in the UK and the early implementation processes involved in the Australian platform service. Discussion will focus on bringing about sustainable and systemic change, not only to improve research recruitment efficiency but also to improve society's attitudes towards dementia and empower those who are directly and indirectly affected by it. We argue that this innovative service has the potential to inform and guide dementia services and research policy development, and lead to an inclusive and integrated system.

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Theme: Prevention

Patterns of cognitive and white matter microstructure decline in healthy older adults presenting with vascular risk factors

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Mild cognitive impairment and vascular dementia are associated with reduced processing speed and executive functions, a pattern of cognitive decline that is also characteristic of 'healthy ageing', albeit in a milder form. Typically, 'healthy ageing' refers to older adults with no neurological incident but who may present with medically-controlled conditions (e.g., hypertension, high cholesterol) known to impact vascular health. These vascular risk factors are associated with decline in cerebral health, including deterioration in white matter macrostructure (e.g., white matter hyperintensities, WMH) and microstructure (e.g., radial diffusivity, RaD, derived from diffusion-weighted magnetic resonance imaging, dw-MRI). Cerebral changes are most prominent over frontal regions and are associated with cognitive decline, especially in executive functions. In this collaborative study across cognitive neuroscience and neurology researchers, we showed that in healthy community-dwelling older adults, the relationship between RaD and both global measures of cognition (Jolly et al., Psychophysiology 2016) and targeted measures of executive functions (Jolly et al., Human Brain Mapping 2017) was only present amongst participants who reported one or more vascular risk factors. Moreover, the relationship between age and cognition was mediated by RaD, indicating that white matter health is a better predictor of cognitive decline than age. New data are presented from a subset of participants were retested at 24 months and showed a decline in executive functioning that was associated with changes in whole brain RaD. We examine whether the relationship between executive function performance and RaD decline was specific to frontoparietal and fronto-subcortical pathways associated with cognitive control processes.

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Theme: Assessment and Diagnosis

Using blood lipid biomolecules to differentiate frontotemporal dementia from Alzheimer's disease

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Behavioural variant frontotemporal dementia (bvFTD) is the most prevalent form of FTD syndromes. bvFTD is characterized pathologically by focal brain atrophy and concomitant loss of lipids, and clinically by eating abnormalities resulting in dyslipidemia. bvFTD patients are commonly misdiagnosed as Alzheimer's disease (AD) because of overlap in clinical presentations. bvFTD patients, AD patients and controls consented to a variety of clinical research studies, including biomarker development, through the Frontier research clinic at NeuRA and the University of Sydney. Here, we assessed fasting plasma lipids and apolipoproteins from the patients (n=16,14,22) using mass spectrometry-based lipidomics and FPLC. The aims of the study were to understand dyslipidemia in bvFTD and to identify lipid biomolecules that can objectively differentiate bvFTD from AD and controls. We identified a number of lipid species that was significantly altered in bvFTD compared to AD and controls. Triglyceride levels increased significantly in bvFTD, whereas phosphatidylserine, phosphatidylglycerol, monogalactosyldiacylglycerol and sitosteryl ester levels decreased significantly in bvFTD. The abundance of lipids with unsaturated fatty acids also increased in bvFTD; the greater the unsaturation the greater the susceptibility to oxidative damage, i.e. neurodegeneration. Furthermore, apoA-I and apoA-II levels decreased significantly in bvFTD, whereas apoB levels remained unchanged. These data indicate significant changes in the circulating lipids and apolipoproteins in bvFTD and provide evidence for hypertriglyceridemia and hypoalphalipoproteinemia. This study represents the first lipidomics and apolipoprotein analyses of bvFTD and has provided new insights into an unrecognized perturbed lipid pathology in bvFTD, providing evidence in support of considerable lipid dysregulation in bvFTD.

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Theme: Assessment and Diagnosis

Computer-Administered Neuropsychological Tests in Seniors (CogSCAN): Study protocol for a cross-comparison and validation of four computerised neuropsychological test batteries in Mild Cognitive Impairment and dementia

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Dementia is a major health problem with 200 Australians diagnosed every day and at least as many having mild cognitive impairment (MCI). Early identification of cognitive impairment is critical for interventions and objective cognitive data are essential for this. Hence, there is an urgent need to develop a method of neuropsychological testing that is efficient and accessible while maintaining appropriate standards of reliability and validity, to meet current and future demands and to facilitate timely and accurate diagnosis. Computer-administered tests offer excellent opportunities for large scale implementation of cognitive screening and monitoring. However, the current evidence base for use of computerised neuropsychological tests in older adults and patients with cognitive disorders is low. CogSCAN is the first systematic, independent evaluation of the psychometric properties, acceptability and performance of four prominent computerised neuropsychological assessment instruments currently in the field within this older adult population.

The cohort will consist of 408 community-living participants (cognitively normal, MCI) and 162 clinically-referred patients with MCI and mild dementia, aged 60 and older. Four computer test batteries (CTB) will be evaluated: Cogstate, CANTAB, Cambridge Brain Sciences and NIH Toolbox. CTB's are administered via iPad under supervision in small groups. Participants are assigned to a 1-month test-retest reliability study arm (2 CTBs) or to a construct validity arm in which they receive 2 CTBs and a standardised pen and paper neuropsychological assessment one week apart and at one year to examine test responsiveness. The influence of demographics, computer familiarity and attitudes on test performance will be examined.

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Theme: Care

Pilot clinical quality registry for dementia in Australia: What are key measures of quality of care?

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A clinical quality registry (CQR) can help to systematically monitor the quality of dementia diagnosis and care, and identify variation in clinical outcomes. The Australian Commission on Safety and Quality in Health Care identified dementia as a CQR priority area in 2016 and similar initiatives have been implemented internationally.

In 2017 Monash University received funding from the Commonwealth Boosting Dementia Research program to develop methodology for a dementia CQR. This project aims to establish a pilot dementia CQR via three programs of work. Phase 1 includes development of Clinical Quality Indicators (CQIs) and a Minimum Dataset via a Delphi process, and testing the feasibility of these using data from a large Australian cohort study, ASPirin in Reducing Events in the Elderly (ASPREE) Study. Phase 2 comprises recruitment of ASPREE participants with a clinical diagnosis of dementia or mild cognitive impairment (MCI) into a pilot CQR. Phase 3 will test the feasibility of recruiting newly diagnosed individuals in the community.

This presentation reports preliminary data from Phase 1 regarding a modified Delphi process to develop CQIs based on a review of Australian and international clinical dementia care guidelines and advice from an Expert Panel. We will also present the methodology that identified a suitable CQR study cohort from existing ASPREE participants.

Throughout the three phases the project engages key stakeholders, including clinicians, people living with dementia and their carers. We expect that outcomes from this pilot registry will inform and assist in the development of the Australian National Dementia Registry.

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Mutations in genes causal of white matter disease and dysregulation of lipid metabolism in frontotemporal dementias

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Frontotemporal dementia (FTD), a common cause of presenile dementia, is characterised by behavioural and/or language changes and progressive cognitive deficits. Brain white matter (WM) facilitates the co-ordination, integration and information transfer between various grey matter regions. Brain WM is composed predominantly of oligodendrocytes, which produce the sphingolipid-enriched myelin. 208 FTD patients recruited through the FRONTIER research clinic (HREC 10/192 and 10361) underwent whole-exome or whole-genome sequencing. 35 patients were identified with deleterious mutations in 20 WM disease genes including LAMA2, ARSA, PEX1, and PEX5. The two most commonly mutated genes were LAMA2, which is required for the maturation of oligodendrocytes, and the PEX gene family which encodes proteins in the peroxisomes that regulate metabolism of lipids. 9 mutation carriers with imaging data (T2 or FLAIR sequences) have abnormal WM hyperintensities or volume loss beyond the normal age-related limits, suggestive of pathological changes. Blood-based sphingolipids were assayed by mass-spectrometry [Kim WS et al. Frontiers in Neurology 2018; 9:104] in 40 sporadic FTD cases, 8 mutation carriers (5 LAMA2 mutation carriers, 3 PEX mutation carriers) and 22 neurological controls. There were significant differences in total sphingomyelin levels between controls vs sporadic cases ($p=0.004$), and between controls vs PEX mutation carriers ($p=0.023$). Total sulfatide lipid levels were highly discriminatory between groups (controls vs PEX mutation carriers ($p=0.008$), sporadic FTD vs LAMA2 mutation carriers ($p=0.005$) and LAMA2 vs PEX mutation carriers ($p=0.001$)). These data suggest that mutations in genes causal of WM disease contribute to FTD via direct or indirect dysregulation of lipid metabolism.

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Tau pathology is associated with reduced neuronal expression of the senescence marker P16INK4a

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The P16INK4a protein is involved in the maintenance of gene stability, inhibition of the cell cycle and the senescence of terminally differentiated cells such as neurons. Dysfunction of the cell cycle including cell cycle activation in post-mitotic neurons and inappropriate neuronal cell cycle control are critical events in Alzheimer's disease (AD) pathogenesis. The tau protein plays a part in microtubule stability, however when hyperphosphorylated, tau can assemble into neurofibrillary tangles (NFTs) which accumulate in AD and can lead to cell death. This research looked at the relationship between P16INK4a and tau deposition in the progression of AD. Following ethics approval, formalin-fixed, paraffin-embedded tissue sections of the anterior cingulate cortex from 36 donated brains with varying Braak staging were obtained from the NSW Brain Banks. Quantitative P16INK4a and tau immunofluorescence was performed and comparisons made between the levels of P16INK4a expressed in tau positive and tau negative neurons. The expression of P16INK4a in tau negative neurons was not significantly different between Braak groups (ANOVA p=0.157). However the expression of P16INK4a in tangle-bearing neurons varied significantly between groups (ANOVA p=<.000), with this proportion decreasing with advancing Braak stage (ANOVA p=<0.009). This suggests that a disturbance of neuronal senescence occurs early in AD, and is associated with tau accumulation and NFT formation. Our study supports the hypothesis that the P16INK4a protein may play an active inhibitory role in AD neurodegeneration.

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Dementia and exceptional longevity: A study of cognitive and functional impairment in centenarians and near-centenarians from 17 population-based studies.

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Centenarians are the fastest growing segment of the population, and successful ageing observed in this cohort is therefore of much interest. ICC-Dementia was established in 2012, with the intention of pooling data from centenarian studies conducted around the world to examine the cognitive profile of exceptionally long-lived individuals and to explore the determinants of healthy brain function at this age. So far, data have been collected from 17 population-based studies from 11 countries. This paper presents recent findings from the consortium on cognitive profile, prevalence of dementia and its risk factors in people aged 95 years and above. We performed a data harmonisation procedure on the diverse datasets and applied uniform diagnostic criteria of dementia, and cognitive and functional impairment, followed by an individual participant data (IPD) meta-analysis to explore differences in cognitive profiles and dementia prevalence across ethno-regional groups. Results from 4121 participants showed that prevalence increased with age (from 95-99 to >=105 years) for dementia (from 35.96% to 75.61%), cognitive impairment (from 45.24% to 78.22%), and functional impairment (from 67.64% to 95.55%). Probability of having dementia, cognitive and functional impairment also increased significantly with institutionalization and lower education level. Other results from the meta-analysis and the cognitive profile analysis will focus on the heterogeneity of the studies. Our findings from the largest consortium of centenarians and near-centenarians yet assembled provide important insights into exceptional longevity and brain health, and have implications for policy planning and health services.

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Risk and protective factors for cognitive performance and decline in diverse ethno-regional groups: the COSMIC collaboration

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for Cohort Studies of Memory in an International Consortium (COSMIC)

Background: With no effective treatments, the growing global burdens of cognitive decline and dementia make identifying risk and preventative factors a research priority. We aimed to do this more comprehensively, and on a truly international scale, using data on demographic, medical, lifestyle, and physical and mental health factors shared by cohort studies representing diverse ethno-regional groups from around the world.

Methods: We harmonized longitudinal data from 20 cohorts across 15 countries, for 48,522 individuals aged 54–105 years (58.4% female) at baseline. Each study had 2–16 assessment waves (median=3) and a follow-up duration of 2–15 years. Primary outcome measures were standardized global cognition (determined across four cognitive domains) and Mini-Mental State Examination scores. Linear mixed models were followed by meta-analyses that pooled effects across cohorts.

Results: Factors associated with worse cognition included age, anxiety, depression, stroke history, poor health, diabetes, hypertension, and peripheral vascular disease, and those associated with better cognition included education, vigorous physical activity, and mild-to-moderate alcohol consumption. Factors associated with faster cognitive decline included age, stroke history, poor health, APOE ε4 positivity, education and ever smoking, while mild-to-moderate alcohol consumption and cardiovascular disease were associated with slower cognitive decline. Asians showed no association between poor health and cognition, but stronger effects of diabetes and high cholesterol on cognitive decline than Whites.

Conclusions: Multiple health and lifestyle factors are related to cognitive performance and decline across a diverse range of international cohorts. Different associations between Asians and Whites highlight the importance of making ethno-regional comparisons.

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The relationship of vascular risk factors with post-stroke cognitive function: an individual participant data (IPD) meta-analysis from the STROKOG (Stroke and Cognition) consortium

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for the STROKOG consortium

There is a growing number of international consortia and data repositories that facilitate collaborative research using meta-analyses based on individual participant data (IPD). Their advantages include the standardisation of analytic methods and data, greater power in the analyses and more robust and detailed results.

STROKOG is an international consortium of studies in cognitive disorders and dementia following stroke. This project addresses the reported inconsistencies in risk factors for post-stroke cognitive impairment (PSCI) by conducting IPD meta-analyses on 11 hospital-based studies from 8 countries. Neuropsychological test scores at 2–6 months after stroke and appropriate normative data were used to calculate standardised domain scores for 3291 patients; the associations between cognitive domain scores and vascular risk factors were examined using 1-stage IPD meta-analyses.

Diabetes and a history of past-stroke had strong significant negative associations with cognitive function in all domains after adjusting for demographic and other risk factors; performance in global cognition was on average 0.47 SD (p<0.001) and 0.45 SD (p<0.001) less in patients with diabetes and past stroke respectively. Hypertension had significant but smaller negative association with global cognition (-0.19 SD; p=0.01) and smoking with memory (-0.16 SD; 0.007) and perceptual-motor (-0.24 SD; 0.001) domains. Atrial fibrillation was associated with worse global cognition, attention and frontal executive domains, with these associations being mediated by subtype of stroke.

Managing these risk factors may reduce the risk of PSCI. Challenges for this project included the harmonisation of neuropsychological test scores and the effort in collating and checking data from diverse international cohorts.

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Let's CHAT (Community Health Approaches To) Dementia: A protocol for a stepped wedge design to optimise detection and management of cognitive impairment (CI) including dementia in Aboriginal Community Controlled Health Services (ACCHOs)

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The population of older Aboriginal and Torres Strait Islander people over 65 years is projected to double by 2026. Aboriginal and Torres Strait Islander older people play a crucial role in their communities, including holding cultural rights and responsibilities for maintaining connections to Country, caring for extended family and providing leadership. Previous work by our team has documented that Aboriginal and Torres Strait Islander peoples experience rates of dementia and Cognitive Impairment (CI) that are three to five times the rate of the rest of the population in both urban and remote regions. In addition, this team has developed, adapted and validated a range of culturally appropriate screening tools for use with older Aboriginal and Torres Strait Islander peoples.

This study aims to implement and evaluate a culturally responsive best practice model of care embedded within current Aboriginal Community Controlled Health Organisations (ACCHOs) and systems to optimise the timely detection and ongoing management of people with CI including dementia. This national, stepped wedge cluster randomised control trial, undertaken in collaboration with 12 ACCHOs across four states is currently in its development phase of co-design. Primary outcome measures include improved detection and management of dementia, and secondary aims include improved quality of life of carers and older Aboriginal and Torres Strait Islander people with cognitive impairment. In this presentation the protocol for this study will be described.

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A comparison of two interventions for people with severe dementia who wander: Issues and Insights.

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Residential Aged Care (RAC) residents with dementia who engage in risky wandering experience adverse outcomes (weight loss, fatigue, injury from falls, resident-to-resident violence, becoming lost and death). Feasibility, acceptability and sustainability of two different tailored behavioral interventions for residents with severe dementia who wander were trialed separately: 1) One-on-one supervised daily 30-minute outdoor walking sessions (n=7) and 2) Individual daily 20 minute indoor listening to preferred music sessions (n=10). Walking sessions were initiated and completed more frequently than music sessions (80% vs. 61%). The majority (90%) of commenced walking sessions lasted the full duration while only 60% of commenced music sessions lasted the full duration. Most music sessions were terminated because the participant removed the headphones (54%) or walked away from the speaker (32%). While staff were concerned that a tailored daily walk involving care staff would be difficult to sustain with the care routines, a similar concern about music sessions was not raised. Staff and family carers suggested a dedicated room was needed to implement the music intervention to avoid interruptions. Despite high intervention fidelity and staff and family commitment to the benefits of both interventions (e.g. improved mood, reduced solitary walking), neither intervention has immediate strong clinical applicability potential. Staff attitudes towards tailored programming and the impact this has on care routines, issues with the music delivery protocol, and questions about appropriate dose impact acceptability/sustainability. Refinement of the interventions and implementation strategies will be discussed as methods to address clinical applicability and sustainability in the RAC setting.

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Novel peptide hydrogel substrates for culturing primary neurons

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Primary neuronal cultures are a powerful tool to understand neuronal maturation, aging and neurodegeneration. They have been used to screen the effects of drugs and misfolded proteins on neural networks in vitro. However, culturing primary neurons in vitro is notoriously difficult, owing to their high sensitivity to their environment. Currently, primary neurons are cultured on glass coverslips coated with poly-D-lysine (PDL). However, it is well known that significant differences exist in cell behaviour in a 2D versus 3D environment, which more accurately mimics in vivo conditions.

Hydrogels have significant potential biomedical applications, including in cell culture, owing to their similarity to the extracellular matrix. We have previously used short peptides capped at their N-terminus with an aromatic group to form biocompatible hydrogels with tuneable stiffnesses, pore sizes and chemical functionalities.

Here, we present a collaborative, multidisciplinary effort where short peptide hydrogels which support the growth of primary neurons in a 2D and 3D environment have been developed. Neurons cultured atop these hydrogels display initial development and maturation comparable to that on PDL, complete with synapse formation and electrical activity. Neurons can also be cultured within the hydrogels, with these 3D neuronal cultures having potential in identifying neurodegenerative disease biomarkers, better screening of drug molecules, modelling CNS damage and insights into aging.

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The SNACKS Project: Identifying Patients with Dementia at Admission to Acute Care

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Diagnostic screening is required to identify persons with Cognitive Impairment(CI). This screening should be applied to individuals over 70, but it is relevant to many admitted patients. A strategy designed only for patients with CI adds burden to a workforce that is already unable to manage clinical care and documentation. A "universal" system that also deals specifically with the issues related to CI is desirable. interRAI is an international not-for-profit collaboration which establishes scientifically robust health assessment systems.

The interRAI Acute Care (AC) was pilot tested in 910 adult patients at admission (N=4 hospitals). 24.3% of patients had short term memory problems, common across all age groups. Delirium is a significant issue in AC, with 4.7% of participants having an acute change in mental status. Self-reported poor health was present in 18.7% of the participants. Finally, pain was present in all age groups (66.2%).

The interRAI AC comprising 56 clinical observations and applications pertaining to CI, including accurate diagnostic screeners for delirium and dementia (and suggestions for care planning), is administered to all adult patients at admission. Completion time is less than 15 minutes including data entry.

Through extensive experience implementing interRAI assessment systems around the world, the interRAI AC is now being implemented in Australia (in the SNACKS project; NHMRC Dementia Project) as an electronic nursing assessment system for inpatients which reduces nursing admission documentation time, increases identification of patients with cognitive impairment and risk of delirium on admission, supports care planning and increases time for direct clinical care.

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Predicting synucleinopathies

To provide our best opportunity for disease modification, the overarching program aim is to identify synucleinopathies that lead to dementia (i.e. Parkinson's Disease — PD and Lewy Body Dementia — LBD) before they clinically present. Patients with idiopathic Rapid Eye Movement Sleep Behaviour Disorder (iRBD) represent an 'at risk' population who almost invariably develop PD or LBD over the course of several years. To date, we have assessed 13 controls, 12 LBD, 17 PD and 22 iRBD patients across a standardised assessment protocol including clinical phenotyping, gait analysis, MRI brain scanning, Polysomnography (PSG) with quantitative electroencephalography (qEEG) and chronobiological evaluations (e.g. clock genes, melatonin).

Significantly, our preliminary gait analyses have revealed a double dissociation whereby PD patients are showing clear asymmetry between the sides of their body, while patients with LBD are not asymmetric but lack postural control as measured by step width variability. Evaluating the gait of iRBD patients revealed that 12 have a pattern of asymmetry whereas 2 are demonstrating a lack of postural control. Our preliminary chronobiological evaluation of the activity of clock genes taken from buccal mucosa cells suggests that there is a breakdown in BMAL1, one of the master circadian control genes in the human cell. Whilst the healthy older controls demonstrated a clear circadian expression of BMAL1 messenger RNA (mRNA), this was not only lost in patients with PD but was also disrupted in iRBD. Thus, our preliminary findings suggest that gait and circadian biomarkers may allow the premorbid diagnosis of diseases that cause dementia.

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Uncovering early Alzheimer's disease changes in post-mortem brain tissue

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Tau pathology in Alzheimer's disease (AD) spreads in a predictable pattern that corresponds with disease symptoms and severity. At post mortem there are brain regions that range from severely to mildly affected by neuritic plaques, neurofibrillary tangles, gliosis and neuronal loss. It is proposed that the natural history of AD can be modelled by comparing the molecular signatures of these differentially-affected areas within cases and between cases and controls. Here we have used RNA sequencing to examine the mildly-affected primary visual cortex (VIC) and moderately-affected precuneus (PREC) in a total of ten age- and gender-matched post mortem brains donated from AD and healthy controls to the NSW Brain Banks (study ethically approved). The AD-PREC and AD-VIC are transcriptomically similar but changes are more prominent in the mildly affected region. The AD-VIC was generally characterised by dysregulation of immune-related pathways and the specific downregulation of the interneuron marker, somatostatin. The downregulation of somatostatin was confirmed in a larger NSW Brain Banks cohort of 32 AD cases and 23 controls using droplet digital PCR, corroborating the findings of previously published immunohistochemical studies. The AD-VIC is a relative hot-spot of disease-related transcriptomic activity with molecular changes in immune signalling and GABA-ergic neurotransmission associated with earliest stages of tau pathology in AD.

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Identifying and modifying factors that lead to severe behaviours in people with dementia

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Behavioural and psychological symptoms of dementia can be triggered by factors internal (e.g., delirium) or external (e.g., loud noise) to a person with dementia (PWD). When these behaviours become severe they may necessitate the involvement of specialist dementia behaviour services such as those provided by Dementia Support Australia (DSA). DSA provides a boots on the ground services for PWD who require short-term (level 1) or long-term (level 2) behaviour management.

A key objective of DSA's service provision is the efficient and accurate identification and modification of triggers that might be responsible for a client's behaviour. This poster not only describes the process by which DSA identifies and modifies these triggers, but also reports on the specific factors that most predict the type of service provided by DSA (i.e. level 1 or level 2). For example, of all the individual triggers identified as affecting the behaviour of a sample of DSA clients (n = 2791), the presence of pain was the single greatest predictor ($b = 0.65$, Wald $\chi 2$ (1) = 15.82, $p < .001$) of whether an immediate and long-term response was provided by DSA (i.e. level 2) over a less immediate response (i.e. level 1). We report these findings in the context of the ways DSA cooperates with residential aged care facilities to identify and modify potential triggers before they lead to severe behaviour that subsequently necessitate the services of DSA.

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Sez6 family proteins are BACE1 substrates with important roles in spine morphology, cognition and motor function

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Overview: Inhibition of BACE1 (ß-secretase) is a promising treatment for Alzheimer's disease. BACE inhibitors also affect the functions of proteins not associated with Alzheimer's disease pathology including the Seizure-related gene 6 (Sez6) family of proteins [1]. Sez6 is required for normal development and maintenance of excitatory synapses [2] and contributes to the decreased cortical spine turnover seen in wild-type (WT) mice treated with BACE inhibitor [3]. Sez6-like, recently validated as a BACE1 substrate in vivo, is expressed widely within the brain [4]. Results: Sez6 family knockout (KO) mice have motor deficits on the rotarod as reported [5] and we found their performance on the fixed and ledge beams deteriorates further with age. Sez6 family KO mice do not extinguish normally in context fear conditioning and have a deficit in the reversal phase of the Morris Water Maze, indicating impaired cognitive flexibility. Pyramidal neurons in the somatosensory cortex of Sez6 family KO mice have fewer mushroom-shaped spines and more spines with an immature morphology. We are examining the effect of chronic BACE inhibition on behaviour and synapse function, focusing on the altered cleavage of Sez6 family proteins, and the first component of this work is nearing completion. Conclusion: Sez6 family proteins are BACE1 substrates that play an important role in synapse formation, maintenance and behaviour.

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International collaboration to build an evidence platform for the development of a Vietnam National Dementia Plan

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Background: Accounting for nearly 60% of dementia cases worldwide, LMICs are facing a much more rapid growth in the numbers of people with dementia, yet less equipped to respond to their corresponding needs compared to high-income countries. The catastrophic costs of intensive and long-term care needed for people with dementia, especially at advanced stage, are mostly borne in informal care of unpaid family members in LMICs. Vietnam is not an exception. Without strategic preventive interventions or curative treatment breakthroughs, there might be as many as 2.4 million people with dementia in Vietnam by 2050. There is an urgent need for countries like Vietnam to develop a national dementia plan to ensure that adequate care and services are provided to both people with dementia and their carers now and in the future.

Proposal: In collaboration with dementia investigators from the DCRC and CDPC, we will work with Vietnamese researchers and key stakeholders to build an evidence platform for the development of a Vietnam National Dementia Plan. Our research programme will include a situational analysis to generate scientific knowledge to inform stakeholders about the context or environment in which their proposed national dementia plan will be embedded. We will use Theory of Change, guided by the PRECEED – PROCEED model, to link the causal assessment (situational analysis) and the intervention planning and evaluation into one overarching planning framework to ensure that our activities achieve maximum impact. The Vietnam national dementia plan will then be formulated in the light of the resulting evidence platform.

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Microglial subtypes in differentially affected areas of the Alzheimer's disease brain

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The pathogenesis of sporadic Alzheimer's disease (AD) is largely unknown. Comparisons between areas differentially affected by AD pathology in individuals with dementia may provide opportunities to model the natural history of AD. Microglia are known to have a role in AD pathogenesis but there are conflicting opinions on whether this is due to their pro-inflammatory effects or loss of their normal functions. An immunohistochemical investigation was undertaken to quantify tau and beta-amyloid pathology and residual neurons in three increasingly affected areas of the AD brain: the primary visual cortex, the superior frontal gyrus and the inferior temporal gyrus. AD pathology was correlated with microglial morphological subtypes: ramified (normal), activated or dystrophic. There were decreased total and ramified microglia in AD cases but only in the inferior temporal gyrus. Furthermore, ramified microglia were inversely correlated with tau pathology in the AD cases. In other areas there were inverse correlations between dystrophic microglia and brain pH and a correlation between activated microglia and age in the superior frontal gyrus. Immunofluorescent microscopy showed occasional dystrophic microglia co-localising with tau-positive neuritic plaques but not neurofibrillary tangles. In summary there is a loss of ramified microglia in the severely-affected inferior temporal gyrus in AD suggesting that loss of microglial function occurs in AD, but only late in the disease course.

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The Spectrum of Sporadic Early Onset Dementia: The Artemis Project and GAAIN

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Early onset dementia (EOD) has its onset prior to the age of 65. We aim to understand clinical presentations; spectrum of sporadic EOD; and to share this information, and genomic and proteomic data with GAAIN.

Over the past 5 years in Perth, Western Australia, 'The Artemis Project' has evaluated 250 patients with a dementing syndrome: Alzheimer's disease (AD), frontotemporal dementia (FTD) and other disorders. All patients undergo a neurological evaluation, MRI or CT, EEG, PET scan if appropriate, neuropsychological assessment, blood investigations and storage of DNA and serum for genomic and proteomic studies. The patients are followed with time to understand the natural history of their EOD.

Of the 250 patients with EOD, 150 have early onset Alzheimer's disease (EOAD), 75 FTD and 25 other diagnoses. In the EOAD group there are more patients with memory loss. In the FTD group there is prominent behavioural change and more patients with an extrapyramidal syndrome. No significant differences exist in other variables. There is heterogeneity in patients with EOAD as some have an extrapyramidal syndrome, posterior cortical atrophy or a linguistic presentation. Additionally, there may be patients with a tau proteinopathy, primary progressive aphasia or semantic dementia. Some patients may have other diagnoses including Lewy body disease, vascular cognitive impairment, motor neurone disease with cognitive change and prodromal AD. Understanding this heterogeneity assists translational research into the understanding and treatment of EOD.

The ARTEMIS project is a member of GAAIN, which supports data storage among global partners to aid Alzheimer's disease research.

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Sleep quality and the risk of incident dementia in the community-based Framingham Heart Study

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Evidence suggests that poor sleep is related to several key processes implicated in Alzheimer's disease. For example, interrupted slow wave sleep has been associated with the acute accumulation of amyloid beta and sleep disordered breathing has been associated with ischemic brain injury. However, the associations between poor sleep and the risk of future dementia are not well understood. We performed a series of studies to examine the associations between subjective and objective sleep quality and the risks of incident dementia in the community-based prospective Framingham Heart Study (FHS). In the first study, we examined whether changes in self-reported sleep duration were a sign of impending dementia. We quantified sleep time at two-time points 13 years apart and then followed participants for a further 10-years for the development of incident dementia. There were 2,457 participants and 234 incident dementia cases. We found that persons transitioning to becoming a long sleeper (≤9 hours at time point 1 and >9 hours at time point 2) had a higher risk of incident dementia (HR 2.43; 95%CI 1.44–4.11). In a subsample of FHS participants who completed an overnight sleep study (N=322), we observed 32 cases of incident dementia over a maximum of 19 years follow-up. We found that each percentage reduction in REM sleep was associated with a 9% increase in dementia risk (HR 0.91, 95% CI 0.86-0.97). Slow wave sleep percentage was not associated with dementia risk. Implications of these findings will be discussed.

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Consumer consultations on a blood test for brain health

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We are investigating blood biomarkers that reflect degeneration of nerve cells in the brain in order to develop a cheap and non-invasive blood test. Consumer consultation is an essential part of the research process and requires collaboration between neuroscientists, social researchers, and the consumers who may in future use such a blood test. The Wicking Dementia Research and Education Centre works closely with consumers through our Massive Open Online Courses (MOOCs, to date accessed by over 140,000 people internationally) and Bachelor of Dementia Care (BDC), offering an ideal opportunity for consumer consultation. A literature review of the current state of evidence for dementia associated biomarkers and the ethical implications of possible preclinical biomarkers disclosure is currently being performed. We will implement a discussion forum on the topic in the BDC, a fully online degree program undertaken by many with a role in dementia care. These will inform development of a questionnaire to survey peoples' opinion on whether and how a blood test measuring nerve cell degeneration would be used by people in a non-research setting. This will be implemented in the Preventing Dementia MOOC, a course undertaken by thousands of international consumers interested in dementia prevention. The project aims to identify possible improvements in the monitoring of brain health at preclinical stages of dementia or other neurodegenerative conditions, such as following a traumatic injury. The results of this study could also be used to formulate recommendations for the ethical management of biomarker blood tests in research and clinical practice.

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Flinders Assistant for Memory Enhancement: an adaptive technology co-design approach for people with Mild Cognitive Impairment (MCI)

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Mild Cognitive Impairment (MCI) may be an indicator of impending dementia in people who exhibit some memory loss, but do not show other signs of dementia and can function independently. This innovative co-design project collaborates with key stakeholders during design, development and pilot-testing of a tablet-based application hypothesised to increase function, independence and confidence in community-dwelling people with MCI. The key stakeholders are researchers (technology designers and health professionals), service organisations (providers of community based services), and people with MCI and their supporters (carer givers, consumers and advocacy groups). The researchers conceptualised the framework and developed a prototype of the application based on co-design consultation. During prototypes the 'useability and accessibility' elements of the application were explored with focus group participants in two sessions (consulting on the prototype as-is and in the next session consulting on the modifications made to the prototype as a result of the first session). Prior to deployment, user acceptance testing will be done with the stakeholders. Upon completion of the co-design development process, participants with MCI will be recruited for testing and co-creating the customisation elements of the application. The phase I and phase II pilots will take place over 12 weeks each where the application will be used by the participants according to a predefined study protocol. The participants will be able to give feedback to the research team every fortnight. Relevant feedback from pilot phase I will be included in the next iteration of the application for testing in pilot phase II.

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The utility of Community Based Participatory Action Research to support the development of Dementia Friendly Communities: the Kiama experience

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This paper explores the utility of a Community Based Participatory Action Research (CBPAR) methodology to support collaboration for research, action and evaluation of the 'Dementia Friendly Kiama' project in NSW (Australia). Activities included: formative research (interviews, environmental audits, community and business surveys, community forums); the establishment of a Dementia Advisory Group and Alliance for project governance; an awareness campaign; educational events; and actions to improve community environments. All activities were co-designed and co-facilitated by people with dementia and their care partners. Evaluation highlighted that CBPAR was useful to support the involvement and empowerment of people with dementia and the engagement of the community to improve awareness. The direct involvement of people living with dementia was also an effective way to improve positive attitudes and reduce the negative stereotypes associated with living with dementia. Results highlight the multiple benefits of applying the principle of 'nothing about us without us' in both dementia research and community action.

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Testing the utility of the ASCOT-Easy Read Toolkit to assess quality of life in community dwelling older people with cognitive impairment

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Understanding the extent to which community care services are supporting choice and quality of life for people with dementia is of critical importance. However, there is currently an absence of inclusive, valid and reliable tools to support people with cognitive impairment to report on their care-related outcomes.

An international collaboration between researchers at the University of Wollongong (NSW, Australia) and the Personal Social Services Research Unit (PSSRU) at the University of Kent (UK) has worked to support the adaptation and cognitive testing of an Easy Read version of the Adult Social Care Outcomes Toolkit (ASCOT-ER) with community dwelling older people with cognitive impairment.

Cognitive interviewing was used with Home Care Packages recipients in the Illawarra — Shoalhaven (NSW, Australia) to explore the appropriateness of ASCOT-ER pictures, wording and visual scales to assess outcomes in the domains of: control over daily life; accommodation cleanliness and comfort; personal cleanliness and comfort; safety; social participation; occupation and dignity. Following initial interviews (n=16), minor changes were made to some pictures and one set of response options to better suit an older audience. Re-testing with additional participants (n= 10) confirmed the amendments were useful in improving the suitability of the tool for this population. Interviews provided insights into factors influencing the areas of greatest need in the domains of social participation and occupation. The collaboration lays the foundation for future cross-country studies using the ASCOT-ER which can be more inclusive of the voice of people living with dementia.

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Improving dementia care in general practice: a quality improvement approach

Background: Funded by the Sydney North Primary Health Network, a Dementia Quality Improvement Program is being rolled out across the general practices in the PHN area.

Program details: An initial meeting with a range of dementia experts and consumers established a series of outcome targets for general practice, in relation to dementia. The meeting was facilitated by Professor Susan Kurrle from the Cognitive Decline Partnership Centre. A suite of change ideas was developed including establishment of a dementia registry. Outcome measures included whether patients had received investigations according to the NHMRC Clinical Practice Guidelines and Principles of Care for People with Dementia. Most targets are electronically extractable using practice software (eg attendance at a 75 Plus Health Assessment at which a cognitive function test was administered, completion of a Domiciliary Medication Management Review and others).

Outcomes to date: five practices have agreed to participate in the Program and attended an initial meeting to reach agreement on measurable. A whole day dementia education program has been delivered to members of those practices. Practices are learning and using quality improvement methodologies including Plan-Do-Study-Act cycles, supported by the PHN, in order to achieve outcomes. Further meetings are planned to share experiences and improve practice.

Conclusion: A quality improvement approach coordinated through the Primary Health Network shows promise for improving dementia care outcomes in general practice

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Risk factor analysis reveal male gender and family history difference in pathologically confirmed dementia with Lewy bodies compared with Parkinson's disease

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Dementia with Lewy bodies (DLB) is the second most common type of clinically diagnosed dementia. However, DLB has been proven difficult to clinically differentiate from Alzheimer's disease (AD) and Parkinson's disease (PD). More importantly, several risk factors for DLB overlap with those for AD and PD, and risk factors predicting an increased risk for DLB versus PD are not fully established. This study aims to assess risk factors in pathologically confirmed cases of DLB compared with PD. Longitudinally followed DLB and PD patients (N=116) with age-matched controls (N=44) from the Sydney Brain Bank were selected, without any neuropathology-specific mutations, stroke or atherosclerosis. Chi-square and logistic regression analyses were performed. When compared with controls, pathologically confirmed PD cases had significantly higher odds ratio for anxiety ($p<0.01$), depression ($p<0.01$) and were twice as likely to have a family history for PD ($p<0.05$). It was found that controls were almost twice likely to have cardiovascular problems ($p<0.01$). When comparing pathological DLB cases with pathological PD, DLB patients were more likely to be males ($p<0.01$) and have had a family history of dementia or PD ($p<0.05$). DLB patients were almost twice likely to have anxiety, and more likely to have a higher education ($p=0.05$). Males were found to have 3–4 years earlier onset for PD and DLB than female patients. The dominance of male gender and family history as risk factors for DLB versus PD was confirmed. This is the only study available that explores the differences in risk factors for DLB against PD.

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Translating imaging pipelines to the clinic

Medical imaging has been at the forefront of dementia research for the past decade as it provides in-vivo assessment of the structural and functional state of the brain. Recent advances in medical imaging acquisition and post processing techniques have enabled great insight into the dementia process, especially differential diagnosis. However these advances have been largely confined to the research lab and it is not easy to integrate the advanced post-processing techniques and normative datasets into the clinical workflow in order to test the efficacy of such pipelines in clinical practice.

In order to translate this work into the clinic, we have developed two key technologies. Firstly, each pipeline produces a report in PDF format that summaries the results of the pipeline and displays them relative to a normative population. This aids the interpretation of the results in an objective manner. Secondly, we have developed an extensible DICOM service that allows us to run our pipelines in the clinical environment. The DICOM service acts as a picture archiving system (PACS) and matches incoming datasets to available pipelines. Once whole datasets are received, matching pipelines are run and results generated in DICOM format and made available.

A demonstrator has been setup a system with our collaborators to perform quantitative susceptibility mapping (QSM) and white matter hyper intensity segmentation with more under development. This technology enables clinicians to apply state of the art post processing with minimal impact to the traditional imaging workflow.

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Environmental and pharmacological modulation of molecular pathogenesis in Huntington's Disease

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Huntington's disease (HD) is a devastating neurodegenerative genetic disorder involving the progressive development of psychiatric symptoms, cognitive deficits (culminating in dementia) and motor impairment. The R6/1 mouse model of HD expresses a mutant human huntingtin transgene and provides an accurate disease model exhibiting strong construct and face validity. Our group was the first to show that female R6/1 HD mice display depression-related behaviours, prior to cognitive and motor deficits, consistent with the progressive development of clinical symptoms in HD.

While there is currently no cure for HD, we recently published beneficial effects of N-Acetylcysteine (NAC) on motor deficits in HD mice. We also have pilot data which suggest effects of NAC on specific glutamatergic receptors within the hippocampus of HD mice. Even more exciting is the fact that NAC seemed to rescue the reduction of system xc-. Altogether, our findings suggest an undiscovered key role of system xc- in both the pathogenesis of HD and the mechanism of action of NAC.

By modulating the exchange of cystine and glutamate, system xc- is at the interface between oxidative stress and glutamatergic signalling and has been recently identified as a key target in mediating ferroptosis. Therefore, our data also suggest that ferroptosis (an iron-dependent form of non-apoptotic cell death) might be involved in the pathophysiology of HD and provide a new avenue for potential therapies. We propose to correct the iron dysregulation in HD mice, by using the iron chelator deferiprone.

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Community Engagement as a means to maximise research engagement with Indigenous Populations: Lessons Learned along the way

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Historically, non-Indigenous researchers were known for using Indigenous knowledge for their own career advancement rather than sharing their findings to benefit the communities involved. For such reasons, research and researchers continue to be regarded cautiously by Indigenous communities. However, as Aboriginal and Torres Strait Islander Australians experience significantly higher rates of chronic disease and a dementia prevalence rate of more than five times higher than the Australian population, addressing such health inequities remains an important area of research. To overcome such issues, non-Indigenous researchers need to focus on building relationships within Indigenous communities and involve community participation in all stages of their projects. This ensures that research is relevant to the community needs; facilitates the translation of knowledge into practice; is culturally appropriate; and recognises the cultural diversity of the communities involved. Developing effective collaborative relationships between researchers and the community is the cornerstone of community engagement but may seem daunting to new researchers unsure of how to engage in community engagement.

The aim of this paper is to outline some strategies for meaningful community engagement utilised by a small group of researchers who have been collaborating for many years with local Indigenous communities to determine dementia prevalence rates in specific Indigenous communities; to identify associated risk and protective factors for dementia; and to promote healthy ageing. Insights from the research team's own experience will be presented to provide practical examples of community engagement and consultation. Pitfalls and lessons learned will also be shared.

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Novel nanocrystalline particles for earlier detection of Alzheimer's onset

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Over the past few decades, there has been a rapid growth in nanoparticles (NPs) discovery and their use for medical therapy and diagnostics [1,2]. Nanoparticles based on crystalline matrix of sodium fluoride have a pronounced ability to host functional ions, such as lanthanide ions. Gadolinium-doped nanoparticles (Gd NPs) have proven to function as enhanced contrast imaging agent for magnetic resonance imaging (MRI) [3]. In this work, we developed ultra-small Gd-doped nanocrystals as a potential MRI sensor. We established a surface functionalization protocol to stabilize NPs in biological media. Furthermore, we demonstrated surface functionalization with molecule that specifically target neuronal cells undergoing apoptosis associated with Alzheimer's or Parkinson's diseases. We confirmed that Gd NPs can be uptaken and well tolerated by neuronal cells at appropriate dosages. Overall, our results show a great potential as novel MRI sensor for non-invasive detection of Alzheimer's disease.

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Changes in molecular stress signaling chaperone FKBP5 in the aging human brain

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Prolonged life stress is a modifiable lifecourse factor which, along with other negative mental factors such as depression and social isolation, has been implicated in risk for Alzheimer's disease (AD). The long-term effects of life stress are mediated by the hypothalamic-pituitary-adrenal (HPA) axis, whose cellular signalling in humans involves the stress hormone, cortisol. Cortisol secretion increases with age and is further elevated in AD, but the mechanisms underlying these changes are not known. We focused on FKBP5, a chaperone which modulates HPA axis activity by regulating the stability and activity of molecular stress signaling complexes. Using human post-mortem cortical tissue, we show that FKBP5 expression increases across brain development and aging. In human neural cells from the olfactory mucosa, we demonstrate that in vitro protein-protein association of FKBP5 with the glucocorticoid receptor (which binds cortisol) in molecular complexes is increased in cells from older, compared to younger, individuals. These findings support the hypothesis that FKBP5 may be involved in age-related changes in cortisol and AD risk, and are consistent with preclinical work suggesting that targeting FKBP5 could represent a potential therapeutic approach in AD.

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Co-creating a model of care for a new multidisciplinary memory clinic in South Western Sydney

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South Western Sydney has the highest projected rates of dementia in all of NSW. The prevalence of dementia in Camden, Campbelltown, Macquarie Fields, and Liverpool is forecast to increase by up to 460% by 2050. To address the current and future needs of the community, our team has been working to establish a new multidisciplinary memory clinic. To inform the model of care, we conducted a needs assessment to map the existing dementia services and identify gaps in service provision for people with dementia and their carers. We interviewed 20 GPs across SWSLHD/SWSPHN and conducted 3 community forums (Campbelltown, Camden, and Liverpool) involving 53 seniors and community representatives, and 32 community healthcare workers. Interviews and community forums were audio-recorded, transcribed verbatim, and coded by thematic analysis using Quirkos. Study participants felt they had a good knowledge of available dementia resources and services, but noted that these are fragmented and need to be easier to navigate for the patient/carer via a "one-stop-shop" or single point of contact. Participants described education (for GPs, patients, and carers), allied health support, legal assistance, and a key worker as the most important services a new memory clinic should provide. Participants felt that the memory clinic should be easily accessible and offer culturally sensitive services. Findings have been integrated into the design of the model of care, which will be finalised via a Delphi method-guided expert panel discussion. By co-creating the model of care, the memory clinic will cater holistically for the local region's needs.

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Research tools to determine whether pericyte dysfunction alters Alzheimer's disease progression

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Pericytes are contractile cells exclusively residing within the basement membrane of capillaries. These cells control cerebral blood flow (CBF) and energy supply, maintain the blood-brain barrier (BBB) and mediate beta amyloid clearance. An emerging pathological mechanism of Alzheimer's disease (AD) is the development of vascular dysfunction leading to chronic hypoperfusion, disruption of the BBB and altered beta amyloid clearance. These symptoms are all, in part, controlled by pericytes. Therefore, the degeneration of pericytes may be critical to the development of AD and could represent a novel cellular target for AD therapy. To investigate this, a number of tools need to be developed including human staining for pericytes, transgenic pericyte mice and pericyte depletion models. To establish a link between pericyte loss and human AD pathology, we are collaborating with the University of Oxford to stain AD brain tissue from the OPTIMA cohort of AD patients. Our preliminary staining of human brain sections shows that pericytes can be observed and pericyte coverage calculated. We have characterised a transgenic mouse line, NG2-DsRed mice, that express fluorescent pericytes. Pericytes in NG2-DsRed mice can be identified and quantified using live two-photon imaging and confocal imaging of their brain sections alongside vascular markers. In addition, we have developed methods to directly deplete pericytes pharmacologically which will allow us to determine how pericytes alter AD progression. These research tools will enable us to uncover the importance of pericyte degeneration to AD pathology and whether pericytes represent a viable therapeutic target for AD.

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Multiple neuronal pathologies are common in young patients with pathologically proven Frontotemporal lobar degeneration

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The past decade has seen a surge in studies identifying mixed pathologies in elderly populations. Importantly however, few studies have focused on mixed pathology in Frontotemporal Lobar Degeneration (FTLD), particularly in younger cases. The present study examined concomitant pathological neuronal inclusions of TDP-43, hyperphosphorylated tau and a-synuclein protein in the anterior cingulate, hippocampus and entorhinal cortex in young (≤65 years at death) vs. elderly (≥80 years at death) cases with pathologically confirmed FTLD (n = 52) or Alzheimer's disease (AD) (n = 47). Our results demonstrate the presence of additional neuronal pathologies not associated with the primary pathological diagnosis in a similar proportion of young and elderly FTLD cases, indicating that disease drivers rather than age are the major risk factors for multiple neuronal pathologies in FTLD. When only sporadic FTLD cases were considered, the proportion of cases with multiple neuronal pathologies across FTLD age cohorts remained similar, indicating that multiple neuronal pathologies in young FTLD cases is not driven by known genetic mutations. In contrast to these findings in FTLD, a significantly greater proportion of elderly compared to young AD cases demonstrated multiple neuronal pathologies, corroborating literature. In summary, the present study reports for the first time that age is not a major risk factor for multiple neuronal pathologies in FTLD. These findings have significant implications for the development of protein-specific biomarkers and treatments for FTLD, and underscore the need for further research to identify the disease factors involved in driving multiple neuronal pathologies in FTLD.

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Can technology be used to deliver home-based exercise for people with dementia?

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Objectives: There is limited evidence falls can be prevented in community-dwelling older people with dementia. Portable technology can provide cost-effective, interactive and individually-tailored exercise programs. This study assessed the feasibility and safety of StandingTall — a tailored, progressive exercise program delivered through tablet-computers.

Methods: Fifteen participants with mild-moderate dementia (age=82±8years (mean±standard deviation [SD]), 47% female) and their carers were assessed at baseline, participated in the 12-week StandingTall program and were reassessed at completion. Feasibility and safety were assessed using the System Usability Scale (SUS; scores=0-100; a priori target>65), Physical Activity Enjoyment Scale (PACES-8; highest score=7), adherence (exercise minutes recorded by StandingTall) and adverse events.

Results: The mean baseline Montreal Cognitive Assessment score was 16±5 and 60% reported falls in the past year. The mean SUS score was 68 for both participants (SD21) and carers (SD16). The mean PACES-8 score was 5.5±1.0. Median (IQR) exercise minutes in week-2, week-7 and week-12 were 33 (21-38), 53 (8-90) and 65 (0-127). In week-2, week-7 and week-12, exercise minutes were recorded by 87%, 73% and 53% of participants and 33% were exercising >100 minutes at week-12. The primary reasons for non-adherence were health-related. One participant fell whilst exercising with no injury sustained.

Conclusions: The StandingTall program reached the usability target and scored well on enjoyment. On average, participants were exercising for more than 60 minutes/week at week-12. The StandingTall program appears feasible and safe for evaluation in a sufficiently powered randomised control trial with falls as the primary outcome in older people with dementia.

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Exploiting drug-APOE gene interactions in hypertension to preserve cognitive function: The Three City cohort study

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Background: The objective was to test the hypothesis that antihypertensive drugs have a differential effect on cognition in carriers and non-carriers of the apolipoprotein ε4 (APOE4) polymorphism.

Methods: A total of 3,359 participants (median age 74 years, 62% women) in a prospective population-based cohort were followed for 10 years. Exposure to antihypertensive drug use and lipid-lowering drugs was established in the first 2 years. Cognitive function was assessed at baseline, 2, 4, 7 and 10 years with a validated test battery covering global cognition, verbal fluency, immediate visual recognition memory, processing speed, and executive function. Clinically significant change in cognitive function was determined using reliable change indices represented as z-scores and analysed with linear mixed-models.

Results: From 3,359 persons exposed to antihypertensive drugs, 653 were APOE carriers (5.1% homozygous, 94.9% homozygous) and median follow-up was 5.2 years (interquartile range 3.7 to 8.0). In APOE4 carriers, improved general cognitive function over time was associated with exposure to angiotensin converting enzyme inhibitors ([ACEI] ß = .14; 95% CI .06 to .23, p = .001) and angiotensin receptor blockers ([ARB] ß = .11; 95% CI .02 to .21, p = .019). Improved verbal fluency was associated with ACEI (ß = .11; 95% CI .03 to .20, p = .012).

Conclusions: Renin-angiotensin-system (RAS) blockade was associated with improved general cognitive function in APOE4 carriers. Findings did not support RAS drugs' lipophilicity or ability to cross the blood-brain barrier as potential mechanisms.

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Global initiatives on Cognitive Reserve

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Several international initiatives are poised to commence on Cognitive Reserve with exciting collaborative opportunities for Australian researchers.

A professional interest area of the Alzheimer's Association (USA) has been working on consensus definitions for the related concepts of cognitive reserve, brain reserve and brain maintenance. This major work is about to be published with clear implications for research.

At the same, the National Institutes of Health (USA) has recently established a funding mechanism for the purpose of establishing collaborations in the domain of Cognitive Reserve.

Recently, the International Federation on Ageing and DaneAge sponsored the Copenhagen Think Tank, including academic leaders, senior WHO representatives and executives from NGOs. There was agreement that the significant corpus of evidence supporting Cognitive Reserve is now sufficient to begin translation into international health policy. Proceedings of this meeting are to be published in a special edition of Alzheimer's & Dementia, with a current open call for high-impact research.

These initiatives are set to coalesce in December at the first Copenhagen Cognitive Reserve Summit. This will be a multi-sectoral event, shifting the emphasis beyond academia into the policy space, aiming to engage leaders of government, industry, labour, media, leisure industries and civil society. One objective is to incorporate Cognitive Reserve action and policies into the WHO Healthy Ageing agenda.

New international collaborative networks are therefore beginning to form around Cognitive Reserve, coinciding with a positive social narrative. This has great potential for real-world impact and Australian researchers are encouraged to engage in these developments.

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Motor speech changes associated with Frontotemporal lobar degeneration: a review

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Motor speech deficits resulting from frontotemporal lobar degeneration vary depending on disease type. Here we systematically review the evidence for frontotemporal dementia (FTD), primary progressive aphasia (PPA), and progressive apraxia of speech. Data may assist in optimising diagnosis and monitoring disease progression and treatment response.

A meta-analysis was conducted for speech measures that were used consistently in multiple studies. The methods and nomenclature used to describe speech in these disorders varied between studies and groups. Our meta-analysis identified 3 speech measures which differentiate variants or healthy control-group participants (e.g., nonfluent and logopenic variants of PPA from all other groups, behavioural-variant FTD from a control group). Deficits within the frontal-lobe speech networks are linked to motor speech profiles of the nonfluent variant of PPA and progressive apraxia of speech. Motor speech impairment is rarely reported in semantic and logopenic variants of PPA. Limited data are available on motor speech impairment in the behavioural variant of FTD. This review identified several measures of speech which may assist with diagnosis and classification, and consolidated the brain-behaviour associations relating to speech in FTD, PPA, and progressive apraxia of speech.

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Mealtime difficulties following frontotemporal lobar degeneration

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Frontotemporal lobar degeneration (FTLD) can result in a decline in behavior, language and motor function. Mealtime disturbances are a common and significant outcome of FTLD. Disturbances during mealtimes can arise from dysphagia or may occur secondary to behavioral changes such as rapid eating, meal rigidity and altered diet preferences.

Dysphagia is reported in the late stages of Frontotemporal dementia (FTD) and early in the motor subtypes of FTLD. The identification of dysphagia can alert individuals and medical teams of disease progression and provide insight into the nature and spread of underlying neuropathology. Few studies have comprehensively evaluated eating behavior or dysphagia in individuals presenting with FTLD pathology despite the potential impact on medical safety and individual quality of life. Improved understanding of eating behaviors can improve individual care and may enhance diagnostic accuracy.

Aberrant eating behavior and swallowing difficulties are reported in the conditions associated with FTLD neuropathology. The consequences of mealtime disturbances include health risks associated with increased BMI and aspiration, reduction of an individual's independence and an increase in caregiver stress and burden. Here we review and summarize the literature on eating behavior and swallow impairments (dysphagia) in each of the syndromes caused by FTLD and discuss limitations.

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Attitudes towards Residential Aged Care: a contact theory approach

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This research evaluates attitudes towards entering residential aged care (RAC) from three angles: 1. The public's perceptions; 2. The Good Neighbour Program (GNP), an intergenerational pilot intervention that provides learning and development opportunities for psychology undergraduates and social support for RAC residents; and 3. RAC Staff. It investigates the association between contact (positive or negative) with RAC residents and workers and behavioural intentions towards RAC. Further, whether such associations are mediated by trust, independence and perceptions of RAC workers. Study 1: public (N = 373) perception revealed that positive contact with RAC residents and workers was associated with decreased resistance towards entering RAC, while negative contact was strongly associated with increased resistance. Study 2: students (N = 14) also revealed a similar pattern. Study 3: RAC workers (N = 38) demonstrated an overall less resistance to enter RAC, which was mediated by education level and occupational status. Those with more education and higher occupational positions were less likely to have high levels of resistance. Implications for the RAC industry suggest that the public hold pervasive future behavioural intentions towards RAC in line with Allport's theory of contact. In contrast, the GNP revealed that many of these extreme attitudes towards RAC did not weaken with increased contact and many staff revealed extreme resistance towards RAC, despite having high levels of contact. Overall, the results suggest that although positive contact may dampen resistance, it does not appear to dissolve our negative evaluation of RAC and essentially influences our future behavioural intentions.

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A comparison of rates of mortality with dementia between Indigenous and non-Indigenous Australians

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Background. Dementia is considered a major health problem in Indigenous Australians. This collaborative research work between epidemiologists and cognitive scientists used population level data to quantify differences in rates, types and age of dementia mortality between Indigenous and non-Indigenous Australians.

Methods. We used death certificate data for all Australian individuals over the age of 40 with any mention of dementia (including Alzheimer's disease and vascular dementia) as the underlying or an associated cause of death for 2006–2014. Death rates were compared using Poisson regression.

Findings. The age-adjusted rates of mortality with dementia were 22% higher in Indigenous compared to non-Indigenous groups. These differences were especially pronounced in those aged less than 75 years, with the rates more than three times higher in the Indigenous compared to the non-Indigenous group. Across all age-groups Indigenous Australians who died with dementia were more likely to have dementia coded as 'Unspecified' and less likely to have 'Alzheimer's disease' recorded, compared to non-Indigenous groups. Rates of death with Alzheimer's disease were overall lower among Indigenous Australians, especially over the age of 75.

Interpretation. Although deaths with dementia are most common at older ages, at ages below 75, Indigenous groups appear to be at considerably higher risk of mortality with dementia compared to the non-Indigenous population. Research is needed into possible differences in aetiology of dementia that might explain the differences in age profile.

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Insomnia symptoms, short sleep duration and sleep medication use associate with lower cognitive function in healthy older adults

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Aims: Increasing evidence suggests that sleep disorders are potentially modifiable risk factors for dementia. This study examined associations between self-reported sleep characteristics and cognition in dementia-free older adults participating in the Aspirin in Reducing Events in the Elderly (ASPREE) study.

Methods: ASPREE is a randomised controlled trial of low-dose aspirin, formed as a collaboration between Australian and US investigators. Recruitment, made possible through partnerships with GP co-investigators across South-Eastern Australia, resulted in a well characterised cohort of 16,703, all aged 70+. Participants completed the Modified Mini-mental State Examination (3MS; score out of 100), Hopkins Verbal Learning Test Revised (HVLT-R; score out of 12), Symbol Digit Modalities Test (SDMT; median score of 37), and Controlled Oral Word Association Test (COWAT-F; median score of 12), and within three months 14, 982 participants (89%) completed further questions, including on sleep characteristics. Multivariable regression analyses allowed adjustment for age, education and gender.

Results: Short sleep, early morning awakening and sleep medication use were associated, respectively, with lower scores (all $p<0.05$) on 3MS of 0.53 (CI 0.36,0.70), 0.38 (CI 0.21,0.56) & 0.45 (CI 0.19,0.71), on SDMT of 0.48 (CI 0.13,0.84), 0.39 (CI 0.01,0.77) & 1.69 (CI 1.13,2.23) and on COWAT-F of 0.31 (CI 0.14,0.49) & 0.21 (CI 0.03,0.40) (but not for sleep medication use). Similar associations were also found for HVLT-R.

Conclusions: Even in a healthy population, insomnia symptoms, sleep duration and medication use associate with small reductions in cognitive test scores. Longitudinal follow-up will determine whether these symptoms predict clinically significant cognitive outcomes.

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Nurse perception of agitation: an influencing factor in the selection of management strategies for people with dementia in residential aged care

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Purpose: Behavioural and psychological symptoms are distressing for people with dementia impacting their ability to interact effectively in the aged care setting. Management strategies when appropriately selected can facilitate participation and inclusion of people with dementia. This study investigates the relationship between nurse understanding of agitation and the management strategies selected to reduce behaviour.

Methods: Semi-structured interviews were conducted at six aged care facilities in Sydney with nursing staff (n=11) as a component of a larger study. The interview questions were constructed from limitations in the literature; they explored nurse perception of agitation and its relationship to dementia, the types of agitation management strategies used at the facilities, characteristics that influence nurse selection of a strategy to reduce agitated behaviour. A content analysis organised data according to key codes and themes.

Results: Nurses reported agitation management to be challenging (72%) in residents with dementia. The behaviours of wandering (64%) and restlessness (64%) were considered intractable to the dementia condition. Impaired ability to communicate causative factors (55%) or comprehend instruction (55%) influenced strategy selection. Short-term management strategies of distraction (91%) and medication (54%) were reported more frequently for people with dementia, and preference-based care a more commonly reported strategy for people without dementia. The behaviour of aggression (54%) was similarly managed by providing space (64%) for residents with and without dementia.

Conclusion: Nurses perceptions that agitation is intractable in the dementia trajectory led to a difference in management approaches provided to older people dependent on dementia diagnosis and communication ability.

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Lavender (Lavandula Angustifolia) and Lemon Balm (Melissa Officinalis) essential oil for the treatment of agitated behaviour

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Background: Behavioural and psychological symptoms can impact a person's self-esteem, ability to engage and can lead to social isolation, better managements are needed. This study compares the effectiveness of Lavender and Lemon Balm essential oil on agitated behaviours of people with and without dementia.

Methods: A randomised controlled trial was conducted at six aged care facilities in Sydney with forty-nine residents, with dementia (N=39) and without dementia (N=10) that had a history of agitation. Residents were randomly allocated a treatment sequence of Lavender, Lemon Balm and Placebo sunflower oil. The oils were applied to the resident's collar daily for two-weeks followed by a washout period. All participants trialed all three treatments over a 10-week period. Data were collected on the Neuropsychiatric Inventory (NPI) and Cohen-Mansfield Agitation Inventory (CMAI) before and after each treatment cycle.

Results: A significant difference in essential oil effect was reported when residents with and without dementia were compared. A post hoc analysis revealed Lavender more effective in reducing CMAI physical non-aggressive behaviour (p=0.04) and Lemon Balm less effective in reducing NPI irritability (p=0.01) in residents with dementia. Lemon Balm was more effective in reducing NPI agitation (p=0.02) and CMAI physical non-aggressive behaviour (p=0.02) in residents without dementia. Lavender or Lemon Balm did not reduce the frequency of behaviour independent of cognitive status when compared to placebo.

Conclusion: The findings support an opposing effect of the essential oils with Lavender more effective in reducing physical non-aggressive behaviours compared to Lemon Balm and placebo in residents with dementia.

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The therapeutic potential of cannabidiol (CBD) in transgenic mouse models of Alzheimer's disease

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Alzheimer's disease (AD) is characterised by the accumulation of amyloid-ß (Aß) and tau hyperphosphorylation causing neurodegeneration, neuroinflammation and oxidative stress. Current AD treatments do not stop or reverse the disease progression, highlighting the need for more effective therapeutic alternatives. The phytocannabinoid cannabidiol (CBD) has demonstrated anti-oxidant, anti-inflammatory and neuroprotective properties. Furthermore, our previous work found chronic CBD treatment (20 mg/kg) to reverse social recognition memory deficits and to have subtle effects on neuroinflammatory markers in an AD mouse model (i.e. APPxPS1 transgenic mice). Here, we determined the chronic effects of 50 mg/kg CBD in APPxPS1 and Tau58/2 transgenic mouse models for AD. Male APPxPS1 at 12 months and Tau58/2 mice at 3 months of age were treated with vehicle or CBD (50 mg/kg, daily intraperitoneal injections) starting 3 weeks prior to behavioural testing. Social recognition memory, spatial memory, and fear-associated memory as well as motor function were evaluated following the initial treatment period. After testing, brain tissue was collected for analysis of AD relevant brain pathology. In male APPxPS1 mice CBD treatment reversed a social recognition memory deficit and trended to reduce insoluble Aß40 levels in the hippocampus. Tau58/2 mice did not exhibit impairments in social recognition or fear associated memory and CBD treatment did not restore motor deficits characteristic for this mouse model. Our study suggests that 50mg/kg CBD has therapeutic-like effects in Aß but not Tau models for AD. Future research will test additional treatment designs, in particular for Tau transgenic mice.

DR EMILIO WERDEN

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Factors associated with cognitive impairment 12 months after ischaemic stroke

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Background — Cognitive decline and dementia are common after stroke, but risk factors for post-stroke cognitive impairment are yet to be defined. Our aim was to identify individual and stroke-related factors associated with cognitive impairment 12 months after ischaemic stroke.

Methods — In the Cognition And Neocortical Volume After Stroke (CANVAS) study, we recruited ischaemic stroke patients of all types from three hospitals in Melbourne. Seven cognitive domains were assessed at 12-months post-stroke. Z-scores were calculated using appropriate norms. Impairments were defined as z-scores < 1.5 SDs. We used odds ratios (ORs) with 95% confidence intervals (CIs) to examine associations between individual (e.g., demographic, vascular risk) and stroke-related (e.g., severity, site) factors and the presence of multi-domain impairment (i.e., impairment in ^{3} 2 cognitive domains).

Results — 109 stroke patients (median age=70 years (Q1=63, Q3=76); sex=75(69%) men; median education=12 years (Q1=10, Q3=15)) completed 12-month reviews. Strokes were typically mild (admission NIHSS 0-7=103(95%)). There were 44(40%) left-and 62(57%) right-sided strokes; 39(36%) posterior and 55(59%) anterior circulation strokes; and 65(60%) subcortical and 29 (27%) cortical strokes. Pre-existing hypertension (65(60%)), hypercholesterolaemia (49(45%)), and type II diabetes mellitus (22(20%)), were common. Eighteen (18%) patients had multi-domain impairment. This profile was associated with older age (OR=1.09, CI=1-1.2), fewer years of education (OR=0.77, CI=0.6-0.9), cortical stroke (OR=3.93, CI=1.4-14); and hypertension (OR=6.9, CI=1.5-32). The results were unchanged after adjustments for infarct volume and prior stroke.

Conclusions — Several factors contribute to the cognitive profile 12 months after ischaemic stroke. Hypertension may be an important risk factor for post-stroke cognitive impairment.

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Apathy and its impact on carer burden and wellbeing in primary progressive aphasias

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Language impairment is the core clinical feature of primary progressive aphasia (PPA). Clinically, however, PPA patients also appear to present with non-cognitive behavioural symptoms, such as apathy, although systematic investigations are scant. Here, we aimed to systematically examine apathy across the three recognised subtypes of PPA and evaluate its influence on carer burden and psychological wellbeing. One hundred and thirteen PPA patients were included: 30 left semantic-variant PPA (svPPA), 16 right svPPA, 30 nonfluent variant PPA (nfvPPA) and 37 logopenic variant PPA (lvPPA). Informants completed the Neuropsychiatric Inventory (NPI), Cambridge Behavioural Inventory (CBI) and Frontal Systems Behaviour Scale (FRSBE) to quantify symptoms of apathy, and the Zarit Burden Interview and Depression, Anxiety and Stress Scale, to determine carer burden and psychological wellbeing. On the NPI, symptoms of apathy were reported in 40% left svPPA, 56% right svPPA; 33% nfvPPA and 43% lvPPA patients. Controlling for language functions, symptoms of apathy were more severe in right svPPA compared to nfvPPA and lvPPA. Notably, despite the higher frequency and severity of apathy in right svPPA patients, symptoms of apathy were associated with higher burden and lower wellbeing in the carers of left svPPA, nfvPPA and lvPPA patients only. Our results reveal that apathy is remarkably common in PPA, although the severity of apathy varies across PPA subtypes. Moreover, these symptoms differentially impact on carers of patients depending on the PPA syndrome. As such, carer psychoeducation which addresses non-cognitive behavioural symptoms may be beneficial in improving burden and wellbeing.

MISS JI HYUN YANG

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Altered network connectivity during resting state in Parkinson's disease patients with mild cognitive impairment as a marker for dementia

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Introduction: Cognitive disturbances detrimentally impact Parkinson's disease (PD) patent's quality of life and contributes to a high disease burden. Mild cognitive impairment (MCI) is common in PD and is a prodromal state of dementia. PD-MCI is a strong predictor of developing dementia therefore it is crucial to explore and understand the specific neurobiological changes associated with PD-MCI. This study aimed to investigate brain connectivity associated with PD-MCI during resting state functional MRI.

Method: 17 PD-MCI, 12 PD patients without MCI (non-MCI) and 17 healthy controls were scanned (3T Siemens PRISMA). Seed-based functional connectivity analysis was performed between groups to identify altered connectivity of seeds in the default mode networks such as medial prefrontal cortex (MPFC), bilateral lateral parietal cortex (LP) and posterior cingulate cortex (PCC) compared to other regions.

Results: MPFC and bilateral frontal pole demonstrated greater connectivity in PD compared to healthy controls. Particularly, PCC and the right frontal pole showed greater connectivity in PD-MCI compared to PD non-MCI and healthy controls. Decreased connectivity between MPFC and right inferior temporal gyrus; right LP and right para-hippocampal gyrus; and PCC and right occipital pole were observed between PD-MCI and PD non-MCI.

Discussion: Reduction in functional connectivity was found in PD-MCI. The strengthening of connection with PCC is indicative of a lack of ability to disconnect this region when needed. Altered functional connectivity in the default mode network may correlate with cognitive burden in PD-MCI. Our results extend understanding of the neurobiology of pre-clinical dementia in PD.

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Comorbidity of cerebrovascular disease and amyloid-B and its influence on rates of cognitive decline and neurodegeneration

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Background: Quantifying the contribution of cerebrovascular disease (CeVD) to the Alzheimer's disease clinical phenotype is challenging. We evaluated the prevalence and influence of CeVD in cognitively normal (CN) adults and patients with mild cognitive impairment (MCI) and AD. We hypothesized that CeVD would be associated with cognitive decline and neurodegeneration, and that this association would be greatest in patients with high amyloid-B burden.

Methods: 218 participants underwent PET, MRI and cognitive assessment at 18-month intervals as part of the AIBL Study. MRI images were reviewed for cortical microinfarcts, large cortical infarcts, and lacunes. White-matter hyperintensity (WMH) and hippocampal volume were quantified automatically. A binary CeVD classification was derived, with participants classified V+ if they had ≥1 brain infarct and/or WMH>90th centile compared to CN subjects. AB+ was defined on PET as SUVR/BeCKeT>1.4. Cognition was assessed using the pre-clinical AD composite. Linear mixed models were conducted comparing change in cognition and hippocampal volume between the resultant groups (AB-/V-, AB-/V+, AB+/V-, AB+/V+), adjusting for age, sex and CN/MCI/AD category.

Results: Mean age at baseline was 74yrs. Clinical diagnosis at baseline was CN(115), MCI(54) and AD(49). Compared to AB-/V- and AB-/V+, the AB+/V- and AB+/V+ groups showed significantly faster cognitive decline and hippocampal atrophy. The AB+/V+ group demonstrated significantly greater cognitive decline and hippocampal atrophy than the AB+/V- group. There was no difference in cognitive trajectory or hippocampal atrophy between AB-/V- and AB-/V+.

Conclusions: CeVD increased the rate of cognitive decline and neurodegeneration in AB+ patients. Further results will be presented at ADF.

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The Health Care Home (HCH): will it just end in tiers

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The HCH model of care aims to improve health outcomes by funding integrated and coordinated primary care services for patients with chronic conditions based on tiers of complexity. It is known that the existing primary care model does not meet the needs of people living with dementia (PLWD) and their support persons (SP). As stated in the World Alzheimer Report 2016; dementia is under-detected, under-diagnosed, under-disclosed, under-treated and under-managed in primary care.

Now's the time, when the HCH is being trialled, to ask; will this model of primary care better meet the needs of PLWD and SPs? The use of the HARP risk assessment tool to stratify patients to determine the level of complexity and funding allocation is concerning. This tool considers dementia as an additive factor to complexity, in the same category as falls or incontinence, when in fact dementia is a multiplier of complexity. Will emerging cognitive impairment, with no other co-morbidity, be considered of low complexity with an according low allocation of resources? In reality this is a time when intensive support is vital. How will SPs, with their complex health care needs be considered? Are the projected allocation of resources required to support the HCH with a projected 20% of the population being eligible adequate? Dementia is underrepresented in the hospital data sets, primary care records and population data used to project these numbers.

This poster will summarise the proposed HCH model and identify key issues for discussion and debate when considering PLWD and their SP.

Australian Government

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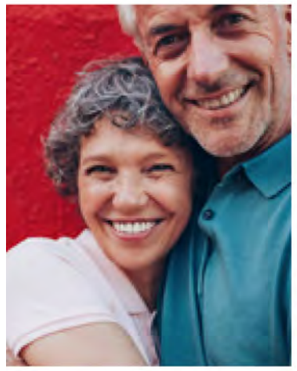

AUSTRALIAN DEMENTIA FORUM ABSTRACTS
Hotel Grand Chancellor Hobart 13-14 June 2019
www.nnidr.gov.au

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AUSTRALIAN DEMENTIA FORUM

Abstracts

Accelerating research. Enhancing collaboration. Creating change.

Hotel Grand Chancellor Hobart, 13-14 June 2019

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INTRODUCTION

At present, it is estimated that over 436,000 Australians are living with dementia.

Globally, a person is diagnosed with dementia every three seconds.

Since 2015, the NHMRC National Institute for Dementia Research (NNIDR) has been targeting, coordinating and translating the strategic expansion of dementia research in Australia. By collaborating with researchers; engaging those living with dementia in research efforts and connecting with health Professionals and policy makers, NNIDR is committed to achieving the World Dementia Council's international target – the identification of a disease-modifying therapy by 2025.

It is in this context that we present to you the full program and abstracts of the Australian Dementia Forum 2019: *Shining a light on the impact of dementia research* (ADF2019).

ADF2019 is being held in Hobart on 13-14 June.

Building on the success of the Australian Dementia Forum 2018, ADF2019 will bring over 400 leading researchers, health service professionals, policy makers, people living with dementia, their carers and family members, together to examine the enormous impact dementia research has on the Australian community.

Researchers submitted over 266 abstracts and of these 73 were selected for presentation, with a further 145 poster presentations across two poster sessions. For the first time in Australian Dementia Forum history, ADF2019 will feature three parallel sessions.

Three international keynote speakers will participate in ADF2019, with a further keynote address to be delivered by Australian researcher, Professor Lizzie Coulson.

Our international keynotes, Professor Carol Brayne CBE from Cambridge University (United Kingdom), Dr Jeff Williamson from Wake Forest Baptist Health (United States) and Dr Margaret Dudley from the University of Auckland (New Zealand) will each share their insights across prevention, care and living with dementia.

ADF2019 will also facilitate vital discussions on dementia research through roundtables, networking opportunities and a research development workshop.

Program Committee

Associate Professor Anna King, Convenor University of Tasmania
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Dr Michele Callisaya University of Tasmania
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Chris Webb National Health and Medical Research Council
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ROUNDTABLE SESSIONS

Wednesday 12 June 2019 - by invitation

9:00 AM TO 11:30 AM

DR CLAIRE BURLEY

Dementia Centre for Research Collaboration (DCRC), University of New South Wales, Sydney

Preventing and managing the behaviours and psychological symptoms of dementia (BPSD)

Behaviours and psychological symptoms of dementia (BPSD) are estimated to effect up to 90 percent of patients and strongly correlate with functional and cognitive impairment (Cerejeira et al., 2012). The topic of BPSD has stirred up much controversy and debate, including: choice of terminology, creating and sustaining dementia friendly communities, reducing stigma through increased education and awareness, determining optimal approaches in the prevention and management, implementing optimal and evidence-based programs through effective knowledge translation, and more recently, determining the economic and societal costs of BPSD on an incremental symptomatic level.

With overwhelming forecasts of increasing dementia incidence, it is imperative that multidisciplinary discussion and action takes place. A BPSD special interest group has recently started at the DCRC, UNSW. The specific aims of the group are to: foster research into the prevention and management of BPSD, encourage research implementation, and encourage collaboration in research and implementation between researchers, service providers, people living with dementia, and their families and/ or care partners. This group is open to anyone with an interest in BPSD, with the intention of bringing together a large group of experts from a diverse background of knowledge and experience.

This invitation is extended to Australian Dementia Forum 2019 attendees and to this Roundtable discussion (if successful). This discussion in Hobart serves an ideal platform for collaboration and growth due to the wide variety of expertise the forum will attract, all of whom are especially interested in dementia and many in BPSD. Every being who has been affected by dementia is an expert in their experience and it is important that this diversity is acknowledged, welcomed, respected and appreciated so that we can join forces and move forward.

Several research themes have been touched upon already though this discussion will invite further suggestions. Below is a summary of discussion points to help guide the session if needed, though the intention is to keep it less structured to encourage new ideas.

10:00 AM TO 12:30 PM

ASSOCIATE PROFESSOR KATE HOY

Monash University

Stimulating Connections: Advancing Brain Stimulation Research in dementia

Dr Ashleigh Smith, NHMRC-ARC Dementia Research Development Fellow, University of South Australia; and Dr Mitchell Goldsworthy, NHMRC-ARC Dementia Research Development Fellow, University of Adelaide

Non-invasive brain stimulation techniques hold considerable promise as novel treatment approaches for dementia. In Australia there are currently over 420,000 people suffering from dementia and, with no significant treatment breakthroughs, this number is predicted to rise to over 1.1 million by 2056. Between 2002 and 2012 there were 413 clinical drug trials for Alzheimer's with an overall failure rate of 99.6%, and of the 244 drugs trialled in this time only one received FDA approval (in 2003). While there are a number of new drugs currently under development, early findings have been largely disappointing. In light of this, the inherent challenges and costs of drug development, and the recent withdrawal of drug companies from Alzheimer's research (i.e. Pfizer announced in January 2018 that it will be ending its research into drug development for Alzheimer's) alternative treatment approaches must be considered. Recent findings regarding the pathophysiology of dementia have indeed suggested an alternative treatment approach, with studies showing damage to specific large-scale, distributed, function-critical neural networks. Whereby it may be the pathophysiological consequences (i.e. abnormal neuronal firing patterns) of the relevant neuropathology which are most related to dementia symptoms. Such pathophysiological processes are ideally suited to both investigation and modulation with brain stimulation techniques that can induce both local and global changes in brain activity (i.e., Transcranial Magnetic Stimulation [TMS], Theta Burst Stimulation [TBS], transcranial Direct and Alternating Current Stimulation [tDCS, tACS]). Indeed in the last 24 months there have been a number of highly promising early findings with respect to the therapeutic potential of these techniques in dementia. However, in order to understand the true potential of these brain stimulation approaches a co-ordinated research effort is required. The quality of research produced by Australia's brain stimulation community is internationally recognised and this community is rapidly growing, as evidenced by the recent formation of the Australasian Brain Stimulation Society (est. 2018). With a strategic and collaborative approach we have the potential to take a leading role internationally in this rapidly developing field. The primary aim of the roundtable discussion will be the formation of a Special Interest Group which will act to facilitate:

1. co-ordination (with respect to sharing of expertise and protocol review/development),

2. collaboration (in order to more rapidly advance this area of research and encourage the pursuit of novel cross disciplinary approaches), and

3. mentoring/sponsorship (to encourage and support the future generation of dementia focused brain stimulation researchers)

It is anticipated that the Special Interest Group will be formed in partnership with Australasian Brain Stimulation Society (A/Prof Hoy is a founding member of the executive committee) in order to maximise impact and reach. As a more immediate outcome the Special Interest Group will also plan to draft and publish a paper on the current state of brain stimulation and future potential of brain stimulation in dementia research; with a view to submit to the leading journal in the field 'Brain Stimulation'.

DR EDWIN TAN

University of Sydney

Safe and effective use of medicines in people living with dementia

Edwin Tan [1], Lisa Kalisch Ellett [2], Tuan Nguyen [2], Julia Gilmartin-Thomas [3], Emily Reeve [2]

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Medication use in people with dementia is challenging. People with dementia are often less likely to receive pharmacological treatment and interventional procedures that could enhance quality of life. The evidence for prescribing medications are usually drawn from trials of younger, healthier individuals, and there is limited guidance for prescribing in people with dementia. Pharmacodynamic and pharmacokinetic changes that occur in this vulnerable population increase the risk of toxicity of some medications. Inappropriate medication use can lead to deteriorations in functional capacity and increase the need for hospitalisation and aged care services. In extreme cases, inappropriate medication use may lead to increased morbidity and mortality.

At this year's roundtable session, we have the privilege of hearing from Dr Juanita Westbury from the University of Tasmania who will present findings and learnings from the Reducing Use of Sedatives or 'RedUSe' project, a nationwide initiative that promotes the appropriate use of sedatives, in particular antipsychotics and benzodiazepines, in residential aged care facilities. The presentation will be followed by an opportunity for group discussion.

The roundtable session will bring together researchers and health professionals who have an interest in optimising medication use in people living with dementia. It will provide opportunities for research collaboration and developing new research directions in this area, and the continuation of an ongoing special interest group.

ASSOCIATE PROFESSOR LEE-FAY LOW

University of Sydney

Rehabilitation in dementia – pathways to practice change

Lee-Fay Low [1]

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Building on our roundtable at the NNIDR 2018, researchers have been reviewing and compiling into a book the evidence that rehabilitation can improve outcomes for people with dementia. While more evidence will need to be generated, we need to understand the contexts (settings, care models, funding mechanisms, workforce) in which rehabilitation is, or could be provided in Australia and start discussing how to influence practice in this space.

Last year's roundtable brought together researchers in rehabilitation in dementia from a range of backgrounds. This year we will invite interested advocacy and service providers to join our discussion (by zoom as needed) in order to discuss strategies that might be undertaken to facilitate practice change. Questions include: What evidence must be generated (i.e. priorities for research)? What attitudinal barriers are there to rehabilitation? What clinical tools might be helpful (e.g. assessment or treatment tools or clinical pathways)? Who are key people who we need to talk to?

DR LYN PHILLIPSON

University of Wollongong

Collaborations and priorities for Dementia-Friendly Research – A Roundtable Discussion

Lyn Phillipson[1] and Dennis Frost[2]

[1]University of Wollongong, [2]Chair, Southern Dementia Advisory Group (Dementia Friendly Kiama); Member, Dementia Friendly Communities Dementia Advisory Group and Dementia Advisory Committee (Dementia Australia)

To address the research priority of 'living well with dementia' the Dementia Friendly Communities (DFC) movement has been highlighted as having a role in promoting 'increased awareness and understanding of rights, needs and experience of people with dementia living in the community'. It may also provide an effective mechanism through which the 'dignity, independence and self-determination of people with dementia' can be supported within local communities. However, despite this potential, and the growing number of projects both nationally and internationally, there is currently no strategic or co-ordinated research agenda through which to build an evidence base for these emerging community-based projects.

The 'Dementia Friendly Research Roundtable' will provide an opportunity for people involved in local 'Dementia Friendly' projects to work collaboratively with current and emerging 'Dementia Friendly' researchers to:

• Identify research themes and priorities to support building an evidence base for 'Dementia Friendly' communities of practice

• Discuss the formation of ongoing Special Interest Groups around these research themes and the resourcing needed to support a DFC 'Research and Action' network

• Identify potential opportunities for coordination and collaboration in research around these themes within existing projects

• Identify targets for potential research opportunities and funding

Importantly this Roundtable will promote the participation of people with dementia and their care partners in leading the agenda for priorities and practice within a Dementia Friendly Research Special Interest Group. This EOI has been developed as a collaboration between a researcher (Phillipson) and a person living with dementia (Frost). In the preparation of submission of this EOI we have also gathered indications of support from: the Dementia Australia Research Foundation (Annette Moxey); Dementia Australia Dementia Friendly Communities Program (Victoria Marshall-Cerins); key Dementia Friendly researchers (e.g. Helen Courtney-Pratt, UTAS and Dr Maria O'Reilly, CQU) and the NHMRC National Institute for Dementia Research. Logistical support to enable the participation of those unable to attend the Roundtable in person will also be explored through the use of 'ZOOM' webinar software. As a result of this roundtable, a communique regarding the feasibility and resourcing associated with supporting a 'Dementia Friendly' Research Interest Group in Australia will be produced.

1.30 PM TO 4.00 PM

ASSOCIATE PROFESSOR MARK YATES

Cognitive impairment Identification and Care in Hospitals

2.30 PM TO 5.00 PM

DR RACHEL WONG

University of Newcastle

Maintaining the blood-brain barrier is critical to protect the ageing brain

Safeguarding the homeostasis of the brain's microenvironment, cerebral endothelial cells form a blood-brain barrier (BBB) of specialised tight junctions in which a complex system of transporters regulates bidirectional trafficking of essential substrates and metabolites of neuronal activity. This unique barrier also keeps neurotoxic substances and pathogens out of the central nervous system. Therefore, a dysfunctional BBB has been thought to compromise brain function, including cognition, but reliable human data are lacking. Simple quantifiable methods and biomarkers are needed to evaluate BBB integrity in the living human brain.

The current imaging method for BBB integrity is via the introduction of gadolinium, a contrast agent, used in magnetic resonance imaging. However, the resolution is insufficient to discriminate between regions and the results are only positive in people with severely compromised BBB function such as in stroke, brain tumours, multiple sclerosis and meningitis, as BBB permeability is typically much lower in the normal ageing brain. Using enhanced contrast, recent research has shown that BBB disruption begins at the hippocampus during normal human ageing and worsens in those with mild cognitive impairment1; similarly a five-year study involving 161 older adults showed that people with severe memory problems had the worse BBB function independent of the presence of abnormal proteins amyloid and tau2, thereby implicating microvascular dysfunction in the initial pathogenesis. A growing body of evidence suggest that early vascular dysregulation associated with cerebral hypoperfusion and impaired haemodynamic responses are already detectable before the manifestation of cognitive decline and/or other brain pathologies. Yet, little attention has been given to this aetiology.

The clinical evidence of whether BBB dysfunction and its sequelae are reversible with treatment is lacking. We and others have demonstrated that non-pharmacological treatments such as nutrients from food ingredients and exercise can restore cerebral vasodilator responsiveness, a key index of cerebrovascular function, which is associated with enhanced cognitive performance in older adults without dementia. Mechanisms of action of nutrients in reversing BBB deficits have also been demonstrated in preclinical models of diabetes, another risk factor for developing dementia.

In this proposed round table event, dementia researchers from both preclinical and clinical research spheres will come together for a high-level discussion regarding the suitability, reliability and affordability of biomarkers such as S100-beta to detect early changes in BBB function in humans that can be used in clinical trials to evaluate various non-pharmacological strategies including lifestyle and dietary changes to prevent or delay accelerated brain ageing. We will also discuss strategies to boost awareness of the importance of optimising the health of the cerebral microvasculature for healthy brain function in the research field as well as to the community. Clinicians and representatives from relevant government and NGOs including Diabetes Australia will also be invited to participate.

1Montagne A, Barnes SR, Sweeney MD, et al. Neuron. 2015; 85:296–302.
2 Nation DA, Sweeney MD, Montagne A, et al. Nature Medicine. Published online January 14, 2019.

PROFESSOR IRENE BLACKBERRY

LaTrobe University

Living well with dementia: what does the future hold for dementia research and knowledge exchange in rural and regional Australia?

In 2018, there were an estimated 436,366 Australians living with dementia and this number is expected to rise to 589,807 by 2028 (1). Dementia creates complex challenges and therefore people living with dementia and their care partners (spouse, family and friends) need access to a variety of medical and social care and support services, in the community as well as in residential care. In rural areas, there is frequently a reduced range of available services and rural people might be obliged to travel longer distances to access services, or there might be reduced availability of services close to home.

Given the tenacious challenges faced by rural communities, the John Richards Centre for Rural Ageing Research, at the La Trobe Rural Health School, La Trobe University, has begun to engage in a program of research to better understand support needs and to trial innovative solutions for increasing support for carers and people living with dementia in rural and regional areas. There are five key projects that the John Richards Centre is currently undertaking, in collaboration with communities, health service partners, and Australian and International researchers:

1. Virtual Dementia Friendly Rural Communities (Verily Connect)

This project is trialling custom-designed and freely available online technologies to make information more accessible and to increase support for carers. Twelve rural communities across Victoria, New South Wales, and South Australia are participating. In addition, volunteers in each community provide face-to-face help to carers in using the technologies.

2. HelpDEM

Volunteers are matched with carers of people living with dementia in two rural communities in Victoria. The trained volunteers serve as a resource that carers can access for information, social and emotional support, friendship, and ideas.

3. Webster Rural and Regional Dementia Care Project

This three-year research initiative is funded through the bequest of Mr Gordon Webster. The project aims to improve dementia care pathways within rural and regional Victoria, with emphasis on developing innovative and sustainable care of residents of Bendigo and surrounding regions.

4. Exploring rural community capacity to enable voluntary and civic participation for people living with dementia

This project aims to determine the potential areas of volunteer engagement for people living with dementia within rural and regional community organisations.

5. Implementing and sustaining Cognitive Screening in Rural and Regional Health Services

This project focusses on overcoming barriers and harnessing facilitators to introduce, implement and sustain effective Cognitive Screening in rural and regional Health Services.

In this round table discussion, researchers and consultants involved with these five projects, will use learnings from the research to highlight challenges, successes, and possible future directions for dementia research in rural areas. A specific focus will be to develop an ongoing Special Interest Group centring on dementia care, support, and research in rural and regional communities.

References:

1. Dementia Australia (2018). Dementia Prevalence Data 2018-2058, commissioned research undertaken by NATSEM, University of Canberra. https://www.dementia.org.au/files/documents/2018-2058%20Prevalence%20CED_AUSTRALIA_alph

FRIDAY 14 JUNE 2019

12.00 PM TO 1.00 PM

DR HELEN MACPHERSON

Deakin University

Dementia Prevention Special Interest Group

This round table will form the basis of an Australian Dementia Prevention Special Interest group. We will provide an update on the scope of research relevant to prevention in Australia. Opportunities to apply for funding, harmonise data sets and prepare a position paper will be explored. We will discuss avenues to disseminate research outcomes via initiatives of the International Research Network on Dementia Prevention (IRNDP).

PROGRAM

THURSDAY 13 JUNE 2019			
0700	Registration desk opens		
JOINT OPENING SESSION **PLENARY SESSION 1**			
0815	Introduction to Plenary – ADF2019 Convenor, Associate Professor Anna King		
0820	Welcome to Country – Rodney Dillon		
0830	Opening Address – Ita Buttrose AO, OBE		
0840	Opening Address – Kevyn Morris, Dementia Advocate		
0850	**Keynote Address** **Professor Carol Brayne CBE, University of Cambridge** ***Contemporary populations and dementia, what have we learnt and where are we headed?***		
0940	Panel Discussion: *Dementia Research in Australia: Past, present & future* – Introduction by Janice Besch, Director, NHMRC National Institute for Dementia Research Facilitated by Maree McCabe, CEO Dementia Australia Panel members: Ita Buttrose AO, OBE, Professor Graeme Samuel AC, Glenn Rees, Associate Professor Anna King, Lucy O'Flaherty, John Quinn and Glenys Petrie		
MORNING TEA			
PARALLEL SESSIONS 1			
	Communities and Dementia	**Clinical Assessment**	**New insights into dementia risk factors**
Chairs	Dr Lyn Phillipson	Associate Professor Adam Vogel and Dr Fiona Kumfor	Associate Professor Michele Callisaya and Dr Chris Moran
1100 – 1115	*Moving Pictures; Raising awareness of dementia in CALD communities through multimedia* Associate Professor Bianca Brijnath	*Delusions in neurodegenerative disorders: Insights into the prevalence, nature and neurocognitive mechanisms* Dr Fiona Kumfor	*Cardiovascular risk associated with poorer memory in middle-aged adults from the Healthy Brain Project* Dr Yen Ying Lim
1115 – 1130	*The dementia knowledge of the Tasmanian community* Dr Claire Eccleston	*Predicting diagnostic change over 6 years using subjective cognitive complaints in the Memory and Ageing Study* Dr Katya Numbers	*Pericyte and vascular changes are associated with the development of amyloid pathology and ageing* Miss Catherine Foster
1130 – 1145	*Delivering an evidence-based dementia rehabilitation program using telehealth* Dr Kate Laver	*The TICS-M telephone cognitive screen: Validation and norms from the Sydney Memory and Ageing Study* Dr Adam Bentvelzen	*Metformin use and risk of Alzheimer's disease among community-dwelling people with diabetes* Dr Janet Sluggett
1145 – 1200	*"Not a robot, because it's so impersonal" technology perspectives of people living with dementia* Dr Jacki Liddle and Mrs Eileen Taylor	*Associations between cognitive function and gait under three dual-task conditions* Miss Oshadi Jayakody	*The relationship between adherence to Australian dietary guidelines and brain health in older people* Miss Fateme Zabetiantarghi
1200 – 1215	*An Environment Assessment Tool for use by people with dementia* Mr Dennis Frost	*Is assessment of executive functions useful in the diagnosis of dementia?* Associate Professor Gail Robinson	*Effects of ageing, sex and menopause on total brain volume* Dr Stephanie Than
LUNCH			
Poster Session *(from 1245)* **Priority Areas: Assessment and Diagnosis, Intervention and Treatment, Prevention**			

PARALLEL SESSIONS 2			
	Residential Aged Care	**Neuroscience**	**Living with dementia**
Chairs	Dr Dina LoGiudice and Associate Professor Lyn Goldberg	Dr Brad Sutherland and Associate Professor Lezanne Ooi	Dr Helen Courtney-Pratt and Ms Kate Lawler
1345 – 1400	*Practical issues in intervention research in residential aged care facilities: Insights from the BPSDplus project* Dr Moyra Mortby	*Brain iron is associated with accelerated cognitive decline in people with Alzheimer pathology* Dr Scott Ayton	*Effective involvement of people living with dementia in research – supported participation* Mrs Theresa Flavin
1400 – 1415	*Challenges in undertaking ethnographic research in a secure dementia-care unit* Ms Andrea Price	*Autophagy-lysosomal-protein changes in late-stage pathologically-confirmed human post-mortem brains of Alzheimer's compared with Lewy body diseases* Dr Siva Purushothuman	*Whose values are relevant in dementia quality of life? A comparative analysis of preference elicitation* Dr Kim-Huong Nguyen
1415 – 1430	*Innovations in monitoring health and medications of people with dementia in residential aged care facilities* Dr Kim Lind	*Using patient monocyte-derived microglia to personalize treatment for Alzheimer's disease* Associate Professor Anthony White	*Expectations for the future in people with dementia: An exploration of their care partners' understandings* Ms Sheridan Read
1430 – 1445	*Do acetylcholinesterase inhibitors prevent or delay psychotropic prescribing in people with dementia?* Dr Edwin Tan	*Late-life environmental enrichment preserves short-term memory and may attenuate microglia in male APP/PS1 mice* Dr Jenna Ziebell	*Involving those with the lived experience in dementia research means we all win* Mrs Bobby Redman
1445 – 1500	*Providing optimal nutrition in residential aged care: The role of staff and family knowledge* Dr Emma Lea	*IU1, a selective inhibitor of deubiquitinating enzyme USP14 inhibits Aβ toxicity in neuronal cells* Dr Prashant Bharadwaj	*Consumer perspectives: How younger onset dementia impacts workforce participation during onset and progression of symptoms* Ms Catherine Andrew and Mr Phil Hazel
1500 – 1515	*Residential respite care associates with lower likelihood of using long-term care for people with dementia* Dr Stephanie Harrison	*Oligodendrocytes in the motor cortex from patients with ALS have an RNA trafficking deficit* Dr Samantha Barton	*Better understanding quality of care - capturing the voice of people living with dementia* Ms Madeleine Gardam
AFTERNOON TEA			
PLENARY SESSION 2			
1545	Introduction to Plenary – Professor John McNeil		
1550	**Keynote Address:** **Dr Jeff Williamson, Wake Forest University School of Medicine** ***Intensive v. Standard Blood Pressure Control for the Prevention of Dementia: SPRINT MIND***		
1640	Academic Debate: *APOE gene status – to know or not to know* Moderated by Dr Maree Farrow, University of Tasmania Speakers: Professor Kaarin Anstey, Neuroscience Research Australia; Dr Jo Burke, Tasmanian Clinical Genetics Service; Dr Tony Cook, University of Tasmania, and Professor Ralph Martins AO, Edith Cowan University & Macquarie University		
1730	**DAY 1 PROGRAM CONCLUDES**		
WELCOME RECEPTION **1800 -2000** **Hobart Function and Conference Centre**			

FRIDAY 14 JUNE 2019			
0700	Registration desk opens		
PLENARY SESSION 3			
0825	Introduction to Plenary – Professor Elizabeth Beattie		
0830	**Keynote Address** **Dr Margaret Dudley, University of Auckland** ***Māori and Dementia***		
0920	Dementia research impact stories: Professor Ashley Bush, Professor James Vickers and Associate Professor Belinda Goodenough		
MORNING TEA			
PARALLEL SESSIONS 3			
	Health of Aboriginal and Torres Strait Islander peoples	**Genetics and Biomarkers**	**Risk, prevention and public perceptions**
Chairs	Aunty Patsy Cameron and Professor James Vickers	Dr Carole Dobson-Stone and Dr Matthew Kirkcaldie	Dr Maree Farrow and Professor Kaarin Anstey
1045 – 1100	*Identifying the cognitive care needs of older Aboriginal and Torres Strait Islander people* Dr Jo-anne Hughson	*Neurofilament light chain in neuropsychiatric and neurodegenerative disorders: A 'C-Reactive protein' for the brain?* Dr Dhamidhu Eratne	*Examining the predictors of 'dementia worry' in a community sample* Dr Shannon Klekociuk
1100 – 1115	*A best-practice guide to dementia care in Aboriginal and Torres Strait Islander primary health care* Dr Mary Belfrage	*Age and gender-specific changes to sphingolipid metabolism may sensitise brain regions to neurodegeneration* Dr Timothy Couttas	*Motivations, obstacles and increasing engagement in online studies of Alzheimer's disease: the Healthy Brain Project* Miss Alexandra Lavale
1115 – 1130	*Items of the Good Spirit, Good Life quality of life tool for older Aboriginal Australians* Dr Kate Smith and Mr Harry Douglas	*Genetic findings from the Dominantly Inherited Non-Alzheimer's Disease (DINAD) Study* Associate Professor John Kwok	*The effect of a six-month high-intensity exercise intervention on verbal learning and memory* Dr Belinda Brown
1130 – 1145	*The Preventing Dementia Massive Open Online Course (PD MOOC): Contribution to Indigenous health and wellbeing* Ms Dianne Baldock	*Hippocampal volume associated with object-location memory impairment in Huntington's disease* Dr Yifat Glikmann-Johnston	*Impact of a randomized controlled trial to reduce sitting on cognitive function in older people* Dr Paul Gardiner
1145 – 1200	*Promoting dementia awareness and prevention across the life course with Aboriginal communities* Dr Kylie Radford	*A novel causative gene for frontotemporal dementia – amyotrophic lateral sclerosis* Dr Carol Dobson-Stone	*Circadian rhythmicity relates to neuropsychological and neuroimaging markers in older people at risk for dementia* Professor Sharon Naismith
LUNCH			
Poster Session (*from 1230*) **Priority Areas: Care and Living with Dementia**			

PARALLEL SESSIONS 4				
	Dementia Care Services	**Clinical Interventions**	**Public Information Session**	
Chairs	Dr Kathleen Doherty and Ms Laura Tierney	Dr Juanita Westbury	Professor James Vickers	
1330 – 1345	*Do psychosocial work characteristics predict turnover intentions of aged and dementia care workers in Australia?* Dr Kate-Ellen Elliott	*A pilot cluster RCT of an Alzheimer's family caregiver intervention in Hanoi, Vietnam: REACH VN* Dr Tuan Anh Nguyen	1330 - 1335	*Introduction to session* Dr Maree Farrow
1345 – 1400	*Social participation and wellbeing of older adults with dementia in community aged care* Dr Joyce Siette	*Dementia Stigma Reduction (DESeRvE): Randomised controlled trial to reduce dementia-related stigma in the general public* Dr Sarang Kim	1335 - 1350	*Brain training: Cochrane Review on cognitive training in dementia* Dr Alex Bahar-Fuchs
1400 – 1415	*Provider perspectives on consumer directed care: Facilitators and tensions in supporting people with dementia* Dr Lyn Phillipson	*Addressing inappropriate medication use in people with dementia: A role for pharmacists in memory clinics?* Mrs Amanda Cross	1350 - 1405	*Blood pressure and dementia* Dr Jeff Williamson
1415 – 1430	*Family-assisted therapy for people living with dementia: A systematic review and meta-analysis* Dr Katherine Lawler	*CogStep: A combined psycho-education and home-based exercise program for individuals with early stage Alzheimer's disease* Dr Shantel Duffy	1405 - 1420	*Sleep and dementia* Professor Sharon Naismith
1430 – 1445	*Using administrative data to understand the health profile of people with less common dementias* Dr Rachael Cvejic	*Invasive experimental brain surgery for dementia: Ethical shifts in clinical research practices* Dr Frédéric Gilbert	1420 - 1435	*Physical activity and dementia* Dr Michele Callisaya
1445 – 1500	*Transitions through aged care in the last five years of life among those with dementia* Dr Heidi Welberry	*Early recognition and management of neuropsychiatric symptoms to improve quality of life in Alzheimer's disease* Dr Willem Eikelboom	1435 - 1450	*Public involvement in dementia research* Mrs Jane Thompson
			Q&A	
AFTERNOON TEA				
PLENARY SESSION 4				
1530	Introduction to Plenary Session – Ms Janice Besch			
1535	**Keynote Address** **Dr Elizabeth Coulson, Clem Jones Centre for Ageing Dementia Research** ***Obstructive sleep apnoea as a risk for Alzheimer's disease: what a mouse models tells us***			
1625	*A participant reflection of clinical dementia research* - Eileen and Dubhglas Taylor *The Australian Dementia Network* – Professor Christopher Rowe *Diagnosing non-Alzheimer dementias known as DiNAD* - Professor Glenda Halliday			
1715 - 1730	**Award presentation and Closing**			

KEYNOTE SPEAKERS

Professor Carol Brayne CBE

Professor Carol Brayne is Professor of Public Health and Epidemiology at the University of Cambridge

Professor Brayne is lead principal investigator in the group of MRC CFA Studies which have informed and will continue to inform national policy and scientific understanding of dementia in whole populations. She has been responsible for training programmes in epidemiology and public health for under and postgraduates since the early nineties.

Dr Jeff Williamson MD

Jeff D. Williamson, MD, MHS is Professor of Internal Medicine and Epidemiology and Chief, Section on Gerontology and Geriatric Medicine at Wake Forest University School of Medicine.

Dr. Williamson's primary research interests are in understanding relationships between chronic diseases such as hypertension and diabetes and maintaining brain health and physical function in aging adults, the prevention of aging-related loss of independence, and in developing research methods for including elderly persons in clinical trials. His most recent work is in developing and testing approaches to improving care coordination for vulnerable elderly patients as they traverse the health care system. Dr. Williamson is currently serving on the leadership team for 3 nationwide research studies funded by the National Institutes of Health. Altogether, his NIH research studies have involved more than 30,000 adults over age 65 and 15,000 persons over age 75.

Dr Margaret Dudley

Dr Dudley teaches cultural competence and neuropsychology at the University of Auckland.

Her interests include cognition and the ageing brain, and increasing the Māori workforce capacity in the mental health sector. Dr Dudley leads a large research project to develop a theory and diagnostic tool for dementia in Māori. She firmly believes the interface of science and mātauranga Māori is the way forward for a better world for Māori and New Zealand as a whole.

Professor Lizzie Coulson

Professor Coulson is Group Leader in dementia research at Clem Jones Centre for Ageing Dementia Research, and a founding member of the Queensland Brain Institute.

Professor Coulson's career has focused on understanding the molecular mechanisms regulating neuronal survival and death, with a view to translating these findings into treatments for neurodegenerative diseases, in particular Alzheimer's disease and motor neuro ne disease. Professor Coulson has also investigated the connection between disturbed sleep and cognitive decline in people living with Alzheimer's disease.

PRESENTATION ABSTRACTS

Prevention

DIANNE BALDOCK

Wicking Dementia, Research and Education Centre

The Preventing Dementia Massive Open Online Course (PD MOOC): Contribution to Indigenous Health and Wellbeing

Ms Dianne Baldock[1], Associate Professor Lynette Goldberg[2], Professor James Vickers[2]

[1]Circular Head Aboriginal Corporation, Smithton, Australia, [2]Wicking Dementia Research and Education Centre, University of Tasmania, Hobart, Australia

Dementia is a global public health issue. Indigenous people are at increased risk due to complex intergenerational factors grounded in inequality in health services and economic and educational opportunities. While there remains no drug-related cure for this progressive neurological condition, evidence confirms that increased understanding of dementia and modification of lifestyle factors can reduce risk. The primary risk factors that are potentially modifiable are: not completing secondary school, midlife hypertension, obesity, type II diabetes, depression, physical inactivity, smoking, hearing loss acquired after the age of 55 years, and social isolation. Addressing these modifiable factors globally could prevent or delay over 40 million cases of dementia. The free Preventing Dementia Massive Open Online Course (PD MOOC) is a globally-recognised 5-week course that aims to build self-efficacy in knowledge and management of modifiable risk factors. The course has reached over 68,000 people world-wide and is rated highly; however, its contribution to Indigenous communities has not yet been investigated. We report on the impact of the PD MOOC in a cohort of 16 Indigenous people (20-65 years of age) in Circular Head, Tasmania. All had completed secondary school. Prior to the course, participants' identified risk factors were, in order: depression; midlife hypertension; physical inactivity; acquired hearing loss; smoking; obesity; and social isolation. No participant had diabetes. Six months after the course, all reported they were working to reduce their identified risk factors and described how. Most found the course understandable and respectful but suggested additional content about dementia prevention in Indigenous communities.

DR BELINDA BROWN

Murdoch University

The effect of a six-month high-intensity exercise intervention on verbal learning and memory

Dr Belinda Brown[1], Mrs Natalie Castalanelli[2], Dr Stephanie Rainey-Smith[3], Dr James Doecke[4], Dr Michael Weinborn[2], Dr Hamid Sohrabi[3], A/Professor Simon Laws[3], Professor Ralph Martins[3], A/Professor Jeremiah Peiffer[1]

[1]Murdoch University, Perth, Australia, [2]University of Western Australia, Perth, Australia, [3]Edith Cowan University, Perth, Australia, [4]CSIRO, Brisbane, Australia

Although extensive evidence exists to support the use of exercise to maintain cognitive health, little is known about the type of exercise that is of greatest benefit to the brain. We investigated the role of a six-month high-intensity exercise intervention on verbal learning and memory in a group of cognitively normal older adults.

Men and women (60-80y) were randomised to either six-months of high-intensity exercise (n=33), moderate-intensity exercise (n=34) or control (n=32). All participants underwent fitness testing and verbal learning and memory assessment using the California Verbal Learning Test (CVLT) pre- and post-intervention. We evaluated group differences on CVLT performance pre- to post-intervention, and, in the exercise groups, whether changes in fitness were associated with changes in cognition from pre- to post-intervention.

No differences were observed across groups in terms of performance on the CVLT from pre- to post-intervention. Nevertheless, when evaluating the role of fitness in modulating cognition, we observed an Association between increases in fitness and improvements on CVLT learning (F=7.30, p=0.009). Post-hoc exploratory analyses revealed the Association between changes in verbal learning and changes in fitness were only evident in apolipoprotein ε4 allele carriers (genetic risk-factor for Alzheimer's disease).

Although no changes in verbal learning and memory were observed from pre- to post- exercise intervention, our results suggest increases in cardiorespiratory fitness in response to exercise may play a role in inducing cognitive change. In addition, our findings indicate apolipoprotein ε4 carriers may receive the greatest cognitive benefit from increases in cardiorespiratory fitness.

DR PAUL GARDINER

University Of Queensland

Impact of a randomized controlled trial to reduce sitting on cognitive function in older people

Dr Paul Gardiner[1], Ms Lily Grisby-Duffy[1], Mr Adam Novic[1], Dr Maike Neuhaus[1], Dr Lucy Lewis[3], Dr Amber Watts[6], Professor Nicola Lautenschlager[5], Professor Kaarin Anstey[4], Dr Dori Rosenberg[2]

[1]The University Of Queensland, Woolloongabba, Australia, [2]Kaiser Permanente Washington Health Research Institute, Seattle, USA, [3]Flinders University, Adelaide, Australia, [4]University of New South Wales, Sydney, Australia, [5]The University of Melbourne, Melbourne, Australia, [6]The University of Kansas, Lawrence, USA

This study aimed to evaluate the impact on cognitive function of an intervention targeting reducing and interrupting prolonged sitting compared with usual practice.

42 inactive pre-frail/frail older people were recruited from a seniors centre and randomized to intervention or usual care. The 12-week REduce Sitting to improve Cognitive fUnction in Elders (RESCUE) program was delivered by a health coach in one face-to-face and five telephone sessions. The intervention group completed a workbook during the sessions with the health coach and received printed feedback on device-measured sitting at their initial session. Primary outcome was cognitive function (California Verbal Learning Test and Trail Making Test)

with secondary outcomes of sitting, standing, stepping (activPAL). Analysis was by linear mixed models.

At baseline, participants (88% women; mean±SD age = 80±7 years; MMSE = 29.1±1.0) sat for 607±135 minutes, stood for 258±104 minutes, and stepped for 68±28 minutes of their waking hours. 19 participants completed each condition. There was no intervention effect for the California Verbal Learning Test -0.3 (95%CI: -1.7, 1.0) words. Intervention effects, favouring intervention group, were observed for Trail Making A test -7.3 (-13.7, -1.0; baseline = 43.4±17.7) seconds; Trail Making B test -20.2 (-37.9, -2.5; baseline = 131.3±57.5) seconds; daily sitting accrued in bouts longer than 30 minutes -57.8 (-111.3, -4.2) minutes/day, standing 36.7 (7.3, 65.7) minutes/day; and, stepping 8.5 (2.8, 14.3) minutes/day.

RESCUE successfully reduced prolonged sitting time and positive changes were observed for visual attention and task switching but not verbal learning and memory.

DR SHANNON KLEKOCIUK

Wicking Dementia Research and Education Centre

Examining the predictors of 'dementia worry' in a community sample

Dr Shannon Klekociuk[1], Dr Claire Eccleston[1], Mr Aidan Bindoff[1], Dr Maree Farrow[1]
[1]Wicking Dementia Research & Education Centre, Hobart, Australia

Dementia worry (DW) is an emerging phenomenon which describes a state of concern or anxiety related to the development of dementia. Factors Associated with high levels of DW are family exposure to dementia, subjective cognitive complaints, being younger, being female, and having less knowledge about dementia, although findings are inconsistent. Participants from the 2016 Preventing Dementia Massive Open Online Course (n= 3323, mean age= 51, 91% female) completed a suite of surveys aimed at quantifying their level of DW, as well as their dementia knowledge, psychological status, and exposure to dementia. The regression model was significant, explaining 24% of the variance in DW $F(17, 3305) = 63.1$, $p < .001$, $R2 = .24$). Subjective memory rating (past two years) was a significant predictor, with memory decline predicting higher DW scores (B = 3.6), whereas memory improvement predicted lower scores (B = -.27), when compared to reports of no change in function. Similarly, those who rated their current memory as "Poor" (B = 25.0) scored higher on the DW scale than participants who rated their memory as "Excellent" (B = 14.6). Positive family exposure ($F(1, 3305) = 39.3$, $p <.001$) had a moderate positive impact on DW (B = 1.5). Overall, poor subjective appraisal of memory function (past and present) and family exposure to dementia appear to be the most influential on level of DW. It may be possible to reduce DW in the community by helping people appraise their memory appropriately, particularly for those who have family members with dementia.

MISS ALEXANDRA LAVALE

The Florey Institute of Neuroscience and Mental Health

Motivations, Obstacles and Increasing Engagement in Online Studies of Alzheimer's disease: the Healthy Brain Project

Alexandra Lavale[1], Lisa Bransby[1], Christa Dang[1,6], David Baxendale[1], Rachel Buckley[1,3,4,5], Matthew Pase[1], Nawaf Yassi[1,2], Yen Ying Lim[1]

[1]The Florey Institute of Neuroscience and Mental Health, Parkville, VIC, Australia, [2]Department of Medicine and Neurology, Royal Melbourne Hospital, University of Melbourne, Parkville, VIC, Australia
[3]Department of Neurology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA, [4]Center for Alzheimer Research and Treatment, Department of Neurology, Brigham and Women's Hospital, Boston, MA, USA, [5]Melbourne School of Psychological Sciences, University of Melbourne, Parkville, VIC, Australia, [6]Department of Obstetrics & Gynaecology, University of Melbourne, Parkville, VIC, Australia

Alzheimer's disease (AD) remains clinically silent for decades despite abnormal accumulation of AD proteinopathies. Many studies recruit middle-aged adults to characterise disease presentation in this very early stage. As AD is considered a disease of aging, the continued engagement of middle-aged adults in such studies can be challenging. One method involves using online platforms to recruit, monitor and assess participants. We surveyed a large sample of middle-aged adults with family histories of dementia to understand their motivations for participation, obstacles to continued participation, and methods of increasing engagement in online studies.

953 cognitively normal adults aged 40-70 with a family history of dementia were asked about their motivations, obstacles impeding participation, and methods of increasing future engagement.

Common participation obstacles were time commitment (42%), inconvenience (28%), and unawareness of opportunities to participate (28%). Most common reasons for participating were family history of dementia (51%) and wanting to help advance AD research (45%). Participants indicated that personalised progress reports (84%) and reminder emails (64%) would facilitate engagement. Most participants were willing to provide a saliva sample (83%), undergo neuroimaging and blood assessments (~74%). Most participants (73%) would like to receive testing results even if their utility strictly pertains to research.

Our results uncover factors that motivate middle-aged adult participation in AD research. They also support online platform use as a recruitment tool for detailed biomarker assessments. Given the interest in individualised test results, future research is directed to understanding the ethical implications and best-practise methods of disclosure.

DR YEN YING LIM

The Florey Institute of Neuroscience and Mental Health

Cardiovascular Risk Associated with Poorer Memory in Middle-Aged Adults from the Healthy Brain Project

Dr Nawaf Yassi[1,2], Dr Rachel Buckley[1,3,4,5], Dr Matthew Pase[1], Dr Yen Ying Lim[1]

[1]The Florey Institute of Neuroscience and Mental Health, Parkville, Australia, [2]Department of Medicine and Neurology, Royal Melbourne Hospital, University of Melbourne, Parkville, Australia, [3]Department of Neurology, Massachusetts General Hospital and Harvard Medical School, Boston, USA, [4]Center for Alzheimer Research and Treatment, Department of Neurology, Brigham and Women's Hospital, Boston, USA, [5]Melbourne School of Psychological Sciences, University of Melbourne, Parkville, Australia

Midlife cardiovascular risk is Associated with worse cognition and increased risk of dementia in late-life. We aimed to use remote online assessment of cognition and cardiovascular risk in a large group of middle-aged adults to further investigate this Association.

The Healthy Brain Project is an online cohort of middle-aged adults (40-70 years) with a family history of dementia who have undergone cognitive assessment, and self-reported demographic, medical and health history. Cardiovascular risk was determined by combining history of hypertension, hypercholesterolaemia, diabetes mellitus, obesity (body mass index ≥ 30), and current cigarette smoking. Each item contributed a score of 1 (maximum score of 5). Participants were grouped into at-risk (n=273) if their score was ≥2 and low-risk (n=1214) if their score was ≤1. We also explored the effect of each cardiovascular risk component on memory. Age, sex and education were included as covariates.

The at-risk group performed worse on learning and memory than the low-risk group (p=.024, Cohen's d=0.14). Groups did not differ on psychomotor function, complex attention, or working memory (all p's>.13; all d's<0.10). Individually, only obesity (β=-0.174, p=.039) and current cigarette smoking (β = -0.638, p = .001) were Associated with poorer memory.

The presence of at least two cardiovascular risk factors was Associated with poorer memory performance. Our results indicate that obesity and current cigarette smoking were the strongest contributors to this Association. These results suggest that remote online assessment of cardiovascular risk is Associated with poorer memory performance in cognitively normal middle-aged adults.

PROFESSOR SHARON NAISMITH

Healthy Brain Ageing, Brain and Mind Centre, University of Sydney

Circadian Rhythmicity Relates to Neuropsychological and Neuroimaging Markers in Older People at Risk for Dementia

Professor Sharon Naismith[1], Mr Jonathon Pye[1], Mr Jake Palmer[1], Dr Shantel Duffy[1]

[1]Healthy Brain Ageing Program, School of Psychology, University of Sydney, Camperdown , Australia

Changes in circadian regulation of the sleep-wake cycle occur with ageing and may be linked to neurodegeneration. It is unclear the extent to which such changes are evident in mild cognitive impairment (MCI), and how they relate to neuropsychological functioning, the integrity of key temporal lobe structures and longitudinal decline.

334 older individuals with subjective cognitive impairment (SCI) and MCI underwent neuropsychological, clinical and wrist-worn actigraphic assessments. Sixty individuals also underwent neuroimaging. Non-parametric circadian rhythm analysis was performed from raw activity counts to obtain intradaily variability, interdaily stability, and activity during the least and most active 5-hours and 10-hours of the day. Cosinor methods were used to derive amplitude, mean, and variability of the rest-activity rhythm. Cortical thickness of the entorhinal cortex and hippocampal volume were derived. Ninety individuals had 2-year longitudinal follow-up data from which memory decline scores were computed.

Compared to SCI, MCIs showed significantly greater intradaily variability, lower activity amplitude across the circadian period, and lower activity during the most active 10-hour period. Across both groups, circadian disruption was significantly associated with poorer verbal memory, visuospatial memory and confrontation naming. Lower activity amplitude was Associated with reduced entorhinal cortex thickness. Longitudinally, greater activity during the least active 5-hours of the day was significantly associated with memory decline.

Rest-activity cycle disruptions relate to memory and language decline cross-sectionally, memory decline longitudinally, and degeneration of key temporal brain regions. Such cycle alterations may represent a preclinical or prognostic marker for dementia and may warrant intervention.

DR KYLIE RADFORD

Neuroscience Research Australia (Neuroscience Research Australia)

Promoting dementia awareness and prevention across the life course with Aboriginal communities

Kylie Radford[1,2], Wendy Allan[1], Terrence Donovan[1], Alison Timbery[1], Kylie Sullivan[1], Margaret Anderson[1], Madeleine Nichols[1], Louise Lavrencic[1]

[1]Aboriginal Health & Ageing Program, Neuroscience Research Australia (Neuroscience Research Australia), Sydney, NSW, Australia, [2]School of Medical Sciences, University of New South Wales, Sydney, NSW, Australia

Increasing numbers of Aboriginal and Torres Strait Islander Australians are living to old age, at which time life expectancy is similar to non-Indigenous Australians. Despite relatively high rates of dementia, the majority of older Aboriginal Australians do not have dementia or cognitive decline and many are ageing well. The Sharing the Wisdom of Our Elders project focuses on their experiences and knowledge to develop culturally meaningful and strength-based resources to raise awareness of healthy ageing and dementia prevention with Aboriginal people of all ages. This project identified

factors (themes) for "growing old well" using a grounded theory approach to analyse responses to an open-ended interview question from the Koori Growing Old Well Study follow-up (KGOWS; N=165). We then invited submissions from local artists to visually represent the major themes and stories. Themes and artworks were combined with population level data from KGOWS baseline life course health and wellbeing survey (N=336), to produce engaging evidence-based health promotion resources. Key 'ageing well' themes from the perspectives of older Aboriginal people included: connections to Culture; resilience; living a good respectful life; keeping healthy to live a long life; saying no to smoking, drugs and alcohol; respect for Elders and all the mob; and lifelong education. Mounting evidence indicates that dementia prevention needs to start from mid-life or younger, but effectively translating this message can be challenging. This project recognizes the cultural significance and wisdom of Elders to help raise awareness of dementia and promote dementia prevention across the life course with Aboriginal communities.

DR JANET SLUGGETT

Monash University

Metformin use and risk of Alzheimer's disease among community-dwelling people with diabetes

Janet K Sluggett[1,2*], Marjaana Koponen[1,3,4*], J Simon Bell[1,2,3,5,6], Heidi Taipale[3,4,7,8], Antti Tanskanen[7,8,9], Jari Tiihonen[7,8,10], Matti Uusitupa[11], Anna-Maija Tolppanen[3,4], Sirpa Hartikainen[3,4]

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Type 2 diabetes has been linked to increased dementia risk. Existing research suggests metformin use may be Associated with an increased risk of Alzheimer's disease (AD). We investigated whether metformin use modifies the Association between diabetes and incident AD.

A case control study nested within the Medication Use and Alzheimer's disease (MEDALZ) study was undertaken. Cases were all community-dwelling Finns with a verified AD diagnosis from 2005-2011, and with diabetes diagnosed ≥3 years prior to AD. Cases were matched with up to 2 controls by age, sex and diabetes duration. We determined metformin exposure from dispensings between 1995 and up to 3 years prior to AD diagnosis. Conditional logistic regression was used to estimate Associations, with adjustment for potential confounders.

9862 cases and 19550 controls with a median age of 81 years were included. Metformin use (ever use) was not Associated with incident AD. The adjusted odds of incident AD were lower among people dispensed metformin for ≥10 years (adjusted odds ratio (OR) 0.85, 95% CI 0.76-0.95), dispensed cumulative defined daily doses (DDDs) of <1825-3650 (aOR 0.91, 95% CI 0.84-0.98) and >3650 DDDs (aOR 0.77, 95% CI 0.67-0.88), and among persons dispensed an average of 2g metformin daily (aOR 0.89, 95% CI 0.82-0.96).

Our findings suggest metformin does not increase the risk of AD, with long-term and high-dose use Associated with a lower risk of AD. The apparent Association with increased AD risk in previous studies may reflect medication exposure assessment too close to the outcome.

DR STEPHANIE THAN

Monash University

Effects of ageing, sex and menopause on total brain volume

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Greater age and female sex are risk factors for dementia. Menopause is Associated with cognitive dysfunction and may contribute to dementia risk. Previous work has considered the effects of ageing and menopause as additive. We aimed to study whether ageing and menopause interact to amplify each other's effect on imaging biomarkers of dementia.

Cross-sectional study of participants with detailed structural brain magnetic resonance imaging data from the UK Biobank, a community-based cohort over 40 years of age in the United Kingdom. Using linear regression modelling, we explored the Associations of age, sex and menopausal status with total brain volume (TBV), examining for interactions, and adjusting for APOE4 status.

Data were available for 1824 postmenopausal women, 233 premenopausal women and 2165 men (median age 63.3, range 44.6–78.0 years). There was an interaction between sex and age ($p<0.01$) such that the negative Association of age with TBV was greater in women (β=-5.42, 95%CI:-5.75 to -5.10) than men (β=-4.74, 95%CI:-5.54 to -3.94). In women, there was an interaction between menopausal status and age ($p=0.01$) such that the negative Association of age with TBV was greater in post-menopausal women (β=-5.89, 95%CI:-6.33 to -5.45) than pre-menopausal women (β=-2.87, 95%CI:-5.70 to -0.04). Use of hormonal replacement therapy did not significantly alter this relationship.

Increasing age, female sex, and the occurrence of menopause appears to have synergistic effects on TBV. Further work is required to understand the mechanisms driving these Associations, to develop ways to prevent or delay neurodegeneration and dementia.

MISS FATEME ZABETIANTARGHI

Menzies Institute for Medical Research

The Relationship between Adherence to Australian Dietary Guidelines and Brain Health in Older People

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Cognitive dysfunction is common in older people, particularly among those with type 2 diabetes (T2D). Dietary Guidelines are evidence-based recommendations to promote health and wellbeing. Higher adherence to American Dietary Guidelines is Associated with better cognition and brain structure. However, it is unknown if greater adherence to Australian Dietary Guidelines (ADG) is Associated with lower cognitive dysfunction in people with and without T2D. The aims of this study were to 1) examine the relationship between adherence to ADG and both cognition and brain structure2) determine whether T2D modifies any Associations.

The Cognition and Diabetes in Older Tasmanians study consisted of 689 people (n=343 T2D) aged 55-90 years. The 80-items Cancer Council Food Frequency Questionnaire was used to assess dietary intake. Neuropsychological tests and magnetic resonance imaging were performed. A score was calculated to assess compliance with the 2013 ADG. General linear models were used to assess the Associations between ADG scores and cognitive z-scores adjusted for age, sex, education, mood and vascular risk factors including T2D. An interaction term with T2D and ADG scores was tested in the model.

The mean ADG score was 65.4 (SD 11.7) (range 24.1 to 95.0). No Associations were observed between adherence to ADG and cognition or brain structure. T2D did not modify any Associations (p>0.05).

This is the first study that investigates the Association between adherence to ADG and brain health. Future prospective studies are required to determine the long-term Associations between adherence to ADG and brain health.

DR JENNA ZIEBELL

Wicking Dementia Research and Education Centre

Late-life environmental enrichment preserves short-term memory and may attenuate microglia in male APP/PS1 mice

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Environmental enrichment (EE) has been consistently reported to enhance cognitive function in mouse models of neuropathology. Microglia, the immune cells of the brain, have recently been implicated in AIzheimer's disease pathology (AD) to unknown effect. The aim of the present study was to investigate the effect of EE on cognitive function and the potential role of microglia in mouse models of ageing and AD pathology. Male wild-type (Wt) and AD (APP/PS1) mice were randomly assigned to standard housing (SH) or EE from 12 to 18 months of age. Memory testing was performed using maze tasks. Immunohistochemical analysis of AD pathology (plaque load), and microglia function, location, and appearance was examined between conditions. AD mice housed in EE from 12 months of age, had improvements in their short-term memory, despite no reduction in their disease progression (plaque load). APP/PS1 mice in EE had significantly (p = 0.01) higher colocalization of Iba1 and CD-68 labelling, indicative of increased phagocytic microglia compared to mice from SH, which suggests improved functional capacity of microglia. AD mice in SH, had no improvements to their short-term memory, but had an increased immunoreactivity for microglia in their neocortex and hippocampus relative to WT animals. The findings of the present study suggest that EE after substantial disease progression, has the potential to preserve domains of cognitive function, but does not affect AD pathology (plaque load). The current study demonstrates that EE may attenuate microglia in ageing APP/PS1 mice, and may promote alterations in cellular phenotype.

Assessment and Diagnosis

DR MARY BELFRAGE

University Of Melbourne

A best-practice guide to dementia care in Aboriginal and Torres Strait Islander primary health care

Dr Mary Belfrage[1], **Dr Jo Hughson[1], Professor Leon Flicker[2], Dr Kate Smith[2], Professor Dawn Bessarab[2], Professor David Atkinson[3], Professor Sandra Thompson[4], Dr Kylie Radford[5,10], A/Professor Edward Strivens[6,8], Adjunct Professor Mark Wenitong[7], Professor Dimity Pond[11], A/Professor Dina LoGiudice[1,9]**

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This presentation will describe the development of a best-practice guide to cognitive impairment and dementia care in Aboriginal and Torres Strait Islander primary health care settings. The guide has been developed as part of the Let's CHAT (Community Health Approaches To) Dementia study which is a randomised control trial based in 12 Aboriginal Community Controlled Health Services throughout Australia, with the aim of optimising detection and management of cognitive impairment and dementia in Aboriginal and Torres Strait Islander populations.

The guide aims to embed cultural principles and key elements of service design in the translation of clinical evidence into health care that is effective in improving health outcomes.

Consensus about cultural and clinical components of the guide was reached through a modified Delphi process and other consultations. The modified Delphi process involved 2 separate surveys (Round 1 and 2) sent to 60 people. Invitees represented wide-ranging perspectives, experience and expertise including: Aboriginal, Torres Strait Islander and non-Indigenous; urban, rural/regional and remote; and clinicians and researchers with relevant experience and expertise in domains of dementia and geriatrics, primary health care, population health, palliative care, and Aboriginal & Torres Strait Islander culture. There were 39/60 respondents in Round 1 with =/> 80% Strongly agree or Agree being accepted as consensus. Round 2 addressed areas that had not reached consensus or that needed greater refinement.

An overview of key sections of the guide will be presented including health promotion and prevention, detection, and dementia care including carer health and wellbeing.

DR ADAM BENTVELZEN

Centre For Healthy Brain Ageing (CHeBA), University Of New South Wales

The TICS-M telephone cognitive screen: Validation and norms from the Sydney Memory and Ageing Study

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Phone-based cognitive screens such as the Telephone Interview for Cognitive Status (TICS) can potentially reduce the barriers and costs of assessing cognition in older adults. Existing normative data for the TICS may lack sensitivity as previous studies have not used regression-based demographic corrections, accounted for cases with subsequent dementia, or estimated reliable change in a large and comprehensively assessed sample of older adults. Furthermore, validation of clinically-relevant psychometric properties is lacking. Here, we address these gaps using the TICS-M (modified 13-item, 39-point version) and provide an online norms calculator for clinicians and researchers. Participants were 617 community-living older adults aged 71 to 91 participants from the Sydney Memory and Ageing Study (M = 79.66 years, 11.72 years of education). TICS-M total scores (M = 24.20, SD = 3.76) decreased with age and increased with higher education levels. The robust normative sample, which excluded incident dementia cases, scored higher on the TICS-M and with less variability than the whole sample, particularly at older ages and lower educational levels. An online calculator https://cheba.unsw.edu.au/research-groups/neuropsychology is provided to compute regression-based norms and reliable change statistics. TICS-M scores correlated more highly with ACE-R (.80) than with MMSE (.70) and showed moderate-strength correlations (r ≥ .30) with neuropsychological tests despite the latter being tested non-contemporaneously. Overall, the TICS-M demonstrated sound validity against well-established and diagnostically sensitive cognitive screens and neuropsychological tests. The regression-based and robust normative data provided will help improve the sensitivity, accessibility and cost-effectiveness of cognitive testing with older adults.

DR TIMOTHY COUTTAS

Centenary Institute

Age and gender-specific changes to sphingolipid metabolism may sensitise brain regions to neurodegeneration

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The major risk factors Associated with Alzheimer's disease (AD) are age and inheritance of the ε4 allele of the APOE gene, which encodes the lipid transporter protein, Apolipoprotein E (ApoE). This suggests a key involvement of lipid transport and metabolism in AD pathogenesis. Sphingolipids, are a class of lipids that exhibit alterations at the prodromal stages of AD, in both brain tissue and serum.

Our study investigated sphingolipids as a function of age and APOE genotype in neurologically normal subjects, aged 65 and over. Lipids were quantified from the hippocampus of post-mortem tissue (n = 80) using mass spectrometry. Significant changes to sphingolipids were observed as a function of age, and were gender-specific. Females had a pronounced decline in the S1P: sphingosine ratio ($p = 0.0020$). In contrast, males exhibited increases in ceramides ($p = 0.0022$), sulfatide ($p = 0.0002$) and sphingomyelin ($p = 0.0045$). No Association between lipids and APOE genotype was identified.

Previous literature has demonstrated AD progression is Associated with a decline in cerebral glucose utilisation, potentially caused by a loss of insulin receptors at synaptic membranes of the cerebral cortex and hippocampus. Ceramide is a metabolic sensor that drives the development of insulin resistance in liver and adipose tissue, whereas S1P is connected with increased glucose-stimulated insulin secretion. Our results establish gender-specific differences in sphingolipid metabolism in the aging human brain, both of which may contribute significantly to a pro-neurodegenerative phenotype in the aging brain.

DR CAROL DOBSON-STONE
University of Sydney

A novel causative gene for frontotemporal dementia – amyotrophic lateral sclerosis

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Frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) are clinically and pathologically overlapping disorders with shared genetic causes. Numerous families exhibiting both disorders have been described, and most of them harbour C9orf72 repeat expansions. However, several C9orf72-negative FTD-ALS families remain and the genetic cause of their disease is unknown. We previously identified a disease locus on chromosome 16p12.1-q12.2 with genome-wide significant linkage in a large European Australian family with autosomal dominant inheritance of FTD-ALS and no mutation in known ALS or dementia genes [Dobson-Stone et al 2013, Acta Neuropathol 125:523-533]. We identified a missense mutation in a gene encoding a lysine-63 deubiquitinase (DUB), within this disease locus. We examined brain tissue of two mutation carriers from this family and observed widespread glial immunoreactivity of the DUB in frontal white matter. The mutant protein showed significantly increased DUB activity, more potent inhibition of the cell signaling molecule NF-kB, and impairment of autophagosome fusion to lysosomes, a key process in autophagy. Although mutations in this gene appear to be rare, it interacts with at least three other proteins encoded by FTD/ALS genes, suggesting that this DUB may play a central role in the pathogenesis of these disorders. Our study highlights the importance of autophagy regulation in the pathogenesis of FTD and ALS.

DR DHAMIDHU ERATNE
Melbourne Health

Neurofilament Light Chain in Neuropsychiatric and Neurodegenerative Disorders: A 'C-Reactive Protein' for the Brain?

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Neurofilament light (NfL) has shown promise as a biomarker for diagnosis, staging and prognosis in a wide range of neurological and neurodegenerative disorders. This study explored the utility of cerebrospinal fluid (CSF) NfL in distinguishing primary psychiatric disorders from neurodegenerative and neurological disorders, a common diagnostic dilemma for neurologists and psychiatrists.

This cross-sectional retrospective study assessed CSF NfL on patients referred to a tertiary neuropsychiatry service from 2009 to 2017 for diagnostic assessment of neuropsychiatric and neurocognitive symptoms, who received lumbar punctures as part of a comprehensive workup. The most recent gold standard clinical consensus diagnosis was categorised in to psychiatric disorder (PSY) or neurodegenerative or neurological disorder (NND). Data from healthy controls was available for comparison. Data extraction and diagnostic categorisation was blinded to NfL results.

129 participants were included: 77 NND (mean age 57 years), 31 PSY (mean age 51 years), 21 healthy controls (mean age 66 years). NfL was significantly higher in NND (M=3560pg/mL, 95% CIs=[2918, 4601]) compared to PSY (M=949pg/mL, 95% CIs=[830, 1108]) and controls (M=1036pg/mL, 95% CIs=[908, 1165]). NfL distinguished NND from PSY with an area under the curve of 0.94 (95% CIs=[0.89, 0.98]); a cut-off of 1332pg/mL was Associated with 87% sensitivity and 90% specificity.

CSF NfL shows promise as a diagnostic test to assist with the often challenging diagnostic dilemma of distinguishing psychiatric disorders from neurodegenerative and neurological disorders. Further studies are warranted to replicate and expand on these findings, including on plasma NfL.

DR YIFAT GLIKMANN-JOHNSTON
Monash University

Hippocampal volume Associated with object-location memory impairment in Huntington's disease

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Object-location memory impairment is a cognitive symptom of Huntington's disease (HD) that appears early in disease progression. Although object-location memory is considered a hippocampal-dependent function, in HD, cognitive symptoms are typically viewed as striatal-related because of the early and severe degeneration seen in this structure. As such, the striatum is the target of new treatment candidates, but the likelihood that striatal-focussed interventions will improve object-location memory is unknown. We aimed to determine the relationship between hippocampal integrity and object-location memory in HD while controlling for striatal atrophy.

We studied 25 peri-manifest HD, comprising participants up to 10 years to predicted clinical diagnosis (pre-HD) and participants with early manifest HD (sym-HD), and a comparison group of 32 matched controls. We examined object-location memory with Paired Associates Learning (CANTAB) and an experimental Virtual House task, and generated hippocampal and striatal volumes using T1-weighted MRI manual segmentations.

Object-location memory differed significantly between HD and controls ($p<0.002$), with sym-HD performing worse than pre-HD and controls. Hippocampal volumes did not differ significantly between HD and controls, but sym-HD had slightly smaller hippocampi than pre-HD and controls. Striatal volumes were lowered in the HD group compared to controls ($p<0.001$). Within the HD group, hippocampal, but not striatal volumes, were Associated with object-location memory ($p<0.01$).

Although previous cognitive studies in HD related impairments to frontostriatal systems, this study suggests that object-location memory is Associated with hippocampal integrity. New treatments that target the striatum may not expect to improve object-location memory.

DR JO-ANNE HUGHSON
University Of Melbourne

Identifying the cognitive care needs of older Aboriginal and Torres Strait Islander people

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Aboriginal and Torres Strait Islander people have high rates of cognitive impairment (CI) and dementia (D), a finding noted among other First Nations peoples. Primary health services are key to identifying and managing people with CI/D, however these conditions are often not detected, or detected late. In partnership with 12 Aboriginal Community Controlled Health Services (ACCHS) in four states, the Let's CHAT (Community Health Approaches To) Dementia project aims to implement a co-designed best practice model of care. The primary outcome measure of the study is a significant increase in documentation of CI/D in ACCHS.

This presentation will discuss the baseline audits (n=841) of the study, which outline the dementia risk profile of ACCHS health clients, rates of documentation of suggested or confirmed CI/D, and current care practices with clients who have or may have CI/D. The age range of clients audited was 50 – 95 years (mean age 60). Dementia risk factors – including current smoking (48%), diabetes (41%), depression (33%) and low physical activity (21%) – were frequently documented and clients often had multiple risk factors. Evidence of documentation of health service assessment for, and investigation of, CI was very limited. These data confirm that rates of detection of CI are currently sub-optimal and that there is much scope for improvement in identifying and introducing appropriate care strategies into primary care services to detect and manage Aboriginal and Torres Strait Islander people who have CI, including better management of lifestyle and medical factors that are known to increase progression of CI.

MISS OSHADI JAYAKODY
University Of Tasmania

Associations between cognitive function and gait under three dual-task conditions

Miss Oshadi Jayakody[1], Dr Monique Breslin[1], Dr Kimberly Stuart[2], Professor James Vickers[2], Associate. Professor Michele Callisaya[1]

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Gait is emerging as an important biomarker of cognitive dysfunction, but there is uncertainty regarding which measure to use. We aimed to examine Associations between cognition and gait under 3 different dual-task conditions.

Participants were from the Tasmanian Healthy Brain Project (n= 92; mean age 69 years). Gait speed was obtained using a computerized walkway under single- and dual-task (alternate letters; counting backwards in 3s; list recall). Cognitive, gait and total cost were calculated as :(single task–dual task)/single task×100. Neuropsychological tests were used to obtain measures of cognition. Partial correlations were used to determine the strength of Associations between cognition and gait.

Under *letter dual-task* poorer 1) attention/processing speed was Associated with slower gait speed (r=.30;p=0.005) and greater gait (r=-.43;p<0.001) and total cost (r=-.26;p=.01); 2) memory recognition was Associated with greater total cost (r=-0.21;p=.045); 3) working memory was Associated with greater cognitive (r=-27;p=.01) and total cost (r=-.28;p=.007) and 4) global cognition was Associated with greater gait (r=-.24;p=.03) and total cost (r=-.25;p=.02) Under *number dual-task*, poorer attention/processing speed was Associated with slower gait speed (r=0.28;p=.008). Under *list dual-task* poorer attention/processing speed was Associated with greater gait (-0.30; p=.004) and total cost (r=-0.26; p=.01). Under *single task*, only poorer verbal fluency was Associated with slower gait speed (r=.24; p=0.02).

The letter dual-task condition was Associated with the most cognitive domains, with gait speed, gait cost and total cost capturing cognitive dysfunction in these domains in healthy older people. Future research should examine motor biomarkers in cognitively impaired samples.

DR FIONA KUMFOR
University Of Sydney

Delusions in neurodegenerative disorders: insights into the prevalence, nature and neurocognitive mechanisms

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Abnormal beliefs and delusions have been reported in some people with dementia, however, the prevalence of delusions, and their neurocognitive basis has been underexplored. Here, we aimed to examine the prevalence, severity and nature of delusions in a large, diverse cohort of dementia patients. 487 dementia patients were included: 102 Alzheimer's disease, 136 behavioural-variant frontotemporal dementia (bvFTD), 53 semantic-variant primary progressive aphasia (PPA), 51 nonfluent-variant PPA, 50 logopenic-variant PPA, 29 motor neurone disease, 46 corticobasal syndrome, 20 progressive supranuclear palsy. All patients underwent brain MRI and cognitive assessment, and the Neuropsychiatric Inventory was conducted with an informant. In our cohort, 48/487 patients (10.8%) had delusions, with the highest prevalence observed in behavioural-variant frontotemporal dementia (5%) and Alzheimer's disease (2.4%). The most common types of delusions were persecutory and delusions of reference. Follow-up analyses revealed that individuals with delusions (n=30) performed worse on the Addenbrooke's Cognitive Examination (p=.035), particularly the attention (p=.022) and memory (p=.013) subtests, than a demographically-matched group of patients without delusions (n=30). Voxel-based morphometry analyses showed that increased severity of delusions was associated with lower integrity of the cerebellum, posterior cingulate and right superior frontal gyrus. Our results reveal that delusions are relatively common in dementia, particularly in behavioural-variant frontotemporal dementia. These symptoms may lead to delayed or inaccurate diagnosis, and therefore increased awareness of the neuropsychiatric features of dementia is important. Patients with delusions appear to have more widespread impairment and may be good candidates for targeted for symptom management.

ASSOCIATE PROFESSOR JOHN KWOK
University of Sydney Brain And Mind Centre

Genetic Findings from the Dominantly Inherited Non-Alzheimer's Disease (DINAD) Study

Associate Professor John Kwok[1,2,3], Dr Boris Guennewig[1,4,5], Dr Carol Dobson-Stone[1,2,3], Professor Olivier Piguet[1,2], Professor John Hodges[1,2], Professor Simon Lewis[1], Professor Glenda Halliday[1,2,3]

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Frontotemporal dementia (FTD) is a common cause of presenile dementia and characterised by TDP-43 or Tau neuropathology. Two neurodegenerative diseases diagnosed by a-synuclein neuropathology are Parkinsons disease (PD) and dementia with Lewy bodies (DLB). PD is a movement disorder affecting over 2% of people over 65. DLB is another cause of dementia, and affects 5% of those over the age of 75. Next generation sequencing of genomic DNA is an economical and rapid way to screen candidate neurodegenerative genes. Bioinformatics pipeline for variant calling and annotations based on the latest hg38 genome build has been established. Likely pathogenic and pathogenic variants were classified according to ACMG guidelines. Sequencing of N = 567 C9orf72 mutation-negative patients has been completed. In the FTD subset, strength of family history was consistent with probability of finding a pathogenic variant, with 100% for revised Goldman score 1 and 0.1% for revised Goldman Score 3.5. LRRK2 was the most commonly mutated gene in PD cohort. Unexpected findings include CYP27A1 mutations [Blauwendraat C et al. Genet Med 2018] in FTD patients, presence of double mutations in different neurodegenerative genes (eg. FIG4 and TARDBP), and unexpected phenotypes (eg. CHMP2B mutation in PD). Finally, there are mutation-negative patients with positive family history. Future research will focus on systematic searches of double/multiple mutations in patients and burden analyses to determine the frequency of rare variants. These analyses will impact on knowledge gain and health outcomes in terms of genetic counselling of patients and at-risk individuals.

DR KATYA NUMBERS
Centre For Healthy Brain Ageing

Predicting Diagnostic Change Over 6-years Using Subjective Cognitive Complaints in the Memory and Ageing Study

Dr Katya Numbers[1]

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Though subjective cognitive complaints (SCCs) remain a core criterion in the diagnosis of mild cognitive impairment (MCI), the usefulness of SCCs in predicting longitudinal clinical outcomes remains unclear. This may be because studies variously operationalise SCCs dichotomously (present/not present), focus on participants' subjective *memory* complaints without considering *non-memory* complaints, or include SCCs from participants only or from both participants and informants.

We examined the usefulness of participant and informant memory and non-memory multi-item SCC scales, as well as a single-item measure, in predicting conversion to MCI and/or dementia over 6-years in participants without dementia from the Sydney Memory and Ageing Study. Participants (M_{age} = 78.4-yrs) completed SCC items, a clinical assessment, and measures of mood and personality. In all analysis, we controlled for age and education.

Overall, SCCs were better predictors of conversion from normal/MCI to dementia than they were for conversion from normal to MCI/dementia. When predicting dementia, both participant and informant memory-specific SCCs were significant predictors, as was the single-item SCC. However, non-memory SCCs were not. Only informants' non-memory SCCs and the single-item SCC predicted conversion from normal to MCI/dementia.

The relationship between SCCs and cognitive decline may be due to the common influence of mood and personality on both. However, inclusion of these variables in the model did not result in a significant reduction in the SCCs predictive power, thus not supporting this suggestion. These results indicate the need for clinicians to take subjective memory complaints seriously. Longer follow-up is being conducted to confirm these findings.

DR SIVA PURUSHOTHUMAN
Brain And Mind Centre & University Of Sydney

Autophagy-lysosomal-protein changes in late-stage pathologically-confirmed human post-mortem brains of Alzheimer's compared with Lewy body diseases

Sivaraman Purushothuman[1], Tony Hsiao[1] & Glenda Halliday[1,2]

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Lysosomal impairment is implicated to produce various neurodegenerative pathogenic events in Alzheimer (AD) and Lewy body diseases (LBD) patients. This is the first study to explore the differences in autophagy-lysosomal proteins across AD, LBD and mixed-type cases since >40% of cases have overlapping disease-specific pathologies that may lead to diagnostic confusion. Pathologically-confirmed post-mortem brains with age-related changes of "pure" AD (amyloid-β; N=18), "pure" LBD (Lewy bodies; N=19), mixed-type (AD+LBD; N=20), and controls (N=20) from superior temporal (STC; mainly affected) and occipital cortices (OC; variably affected) cases without neuropathology-specific mutations or cerebrovascular diseases were selected. Protein levels of lysosomal and autophagy-related proteins were assessed using immunoblotting. Multivariate and one-way ANOVA with Tukey's multiple comparison statistical analyses were performed. Age, gender or postmortem delay did not affect the results. Lysosomal enzymes such as glucocerebrosidase and Cathepsin K were significantly (p<0.05) reduced in both regions and all three disease groups versus controls, while Cathepsin D level was significantly (p<0.05) increased only within the OC. In both AD brain regions, lysosomal-Associated membrane protein 1 (LAMP1) was significantly (p<0.01) reduced from controls. Against controls, LAMP2 was increased (p<0.0001) in AD for OC only, while LAMP3 was reduced (p<0.01) in AD and mixed-type cases within OC region only. Autophagosome proteins of Beclin1 and p62 in both brain regions were significantly reduced in all three disease groups versus controls. Neurons (assessed using NeuN and TubulinIIIβ) in STC and OC were reduced (p<0.05) in AD only. Results revealed that lysosome-Associated proteins need closer examination across similar diseases.

ASSOCIATE PROFESSOR GAIL ROBINSON
The University Of Queensland

Is assessment of executive functions useful in the diagnosis of dementia?

Associate Professor Gail Robinson[1], Ms Amelia Ceslis[1], Ms Emily Gibson[1], Dr Megan Barker[1], Dr Andrew Martin[1]

[1]The University Of Queensland, St Lucia, Australia

Assessment of cognitive functions is key for a diagnosis of dementia. Integral to this is the use of tests that are both *sensitive* to detect changes and *specific* in that they assess particular cognitive functions and have neural specificity. Although executive functions have not been a major focus for dementia diagnosis, they are crucial for memory encoding and retrieval, as well as for adaptive behaviour in novel contexts. Executive functions are more sensitive to disturbance than other cognitive abilities, in both healthy ageing and dementia. This study aimed to investigate the effect of ageing on the executive processes of initiation, inhibition and strategy use via performance on the Hayling Sentence Completion Test. Baseline cognitive tests and the Hayling were administered to healthy adults across the lifespan (N = 344; 18 to 89 years). Correlations and regression analyses were used to assess the impact of ageing on the Hayling Test components. Older age was Associated with slower response initiation and inhibition times, more inhibition errors and fewer strategic-based responses. These findings remained significant after controlling for demographic factors such as education and other cognitive functions sensitive to ageing such as fluid intelligence, attention, working memory and verbal fluency. This study provides clarification of the effect of age on the processes of initiation, inhibition and strategy generation across the adult lifespan. The results are discussed in relation to the significant challenge of dementia diagnosis; namely, identifying clinical tests that can detect subtle changes at an early stage.

DR KATE SMITH
University Of Western Australia

Items of the Good Spirit, Good Life quality of life tool for older Aboriginal Australians

Dr Kate Smith[1], Ms Lianne Gilchrist[1], Mr Harry Douglas[2], Professor Leon Flicker[3], Dr Dina LoGiudice[2], Professor Julie Ratcliffe[4], Professor Dawn Bessarab[1]

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Enhancing quality of life is the primary goal of aged care services for people with dementia. Despite this, there are no culturally informed quality of life measures developed with older Aboriginal Australians, including people with dementia. This study aims to address this gap.

The Good Spirit, Good Life package was co-developed with Aboriginal older people and service providers in Perth, and adapted in Melbourne using a Participatory Action Research approach. Thematic analysis identified 12 items for the draft tool: community; culture and identity; elder role; supports and services; spiritual beliefs; family and friends; country; health and happiness; future planning; safety and security; respect; and basic needs. Quantitative data was collected in Perth and Melbourne by Aboriginal researchers administering the survey instrument. Purposive sampling ensured a range of cognition. Factor analysis is being completed for item reduction.

Initial analyses were completed based on responses from the first 41 participants aged 48-92 years, 83% women. Five factors were extracted through principal component analysis, with all 12 items contributing to the simple factor structure with a loading > 0.5. The initial factor labels are: culture; external factors; country; empowerment and respect; and basic needs. Eigen values indicate that the first three factors account for 54% of the variance.

The 12 Good Spirit, Good Life tool items are based on the quality of life priorities of older Aboriginal Australians. Initial analyses identified five distinct factors underlying tool response. Item reduction will be completed based on the larger dataset, and final tool items presented.

Intervention and Treatment

DR SCOTT AYTON
Florey Institute of Neuroscience and Mental Health

Brain iron is Associated with accelerated cognitive decline in people with Alzheimer pathology

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Cortical iron has been shown to be elevated in Alzheimer's disease, and we recently showed that brain iron content, as measured by either quantitative susceptibility mapping (QSM)-MRI (Ayton et al Brain, 2017) or cerebrospinal fluid (CSF) ferritin (Ayton et al Nat Comm 2015; JAMA Neurology 2018), is Associated with longitudinal cognitive decline in people with underlying β-amyloid pathology. Here, we investigated the Association between post-mortem iron levels with the clinical and pathological diagnosis of Alzheimer's disease, its severity, and the rate of cognitive decline in the 12 years prior to death in subjects from the Memory and Aging project (n=209). Iron was elevated (β[S.E.]=9.7 [2.6]; P=3.0x10^{-4}) in the inferior temporal cortex only in subjects who were diagnosed with clinical Alzheimer's disease during life and had a diagnosis of Alzheimer's disease confirmed post mortem by standardized criteria. Whereas iron was weakly Associated with the extent of proteinopathy (plaques and neurofibrillary tangles), it was strongly Associated with the rate of cognitive decline (e.g. Global Cognition: β [S.E.] =-0.040 [0.005], P=1.6 x10^{-14}). Thus, cortical iron might act to propel cognitive deterioration upon the underlying proteinopathy of Alzheimer's disease, possibly by inducing oxidative stress or ferroptotic cell death. These data support lowering iron as a therapeutic strategy for Alzheimer's disease, which we are currently investigating in a phase II study of the iron chelator, deferiprone.

DR SAMANTHA BARTON
Florey Institute of Neuroscience and Mental Health

Oligodendrocytes in the motor cortex from patients with ALS have an RNA trafficking deficit

Samantha K Barton[1,2,3,4], Jenna M Gregory[2,3,4], Karina McDade[2,3], Bradley J Turner[1], Colin Smith[2,3,4*], Siddharthan Chandran[2,3,4*]

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Oligodendrocytes myelinate and provide metabolic support to neurons; however, these processes are disrupted in motor neuron disease (MND). Many proteins critically involved in myelination and metabolism are locally translated and it is well established that RNA metabolism is altered in MND. We aimed to characterise if RNA trafficking is disrupted in oligodendrocytes in MND.

We used human post-mortem formalin-fixed paraffin-embedded motor cortex from control (n=5), sporadic ALS (sALS; n=5), ALS patients with a C9ORF72 mutation (C9ALS; n=5) and an ALS patient with a SOD1 mutation (SOD1ALS; n=1). Using BaseScope™, we probed for myelin basic protein (*MBP*) and carbonic anhydrase II (*CAII*) (locally translated mRNAs unique to oligodendrocytes). RNA and protein was extracted from frozen tissue for qPCR and western blot, respectively, and tissue was processed for electron microscopy.

In oligodendrocytes in the motor cortex white matter, C9ALS and sALS cases had TDP-43 aggregations, and C9ALS cases had RNA foci (both hallmarks of MND). sALS and C9ALS oligodendrocytes had cytoplasmic aggregations of *MBP* mRNAs and C9ALS had nuclear aggregation of *MBP* mRNAs; control and SOD1ALS had normal mRNA distribution. Total *MBP* mRNA expression was elevated in sALS and C9ALS compared to control.

There was no difference between groups in MBP protein levels or myelin thickness (g-ratio). Both sALS and C9ALS also had aggregations of *CAII* mRNA.

The sALS and C9ALS motor cortices had disrupted mRNA trafficking in oligodendrocytes, coinciding with TDP-43 and RNA foci pathology. Disruption to normal oligodendrocyte function could have an additive detrimental effect on motor neurons in MND.

DR PRASHANT BHARADWAJ

School of Medical and Health Sciences, Edith Cowan University

IU1, a selective inhibitor of deubiquitinating enzyme USP14 inhibits Aβ toxicity in neuronal cells

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Autophagy is a vital intracellular catabolic pathway for misfolded proteins and an attractive therapeutic target for neurodegenerative diseases including Alzheimer's disease (AD). We have previously shown that enhancing autophagy reduced Aβ accumulation and toxicity in cells and improved cognition in an AD mouse model. A wide range of small molecules targeting multiple cell functions have now been developed to modulate autophagy. Assessing the neuroprotective effects of modulators against Aβ toxicity would further our understanding of their protective mechanisms and aid development of novel treatments for AD. Therefore, the main aim of this project is to identify potent autophagy modulators that protect against Aβ induced neuronal cell death.

In this study, we used the MC65 cell line to model Aβ accumulation and toxicity. MC65 is a well-established human CNS derived cell line that generates Aβ by γ-secretase cleavage from a stably transfected C99 fragment of the amyloid precursor protein (APP). Using this cell line as a platform, we screened an autophagy compound library containing 156 small molecules for inhibition of Aβ toxicity. We observed inhibition of Aβ induced cell death by the ion channel blockers carbamazepine, omeprazole and IU1, a selective inhibitor of deubiquitinating enzyme USP14. Overall, IU1 was identified as the most potent compound showing a marked 40% increase in cell survival in MC65 cells producing Aβ. Recent studies show that IU1 regulates autophagy and degradation of prion aggregates in cells. This suggest that its protective effect in MC65 cells is possibly through the upregulation of Aβ protein clearance. Our findings demonstrate a novel role for IU1 in reducing Aβ induced toxicity. Further investigation of its protective effects will be essential in determining its therapeutic potential in AD.

PROFESSOR ASHLEY BUSH

Florey Institute of Neuroscience and Mental Health

Iron and Alzheimer's disease: the 3D Study

Professor Ashley Bush[1]

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Alzheimer's disease is an incurable, prevalent dementia, with hallmark neuropathology of neuronal death, oxidative damage, amyloid and tau deposition in the brain. Pharmacological limitation of amyloid accumulation has not met expectations, and other lesions should be explored. AD brain tissue exhibits iron elevation Associated with the rate of cognitive loss. Pharmacological suppression of iron-mediated oxidation is effective in animal models of neurodegenerative disease, and a recent phase 2 clinical trial of the iron chelator, deferiprone, in Parkinson's disease lowered nigral iron and improved clinical readouts over 18 months. Thus, we are testing deferiprone in a randomised, double-blind, placebo-controlled, multicentre, Phase 2 clinical trial for patients with amyloid positive Alzheimer's Disease (MMSE ≥20), randomised (2:1 ratio, n=171) to receive deferiprone or placebo over 12 months. The primary outcome is a Global cognitive composite from the a neuropsychological test battery = (Episodic Memory + Executive Function + Attention)/3. Intention-to-treat analysis of the intervention will use linear mixed models. Secondary outcomes include whether the change in brain iron values (by MRI QSM) is inversely proportional to extent of change in cognition.

MRS AMANDA CROSS

Monash University

Addressing inappropriate medication use in people with dementia: a role for pharmacists in memory clinics?

Mrs Amanda Cross[1,2], Dr Johnson George[1], A/Professor Michael Woodward[3], Ms Vivien Le[1], A/Professor Rohan Elliott[1,2]

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Medication-related problems (MRP) and inappropriate medication use are prevalent among people attending memory clinics. Pharmacists are not typically involved in the memory clinic team.

To evaluate the feasibility and acceptability of a pharmacist-led interdisciplinary deprescribing intervention for people attending a memory clinic.

A pre- and post-intervention feasibility study was conducted at an outpatient memory clinic. Participants were English-speaking community-dwelling patients identified as being at risk of a MRP. Following baseline assessment, participants received a comprehensive medication review in their home from a consultant pharmacist who collaborated with the patient/carer, memory clinic and general practitioner (GP) to develop a plan for optimising medication use. The primary outcome was feasibility, assessed based on i) proportion of patients

eligible for the study, ii) proportion of eligible patients who consented and iii) proportion of inappropriate/unnecessary medications reduced/ceased at six months. Stakeholder acceptability was evaluated using patient/carer questionnaires, fax-back GP surveys, a memory clinic focus group and pharmacist interviews.

One-third of memory clinic patient/carers were eligible (n=82/238) and 60% (n=50/82) consented to participate. Forty-six patients received the intervention, median (IQR) age was 81.0 (71.5-85.0) years and number of medications was 11 (8.0-13.3). Pharmacists recommended deprescribing 124 medications, and 53 (42.7%) of these had been reduced/ceased at six months. Stakeholder feedback was positive, with majority believing it was important to have pharmacists involved in the memory clinic.

Pharmacist-led interdisciplinary deprescribing in a memory clinic setting is feasible and acceptability to stakeholders. Larger studies are needed to confirm effectiveness and clinical outcomes.

DR SHANTEL DUFFY
University of Sydney

CogStep: A combined psycho-education and home-based exercise program for individuals with early stage Alzheimer's disease

Dr Shantel Duffy[1,2], Ms Kahala Dixon[1,3], Ms Bonnie Tran[1,3], Ms Isabella Leung[1,3], Mr Bradley Skinner[1,5], Ms Ashlee Turner[1,4], Dr Loren Mowszowski[1,4], Professor Yun-Hee Jeon[6], Professor Lindy Clemson[2,7], Professor Sharon L Naismith[1,4]

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Physical exercise in individuals living with dementia may help to maintain functional capacity, improve sleep and mood, and slow cognitive decline. Exercise programs for older adults with cognitive impairment typically do not concurrently implement psychoeducation, which may improve compliance and understanding. This study sought to assess the feasibility of a 12-week combined psycho-education and individualized home-based exercise program (*CogStep*) in older adults with early-stage Alzheimer's disease (AD).

This study aimed to recruit 60 individuals with early-stage AD to assess the feasibility of the study design and examine potential effects of the *CogStep* intervention. All participants completed neuropsychological, medical, physical and mood assessments prior to randomization to *CogStep* or a waitlist control condition, and again after the 12-week intervention period.

Over an 18-month recruitment period, 46 individuals were screened and 15 participants were randomized. Thirteen participants (seven intervention, six waitlist) completed the 12-week follow-up assessment. Post-intervention, change in self-reported physical activity was inversely Associated with body mass index (r=-0.7, p=0.030); increases in habitual and maximal walking velocity were Associated with reduced depressive symptoms (r=0.6, p=0.038; r=0.7, p=0.019); and greater six-minute timed walk distance was Associated with increased processing speed (r=0.7, p=0.038).

Recruitment targets were unmet, with insufficient sample size to investigate between-group effects. Nonetheless, overall, participants demonstrated strong Associations between changes in physical activity levels, exercise capacity, body composition, mood and cognition over 12-weeks, illustrating *CogStep's* therapeutic potential. We now seek to modify the study design to improve feasibility prior to proceeding to a full-scale randomized trial.

MR WILLEM EIKELBOOM
Erasmus University Medical Center Rotterdam, the Netherlands

Early recognition and management of neuropsychiatric symptoms to improve quality of life in Alzheimer's disease

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Neuropsychiatric symptoms (NPS) are nearly universal in persons with mild cognitive impairment (MCI) and Alzheimer's disease (AD), and are Associated with various disadvantageous clinical outcomes. Despite growing evidence on the efficacy of (non)pharmacological interventions to reduce these symptoms, NPS remain under recognized and undertreated in memory clinics. The Behavioral symptoms in Alzheimer's disease Towards early Identification and Treatment (BEAT-IT) study is aimed to improve the quality of life of persons with AD and their caregivers by structuring and standardizing the detection and management of NPS in the memory clinic.

We aim to enroll 150 community-dwelling individuals with MCI or AD and their caregivers. Currently, we are enrolling a historical control group that receives care as usual. Next year, a second wave of participants will undergo the DICE method consisting of the following steps: 1) Describe the context in which NPS occur, 2) Investigate possible causes, 3) Create and implement a treatment plan, and 4) Evaluate whether interventions were effective. Primary outcomes are the quality of life of persons with AD and caregivers. Secondary outcomes include NPS change, caregiver burden, caregivers' confidence managing NPS, psychotropic medication use, the experiences of the participants that underwent the DICE method, and the cost-effectiveness of the intervention.

We present the protocol of the BEAT-IT study, aimed to improve quality of life of individuals with AD. By exchanging knowledge and expertise regarding the management of NPS in AD, we hope to benefit the international forum on care and research concerning NPS in AD.

MISS CATHERINE FOSTER
University of Tasmania

Pericyte and vascular changes are Associated with the development of amyloid pathology and aging

Miss Catherine Foster[1], Miss Natalie King[1], Dr Jo-Maree Courtney[1], Dr Brad Sutherland[1]

[1]School of Medicine, University Of Tasmania, Hobart, Australia

Although the cause of Alzheimer's disease (AD) is currently unknown, five out of the seven preventable risk factors for AD are cardiovascular related. Therefore, vascular dysfunction in the brain may be an important early event leading to the deposition of amyloid and development of AD. We hypothesise that dysfunction or loss of pericytes, a cell involved in blood flow regulation, blood-brain barrier maintenance and amyloid clearance, may play a role in AD development and onset. To better understand how amyloid deposition might affect pericytes and the cerebro-vasculature, we characterised pericyte and vascular density in 3, 6, 9, 12 and 18-month-old APP/PS1 mice, a transgenic mouse line that models the process of amyloid deposition. Greater blood vessel density was identified in 3-month-old APP/PS1 mice compared to wild type mice, which was not observed in the 6-18-month old APP/PS1 mice. Furthermore, a reduction in pericyte number in animals 6-months or older was found in both APP/PS1 and wild type mice compared to 3-month old mice. These results might suggest that when amyloid load is increased, prior to plaque formation, there is a strong increase in brain vascularisation to enhance the clearance of amyloid. Further, a large age-related decrease in pericyte number could reduce amyloid clearance that may lead to the formation of amyloid plaques and could explain changes in vascular function during aging. Overall, vascular clearance of amyloid is critical to maintain brain function, and age-dependant reductions in pericyte number may put an ageing population at risk of developing AD.

DR FREDERIC GILBERT
University of Tasmania

Invasive experimental brain surgery for dementia: Ethical shifts in clinical research practices

Dr Frederic Gilbert[1,2], PhD John Viaña[1], Phd Cand Merlin Bittlinger[3], PhD James Vickers[1], PhD Judy Illes[4]

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The objective is to examine the ethics features of experimental trials involving high-risk invasive interventions for dementia.

We examined studies using invasive unproven neurosurgical interventions to treat dementia registered in clinicaltrials.gov from 2001 to 2018 for eight variables: target brain region, host country, age of participants, MMSE, medical history, consent, context (living and caregiving situation), and IRB/REB approval.

By the end of 2018, we found 37 preregistered high-risk unproven trials from eight countries, which are enrolling or have enrolled 1,646 participants (Figure). Of these participants, 1,279 or 77.7%, have received a neurotechnological intervention just in the last three years (2016 to 2018). The trials involved stem cells, deep brain stimulation, and gene therapy for Alzheimer's, Parkinson's, and Huntington's diseases. Several registered trials permitted inclusion of participants with an MMSE score as low as 0 (1 trial in China) or 3 (2 trials in China). Nine trials required consent from participants only; 8 additionally required consent of a legal designate or of a caregiver/family member.

There is a pressing need to proactively consider and refine the ethics of invasive experimental trials on people with dementia. A set of nine recommendations that builds on ethical consensus set by the Declaration of Helsinki provides a foundation for these deliberations.

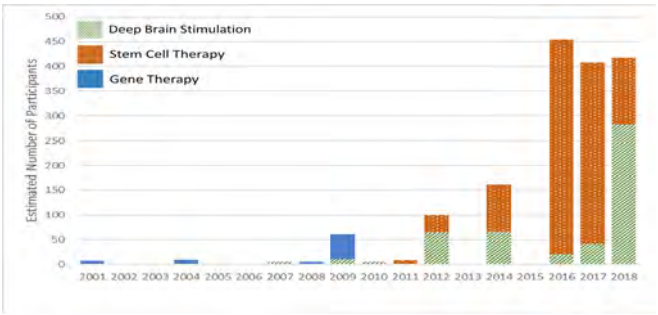

Figure: *Participants enrolled in studies assessing the use of experimental invasive brain technologies (search limited to deep brain stimulation (DBS), stem cells, and gene therapy) in people with dementia up to December 31, 2018. Data was obtained from the U.S. National Institutes of Health clinical trial database, clinicaltrials.gov*

DR SARANG KIM
Wicking Dementia Research and Education Centre

Dementia Stigma Reduction (DESeRvE): Randomised controlled trial to reduce dementia-related stigma in the general public

Dr Sarang Kim[1,2], Dr Alice Richardson[4], Professor Perla Werner[3], Professor Kaarin Anstey[5,6]

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Dementia is a highly stigmatised condition leading to significant negative effects on the health and well-being of people with dementia (PWD), and their carers. Stigma can also prevent people from seeking help, which results in people missing out on timely diagnosis and the utilisation of health and social services. Despite the success of interventions for reducing the stigma of mental illnesses, research on dementia-related stigma is lacking. This project therefore developed and evaluated an intervention program (DESeRvE) aimed at the general public to reduce dementia-related stigma.

1024 Australians aged between 40 and 87 (M=60.8, SD=10.1) participated in the study and 458 completed the 12 weeks follow-up assessment. DESeRvE tested four conditions (online education program (ED), contact through simulated contact with PWD and carers (CT), education + contact (ED+CT), and control). Dementia-related stigma was measured with a modified Attribution Questionnaire and knowledge of dementia was measured by the Dementia Knowledge Assessment Scale.

The preliminary findings suggested that the interventions produced a greater impact on stigma than on knowledge, adjusted for baseline scores. The effect of contact was highly significant, and education less so. A small effect persisted at the end of 12 weeks follow-up.

DESeRvE can be a valuable tool to reduce dementia-related stigma. Having (virtual) contact with PWD and carers and learning about dementia from them can have a positive effect on the general public. This contact will encourage the general public to enable PWD to feel more included and to enhance their quality of life.

DR TUAN ANH NGUYEN

QUMPRC, School Of Pharmacy and Medical Sciences, University Of South Australia

A Pilot Cluster RCT of an Alzheimer's Family Caregiver Intervention in Hanoi, Vietnam: REACH VN

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Vietnam and other low and lower middle income countries are experiencing a dramatic growth in the number of persons with dementia yet very little is known about interventions and programs to support family caregivers these countries.

Clusters, defined as geographic areas served by commune health clinics, were randomly assigned to either the intervention or enhanced control condition. To be eligible, caregivers needed to be family members identified as providing the most day-to-day care, age ≥ 18, have a score of ≥ 6 on the 4-item version of the Zarit Burden Inventory (ZBI), and be caring for an older adult previously diagnosed with dementia. Caregivers in clusters randomized to the intervention arm received 4-6 in-home or phone sessions over 2-3 months based on the manualized REACH VN protocol. Caregivers in the enhanced control condition received a single educational session. Primary outcomes included the 4-item ZBI and the 4-item Patient Health Questionnaire (PHQ-4) which were assessed at enrollment and three months later by research assistants masked to allocation.

Of the 10 communes randomized, one was dropped because of low caregiver enrollment. Based on analysis of the 51 caregivers who completed the study, there were no differences in ZBI (p=0.9) or PHQ-4 (p=0.5) between the REACH VN and enhanced control groups at baseline. Using analysis of covariance to evaluate the intervention effect, with the month three assessment as the outcome and the baseline assessment as a covariate, we found that the REACH VN group had average ZBI scores 1.2 SD lower (p=0.02) and PHQ-4 scores 0.7 SD (p=0.03) lower than the enhanced control group.

In the first test of a family caregiver intervention in Vietnam, a relatively brief culturally adapted family caregiver intervention (REACH-VN) was found to have good preliminary efficacy compared with an enhanced control condition.

ASSOCIATE PROFESSOR ANTHONY WHITE

QIMR Berghofer Medical Research Institute

Using patient monocyte-derived microglia to personalize treatment for Alzheimer's disease

Associate Professor Anthony White[1], Dr Hazel Quek[1], Dr Lotta Oikari[1], Dr Ben Gu[2], Dr Xin Huang[2], Professor. Eske Derks[1]

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Neuroinflammation is a major contributor to Alzheimer's pathology, but translational outcomes of new drugs are hampered by patient heterogeneity and difficulty of patient selection for drug trials. This is exacerbated by the fact that microglia, the resident immune cell in the brain, are uniquely sensitive to microenvironmental factors and their activation state can therefore be dependent on a range of factors. To overcome these issues a rapid and cost-effective method of generating patient-derived microglia is required for personalized neuroinflammatory therapeutic development in Alzheimer's patients. We have adopted the method to generate microglia-like cells from Alzheimer's patient peripheral blood mononuclear cells. Our preliminary analysis of 20 clinical blood samples has identified key differences between Alzheimer's patients and healthy control microglia including altered cytokine expression (TNF, IL-6, and TGF), microglia migration rate, phagocytosis, and response to immune modulatory compounds. Significantly, we also identify patient-specific differences in microglia inflammatory responses, which could potentially be used to stratify patients for clinical trials or to identify effective patient-specific therapeutics. In addition, we are currently developing genetic and transcriptomic methods to identify new immune targets in patient microglia. This will be combined with drug repurposing to improve efficacy of drug targeting for abnormal microglia function in Alzheimer's patients. This model could form the basis of a clinically applicable precision medicine approach to treating neuroinflammation in Alzheimer's disease.

Living with dementia

MS CATHERINE ANDREW
University of Wollongong

Consumer perspectives: How younger onset dementia impacts workforce participation during onset and progression of symptoms

Ms Catherine Andrew[1,2], Mr Phil Hazel[1], **Dr Lyn Phillipson[1], Dr Lynnaire Sheridan[1]**

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Engagement in meaningful work is important for health and well-being. However, dementia has the potential to cause considerable disruption to occupational engagement. An estimated 26,000 people of working age were living with dementia in Australia in 2017. Further increases are expected as people extend workforce participation either by choice or in response to increasing the age of pension eligibility. Therefore, it is increasingly important that workforce participation issues confronting people living with dementia symptoms are appropriately addressed.

Explore how workforce participation is maintained when symptoms of dementia occur, thereby influencing experiences of transitioning from paid employment to 'retirement'.

Extending on findings from a qualitative study with Australians living with a dementia (n=10) an in-depth case study further explored the experiences of transitioning away from paid work. Following ethics approval, one person living with younger onset dementia co-researched and presented findings regarding enablers and barriers to: (i) maintaining engagement in paid work; and (ii) transitioning to other meaningful roles following retirement.

Specific factors that contributed to maintaining employment, and then transitioning to retirement for the person living with a dementia were identified: (i) early engagement with employers, colleagues and trusted health Professionals; (ii) access to support and reasonable adjustment from the employer and colleagues; (iii) gradual transitions from a full-time role; and (iv) engagement in other meaningful roles post separation.

Access to reasonable workplace adjustments can extend workforce participation people living with a dementia. Opportunity to transition to other meaningful roles after ceasing work is essential.

DR ALEX BAHAR-FUCHS
The University Of Melbourne

Cognitive training for older adults with dementia: An updated Cochrane Review

Alex Bahar-Fuchs[1], Anthony Martyr[2], Anita Goh[1,3], Julieta Sabates[1], Linda Clare[2]

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Cognitive training (CT) was found by previous meta-analytic reviews to be ineffective for people with mild-moderate dementia. The quality of trials was however low, and since 2013 many additional trials were completed.

33 trials were eligible for inclusion, 11 of which were included in our 2013 review. Data were extracted and risk of bias (RoB) was rated using the Cochrane RoB tool. Change from baseline was used to calculate effect estimates, which were expressed as Hedges g, and a random effects meta-analysis was performed.

RoB in several domains was high or unclear in at least 50% of included studies. Relative to a control condition, we found moderate quality evidence of a small to moderate effect of CT on composite measure of global cognition (SMD = 0.42, 95% CI = 0.23 to 0.62), and high quality evidence of moderate effect on verbal semantic fluency (SMD 0.52, 95% CI 0.23 to 0.81) at the end of treatment, and these gains were retained in the medium term (3 to 12 months post treatment). In relation to most other outcomes immediately post treatment and in the medium term, the quality of evidence was low.

This study represents a major update, and with the significant expansion in the body of evidence we now conclude that CT may improve some cognitive functions in the short term and intermediate terms. Low quality of evidence remains an issue, and confidence in the findings in relation to many of the assessed outcomes is correspondingly low.

ASSOCIATE PROFESSOR BIANCA BRIJNATH
National Ageing Research Institute

Moving Pictures; raising awareness of dementia in CALD communities through multimedia

Associate Professor Bianca Brijnath[1], Dr Josefine Antoniades[1], Professor Jon Adams[2], Professor Colette Browning[3], Dr Dianne Goemann[4], Associate Professor Katie Ellis[5], Associate Professor Mike Kent[5]

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Limited awareness of dementia in people from culturally and linguistically diverse (CALD) backgrounds often results in delayed diagnosis, poorer prognosis, and a higher burden of care on families and health systems. Given Australia's rapidly ageing and multicultural population, this disparity needs urgent address.

To inform and educate people from five linguistically diverse backgrounds – Hindi, Tamil, Mandarin, Cantonese, and Arabic – about dementia.

A mixed methods, multimedia design comprising video-interviews with 76 participants including carers from the five languages and key service providers. Data were gathered nationally in 2018 and thematically analysed. Data were used to co-produce 15 short films, comics, and a mobile-optimised website from which data analytics were measured.

The films and comics focused on dementia detection and timely diagnosis, how to navigate the aged care system, and the importance of self-care. Analytics data is currently being collected online and via community forums.

Co-production methods in tandem with digital multimedia are fundamental to developing culturally salient interventions to address dementia disparities in CALD populations in Australia and internationally.

DR CLAIRE ECCLESTON
Wicking Dementia Research And Education Centre

The dementia knowledge of the Tasmanian community

Dr Claire Eccleston[1], Dr Kathleen Doherty[1], Professor Fran McInerney[1], Ms Amber Johnstone[1], Dr Helen Courtney-Pratt[1]

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Improving education and awareness of dementia have been identified globally as key priorities due to their importance for dementia prevention and supporting dementia inclusive communities. In order to better understand, and therefore serve, the information needs of the broader community, this study sought to determine current dementia knowledge of a cross section of Tasmanians.

Over 400 participants were surveyed using the Dementia Knowledge Assessment Scale in different Tasmanian community settings. The DKAS comprises 25 items within four subscales; causes and characteristics (CCH), prevention and risks (RHP), care considerations (CCO) and communication and behaviour (CB). Demographic indicators including education and dementia-related experience were also collected.

Participants obtained highest median scores for the CCO subscale and lowest for the RHP subscale. Linear regression analysis was conducted for total knowledge and each subscale (372 complete cases). Previous dementia-related work experience and education were significant predictors of total knowledge and all subscales. Educational attainment was a predictor for all subscale scores except CCO, and provision of care for friends or family with dementia was a predictor of CCH and CB. Being close to someone with dementia was a predictor of total knowledge and CCO. Age and income were not significant predictors of dementia knowledge or any subscales. This research will help us to understand the demographic factors that explain levels of community knowledge about key aspects of dementia. It will have demonstrable impact through an increased capacity to tailor education and therefore more effectively support development of dementia aware and inclusive communities.

MS MADELEINE GARDAM
Monash University

Better understanding quality of care - capturing the voice of people living with dementia.

Ms Madeleine Gardam[1], Dr Darshini Ayton[1], Ms Sandra Robinson[1], Dr Elizabeth Pritchard[1], Dr Rasa Ruseckaite[1], Dr Stephanie Ward[1], Professor John McNeil[1], Scientia Professor Henry Broadaty[2], Professor Elsdon Storey[1], Associate Professor Arul Earnest[1], Associate Professor Robyn Woods[1], Professor Mark Nelson[3], Professor Jane Banaszak-Holl[1], Professor Danny Liew[1], Dr Joanne Ryan[1], Associate Professor Susannah Ahern[1]

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Clinical quality registries (CQRs) collect clinical data for monitoring and reporting healthcare quality and safety. CQRs can report lack of consistency in healthcare provided for people living with dementia. Patient-Reported Outcome Measures (PROMs) are increasingly incorporated into CQRs and assess the patient's perspective of clinical care and the impact on function and quality-of-life. There is currently no systematic reporting on quality of dementia care across Australia.

This study aimed to test acceptability of PROMs with people living with dementia to inform the pilot Australian Dementia Network (ADNet) Registry.

A systematic scoping review was initially conducted to identify existing PROMs in dementia care. Acceptability of different measures were explored in face-to-face semi-structured interviews with participants to elicit their healthcare experiences via a think-aloud approach. People living with dementia were recruited via support groups and social media. Content analysis facilitated identification of PROM items for inclusion in the CQR.

The search yielded 4,288 studies, with 21 studies included in the final review. Dementia specific PROMs most used were the QoL-AD (n=12), the DemQoL (n=5), and the QualiDem (n=1). The review identified that no PROMs were currently used in dementia CQRs. Initial qualitative results identified ease of use with the QoL-AD, with full results to be confirmed.

This innovative acceptability study in collaboration with people living with dementia ensures that the voice of the individual is heard. The inclusion of PROMs in the ADNet registry will enhance understanding of patient experiences and contribute to improving quality of care outcomes.

DR KATE LAVER
Flinders University

Delivering an evidence-based dementia rehabilitation program using telehealth

Dr Kate Laver[1], Professor Maria Crotty[1], Professor Lindy Clemson[2]

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People with dementia and their families have called for programs that involve a rehabilitative approach. Home based programs that offer such an approach have been

shown to be effective in delaying functional decline and improving carer skills. However, travelling to the home to provide home based rehabilitation programs is time consuming and challenging to implement in lean health and aged care services.

This project aims to determine whether telehealth delivery is non-inferior to conventional face-to-face delivery of the same program.

Adaptation of the program for telehealth delivery occurred within a randomised controlled trial examining whether telehealth is a non-inferior approach to conventional home visits. Participants in the telehealth group received two home visits and up to eight consultations with an occupational therapist using videoconferencing software and tablet devices. The home visit group received up to ten visits from an occupational therapist.

60 trial participants have been recruited to date. Participants in the telehealth group received slightly fewer consultations on average (5.0 vs 5.9). The average travel time per program was 284 minutes for those receiving home visits. Planning in advance of telehealth sessions was important to ensure that core elements of the program could be conducted. Many families participating in the telehealth arm of the study already owned devices and use of the technology deterred few participants.

It was possible to provide multiple consultations using telehealth without compromising core principles of the treatment program. Telehealth delivery reduced travel time and the cost of program delivery.

DR JACKI LIDDLE
The University Of Queensland

"Not a robot, because it's so impersonal" Technology perspectives of people living with dementia

Dr Jacki Liddle[1], Mr Peter Worthy[1], Dr Anthony Angwin[1], Professor Janet Wiles[1], Florence Lived Experience Expert Reference Group[1]

[1]The University Of Queensland, St Lucia, Australia

Despite a large growth in technologies aiming to support people living with dementia, there has been low uptake and high abandonment of technology. Research suggests that the technology-focussed rather than person-centred approach to technology development has contributed to this issue. For technology to enable connection, participation, safety and wellbeing, it needs to engage users throughout the process of development. It also requires a deep understanding of the technology related needs, experiences and preferences of people living with dementia and their care partners.

An interpretive description study was undertaken to explore the experiences, needs and perspectives of people living with dementia and their care partners in relation to technology. Twelve people living with dementia and 17 care partners participated. Semi-structured interviews were undertaken, and interviews were transcribed and analysed for core concepts. Core concepts were discussed with the research team including lived experience experts to clarify understanding.

Findings indicated that participants used technologies in a variety of ways. The potential of technology to support people in being *happy, safe and connected* was identified. Importantly, people identified a desire for future technology development to focus on *making the day go better* and supporting the participation of people living with dementia in their daily participation in their homes and communities. Participants also identified the *trouble with technology*, which included problems with usability, and concerns about reducing connection with people, labelling and the lack of transparency in technology. Guidelines as to what technology for people living with dementia should and shouldn't do were developed.

DR KIM-HUONG NGUYEN
The University Of Queensland

Whose values are relevant in dementia quality of life? A comparative analysis of preference elicitation

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Involving people with dementia and carers in valuing quality of life (QoL) offers a wealth of information on the lived experience of dementia. Traditionally, they have been largely excluded from preference elicitation exercises because general population values were considered sufficient.

This study compared and contrasted the differences in QoL preferences by three groups: people with dementia, carers, and older Australians (aged 55+).

Five domains of dementia QoL were defined by the AD5D instrument: physical health, mood, memory, living situation, and ability to do fun things. People living with mild-moderate dementia (N=103) and carers (N=131) completed a Discrete Choice Experiment with survival duration and a Best Worst Scaling via a face-to-face interview. The older Australia general public (N=710) undertook the same survey using an online platform. Multinomial logistic regressions were used to estimate the relative weights attributable to the five AD5D domains.

The domains considered most important for QoL differed between people with dementia, their caregivers and the older Australians, with memory the least important for all three. For the older Australians, "physical health" ranked first and "living situation" first for the dementia dyads. Compared to the older Australians, the dementia dyads found it challenging weighing up the options presented. However, with appropriate interview techniques and statistical methods, their preferences could be reliably estimated.

This study provides further evidence to support the applicability of elicitation methods to understand the preferences of dementia dyads. This can inform the values of interventions in supporting and treating this increasingly prevalent but currently incurable condition.

MS SHERIDAN READ
Curtin University

Expectations for the future in people with dementia: An exploration of their care partners' understandings

Ms Sheridan Read[1], Associate Professor Chris Toye[1], Professor Dianne Wynaden[1]

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Dementia is a syndrome resulting in progressive cognitive decline. Although people with dementia report wanting to uphold their decision making autonomy for as long as possible, proxy decision making may become necessary as the condition progresses. Care partners are family or friends who provide support for the person with dementia, and some who become the person's proxy decision maker report feeling burdened with the responsibility. Given that making informed decisions for another person requires an understanding of their expectations for the future, this study aimed to explore such understandings in care partners of people with dementia. Purposive and theoretical sampling was used to recruit 21 English speaking adults providing care for a family member with dementia at which point data saturation was reached. Recruitment was undertaken via support groups within the metropolitan area and a community radio station. Data were collected using semi structured interviews and analysed using constant comparative analysis. Data analysis ceased when four main categories had emerged. These categories were: *Knowing the person*, *Process of decision making*, *Maintaining normalcy and quality of life* and *Out of their control*. These findings provide insights into the importance of relationships between the person with dementia and their care partner. A person with dementia needs to communicate their desires and expectations for the future to their care partner if the care partner is to be suitably equipped to help safeguard their autonomy and preserve their quality of life as the dementia progresses.

Care

DR RACHAEL CVEJIC
UNSW Sydney

Using administrative data to understand the health profile of people with less common dementias

Dr Rachael Cvejic[1], Dr Ying Ho[1], Dr Preeyaporn Srasuebkul[1], Dr Simone Reppermund[1, 2], Professor Brian Draper[2, 3], Professor Julian Trollor[1, 2]

[1]Department of Developmental Disability Neuropsychiatry, School of Psychiatry, UNSW Sydney, Australia, [2]Centre for Healthy Brain Ageing, School of Psychiatry, UNSW Sydney, Australia, [3]Prince of Wales Hospital, Randwick, Australia

Most studies investigating the health of people with dementia have focussed on Alzheimer's disease and vascular dementia, the most common dementia types. Few have focussed on less common dementias, including frontotemporal dementia, Lewy body disease, and dementia due to other disorders and diseases. Here we explore the utility of routinely collected administrative hospital data to investigate the health profile of people with less common dementia types.

Using a large linked administrative dataset we formed a cohort of people with more common (n=23,128) and less common (n=10,043) dementias aged 25-107 years who were hospitalised in New South Wales from 2001-2010. We compared the principle diagnoses received by people with more and less common dementias at the first admission where dementia was recorded using logistic regression, adjusting for sociodemographic factors.

Compared to people with more common dementias, those with less common types were more likely to be hospitalised for diseases of the nervous system (excluding dementia; OR=5.13, 95%CI=4.65-5.65), injury/poisoning (OR=1.31, 95%CI=1.23-1.40), and other factors influencing health and service use (OR=1.25, 95%CI=1.14-1.38), e.g. problems related to health care. People with less common dementias were less likely to be hospitalised due to dementia itself (OR=0.30, 95%CI=0.27-0.33), diseases of the circulatory system (OR=0.60, 95%CI=0.55-0.65), and cancer (OR=0.64, 95%CI=0.55-0.74).

Our findings provide preliminary evidence of different patterns of primary reasons for hospitalisation for people with more and less common dementia types, highlighting the potential utility of administrative data to investigate the specific health needs of people with less common types of dementia.

DR KATE-ELLEN ELLIOTT
Wicking Dementia Research and Education Centre, University of Tasmania

Do psychosocial work characteristics predict turnover intentions of aged and dementia care workers in Australia?

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[1]University of Tasmania, College of Health and Medicine, Wicking Dementia Research and Education Centre, [2]University of Tasmania, College of Health and Medicine, Psychology.

Staff turnover can have detrimental effects on care outcomes. The objective of the study is to examine whether psychosocial work characteristics predict turnover intentions of aged and dementia care workers in Australia. Findings will inform the design of workforce development interventions that aim to build capacity, reduce turnover and improve quality of care.

An online cross-sectional survey used validated measures to assess intention to leave and psychosocial work characteristics including general self-efficacy, occupational self-efficacy, work engagement, and occupational communion (a multi-dimensional construct on social connection at work). Intention to leave was the main outcome variable in a multiple regression analysis. The remaining variables were predictors.

Participants (N=662) were predominately female (88%) and on average were 49 years old (SD = 10.31 years, Range 20-73). Nearly half (48%) were care workers, a third nurses (32%), and other category (20%) included allied health, managers or coordinators. Four psychosocial work characteristics significantly predicted intention to leave and explained approximately one third of the variance. Higher intentions to leave were significantly predicted by low 'natural' carer identity, low connection with co-workers, low work engagement, and higher blurred boundaries.

Capacity building strategies that aim to reduce turnover should enhance the psychosocial work environment in aged care. Workers could be supported to develop a caring identity, connect with their colleagues, engage with their job roles, and critically reflect on caring relationships and boundaries with care recipients. Future intervention research has a role to test the efficacy of such strategies prior to implementation.

DR STEPHANIE HARRISON
SAHMRI

Residential respite care Associates with lower likelihood of using long-term care for people with dementia

Dr Stephanie Harrison[1], Ms Catherine Lang[1], Professor Craig Whitehead[2], Professor Maria Crotty[2], Megan Corlis[3], Professor Steve Wesselingh[1], A/Professor Maria Inacio[1]

[1]SAHMRI, Adelaide, Australia, [2]Department of Rehabilitation, Aged and Extended Care, Adelaide, Australia, [3]Helping Hand, Adelaide, Australia

Residential respite care is considered a key aged care service to support carers and delay entry to long-term care, but the evidence-base for respite care is lacking. The aim of this study was to evaluate Associations between use of residential respite and use of long-term residential care.

480,862 people with residential respite care approvals in Australia (2005-2012) and 2-year follow-up were included (28.3% were living with dementia). Cox proportional hazard models and Poisson regression models adjusted for confounding factors were employed.

36.9% of participants used their respite approval (40.7% used respite once and returned home, 32.0% used respite and went directly to long-term care and 27.3% used respite ≥2 times). For people with dementia, compared to people who did not use respite care, using respite once and returning home or using respite ≥2 times was Associated with a lower likelihood of using long-term care (Hazard Ratio (HR),95%CI: 0.85,0.83-0.87). Whereas for people without dementia, using respite ≥2 times was Associated with a higher likelihood of using long-term care (1.07, 1.06-1.08). Using respite ≥2 times was associated with fewer overall days in residential care (respite plus long-term care days) for people with and without dementia (Incidence Rate Ratio, 95%CI: 0.88, 0.88-0.88).

For people with dementia using residential respite care reduces the likelihood of using long-term residential care and the number of days in residential care when people return home after their stay. This suggests using residential respite as intended achieves the goal to help people stay living at home.

MS KATHERINE LAWLER
Wicking Dementia Research and Education Centre

Family-assisted therapy for people living with dementia: a systematic review and meta-analysis

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Higher doses of allied health therapies improve outcomes for a range of patient groups. Training families to assist with therapy increases therapy dose. Family-assisted therapy may increase therapy dose and address some of the barriers to effective care faced by people living with dementia.

To determine the evidence for family-assisted therapy and its impact on outcomes for people living with dementia and their family members.

Systematic review with meta-analysis of randomised controlled trials. Electronic databases were searched from the earliest available date until November 2018. The search strategy included synonyms for allied health professionals, family members, and randomised controlled trials. Risk of bias was assessed using the Physiotherapy Evidence Database (PEDro) scale.

Eight trials including 840 participants (494 male) with a mean age of 78 years met the inclusion criteria. Trials investigated family-assisted therapy interventions in occupational therapy (n=5), physiotherapy (n=1), psychology (n=1) and physiotherapy and psychology combined (n=1). Individual trials reported family-assisted therapy improved health outcomes for people living with dementia, including reduced pain, behavioural symptoms and depression, and improved physical health and functional independence. Individual trials also reported family-assisted therapy improved outcomes for family members, including reduced distress and improved self-efficacy and quality of life. Meta-analysis of four trials with 267 participants provided high quality evidence that improved outcomes may be achieved without increasing caregiver burden scores (SMD -0.08, 95% CI -0.32-0.16, I2 0%).

Family-assisted therapy is a promising approach to improving outcomes for both people living with dementia and their family members.

DR EMMA LEA
Wicking Dementia Research and Education Centre

Providing optimal nutrition in residential aged care: The role of staff and family knowledge

Dr Emma Lea[1], Lyn Goldberg[1], Andrea Price[1], Fran McInerney[1], Katheleen Doherty[1], Amber Johnstone[1], Dana Gray[1], Elizabeth Beattie[2], Liz Isenring[3]

[1]Wicking Dementia Research and Education Centre, [2]Queensland University of Technology, [3]Bond University

Dementia increases malnutrition risk. Malnutrition rates among people with dementia living in residential aged care facilities (RACFs) are high, with half of all Australian residents malnourished. Malnutrition increases susceptibility to ill health and decreases quality of life. This study examines nutritional knowledge, attitudes and organisational practices in two southern Australian RACF as part of the baseline data for the Meaningful Engagement in Nutritional Understanding (MENU) intervention project. A survey of staff and family knowledge of nutrition based on an existing tool was undertaken in the RACFs, with descriptive analysis conducted. Findings suggest nutrition knowledge is moderate, with a minority of staff having undertaken nutrition education. Areas of highest nutritional knowledge included factors contributing to malnutrition in residents, identification of key nutrition issues as a person ages, and methods to decrease constipation. Specific knowledge deficits were around how to encourage residents with dementia to eat, signs of swallowing difficulties in people with dementia, what constitutes adequate fluid intake, and knowledge around specific nutrients. In terms of nutrition-related attitudes and organisational practices, concerns were raised about the appearance of food and staffing issues, such as lack of staff time to observe residents eating their meals and a perception of nurses' lack of knowledge about nutrition screening/assessment. However, respondents tended to agree that residents generally liked the food served, and received appropriate assistance and sufficient food. These findings suggest the need for increased awareness of the importance of good nutritional care for people living with dementia in RACFs, supported by tailored nutrition education.

DR KIMBERLY LIND
Macquarie University

Innovations in monitoring health and medications of people with dementia in residential aged care facilities

Dr Kimberly Lind[1], Dr Magdalena Raban[1], Professor Andrew Georgiou[1], Professor Johanna Westbrook[1]

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Aged care is data rich, but information poor. Little is known about the health status of people with dementia living in residential aged care facilities and their medication use. Our objective was to develop a novel approach to monitoring medication use and comorbidities with existing electronic health record data.

We conducted a retrospective dynamic cohort study set in 68 Australian residential aged care facilities during 2014-2017. Using medication administration records and electronic health record data, we developed algorithms to identify dementia and other chronic conditions, and measure longitudinal medication use patterns. We analysed trends in antipsychotic medication use, often used for behavioural and psychological symptoms of dementia, and trends in anti-dementia medications (cholinesterase inhibitors and memantine) used to treat dementia symptoms.

5354 residents with dementia were identified from a total sample of 10,367. Hypertension and arthritis were the most common comorbidities (prevalence of 61% and 57%, respectively). Annual prevalence of medication use ranged from 28% to 38% for antipsychotics and 8% to 9% for anti-dementia medications. Antipsychotic use was longer than guideline recommendations in 65% of residents using these medicines. 83% of residents who used anti-dementia medications were using these medications at admission and 76% of residents who used antipsychotics were using these medications at admission.

Existing electronic health record data can be used to identify the prevalence of common conditions and monitor medication use and health status in residential aged care populations. Monitoring these outcomes is a critical step in improving the quality and safety of residential aged care.

DR MOYRA MORTBY
University of New South Wales

Practical Issues in Intervention Research in Residential Aged Care Facilities: Insights from the BPSDplus Project

Dr Moyra Mortby[1], Professor Elizabeth Beattie[2], Professor Nicola Lautenschlager[3], Professor Colleen Doyle[4], Scientia Professor Kaarin Anstey[1]

[1]University of New South Wales, Randwick, Australia, [2]Queensland University of Technology, Brisbane, Australia, [3]University of Melbourne, Melbourne, Australia, [4]National Aging Research Institute, Melbourne, Australia

The availability of effective non-pharmacological interventions to ameliorate discomfort of Residential Aged Care Facility (RACF) residents with Behavioural and Psychological Symptoms of Dementia (BPSD) remains a pressing sector need. However, the development and testing of such interventions in the complex and challenging RACF environment requires awareness of issues likely to impact access, recruitment and retention, data collection and data quality and staff engagement in the intervention. This presentation discusses the challenges and methodological issues encountered when developing and conducting the BPSDPLUS Program - an embedded trial in residential aged care.

The BPSDPLUS Program provided RACF staff with evidence-based training for BPSD assessment and management using non-pharmacological intervention. 64 staff (81% female) and 76 residents (68% female) from 3 sites of a non-for-profit care provider with dementia-specific units, participated in this 12-month program.

Developmental challenges included the development of an evidence-based training program and materials suitable for care staff from diverse cultural, linguistic and educational backgrounds as well as a research protocol that adheres to scientific rigour, while also facilitating practical fit within RACF operational requirements. Implementation challenges include participant recruitment and retention,

staff concerns relating to operational time-constraints, confidentiality and job security when participating, issues with informed/proxy consent and maintenance of privacy when conducting staff and resident assessments.

Conducting Behavioural Intervention Research poses a number of complex challenges above and beyond those of traditional clinical trial requirements. However, embedded research is needed to help generate evidence-based programs that can be used to facilitate and inform practice changes in RACF.

DR LYN PHILLIPSON
University of Wollongong

Provider perspectives on consumer directed care: facilitators and tensions in supporting people with dementia

Dr Lyn Phillipson[1], Dr Louisa Smith[1]

[1]University of Wollongong, Australia

This study provides insights into how aged care service providers define and describe Consumer Directed Care (CDC) within the Home Care Packages program, and in particular the synergies and tensions between these descriptions and providing CDC for older people with dementia. In 2017-2018 telephone interviews were conducted with a convenience sample of n= 16 case managers from n= 6 unique aged care service agencies who were providers of Home Care Packages within NSW (Australia). Thematic analysis of interview transcripts highlighted five components that formed their conceptions of CDC. 'Supporting connections', 'Being flexible' and 'Focussing on choice and control' were recognised as integral, though challenging, when it came to supporting people with dementia – especially if that person was not supported by a family carer. However, the impacts of 'Focussing on budgets' and 'Organisational change' were considered at odds with engaging, including and providing supportive care of people with dementia. While the five components are all in line with government policy around CDC, participants' descriptions of them in practice indicate the need for capacity building around ways to improve implementation of CDC to better enact the principles of empowerment and choice and control for people with dementia.

MS ANDREA PRICE
Wicking Dementia Research and Education Centre

Challenges in undertaking ethnographic research in a secure dementia-care unit

Miss Andrea Price[1], Associate Professor Andrea Carr[2], Professor Fran McInerney[1]

[1]Wicking Dementia Research and Education Centre, University Of Tasmania , Hobart, Australia, [2]University College, University of Tasmania, Sandy Bay, Australia

Participant observation is a key element of ethnographic methodology. Contemporary ethnographic approaches acknowledge that researchers bring values and biases that influence their observations. This presentation discusses how the values and biases of an expert nurse/student researcher contributed to unexpected personal tensions and possibilities during ethnographic research with a vulnerable population.

Participant observation took place over 12 months in a secure dementia-care unit. The researcher was immersed in the day-to-day life of the unit, observing but not actively participating in routine tasks, events and activities. Residents living with dementia often assumed the researcher was a staff member and requested her assistance. Declining to assist was morally and professionally challenging for the researcher, as this conflicted with her personal and nursing values. Ethical challenges emerged during observation periods if a resident was observed to be at risk of harm and staff were not available to intervene. Further tensions emerged when clinical expertise could not be offered to assist staff in care. Identifying boundaries between active participant, non-participant observer, and participant observer roles was complex. For example, residents sought the researcher's company for conversation; as staff had limited opportunity to sit and talk with residents, these conversations could be considered therapeutic interventions, raising further research complexity.

Reflexive journaling and meetings with supervising members of the research team were crucial in uncovering tensions and possibilities around expert clinicians undertaking ethnographic research with vulnerable populations, and serve as a critical data source for exploring this in this presentation.

DR JOYCE SIETTE
Macquarie University

Social participation and wellbeing of older adults with dementia in community aged care

Dr Joyce Siette[1], Professor Andrew Georgiou[1], Professor Johanna Westbrook[1]

[1]Australian Institute of Health Innovation, Macquarie University, Australia

Although social networks play a role in slowing the development of dementia in the general population, much is unknown about the sub group of older adults receiving home- and community-based aged care. We aimed to identify the Associations between cognitive function and interpersonal relationships in older adults receiving community care services.

Older Australians (n=178) receiving community aged care services in NSW were asked about their social networks, health-related quality of life and assessed for cognitive function. Service use and sociodemographic variables were also collected. The primary outcome was cognitive function, measured by the Telephone Interview for Cognitive Status-Modified (TICS-M). Multiple regression analyses were performed to ascertain the Associations between quality of life, social network size and relationship status, demographics and cognitive impairment.

The sample had a mean age of 80.4± 6.7 years and the majority (65.8%) was female. A third (37.6%) had cognitive impairment and reported moderately high social networks (M=33.5, SD=11.8). Having increased contact with friends and high quality of life were significant predictors of better cognitive outcomes, while age, gender, number of family and friends were not associated with cognition.

Our findings suggest that maintaining a socially active lifestyle with friends in later life may benefit cognitive

function. This has important implications for community aged care interventions targeting social isolation to improve cognitive function.

DR EDWIN TAN
University of Sydney

Do acetylcholinesterase inhibitors prevent or delay psychotropic prescribing in people with dementia?

Dr Edwin Tan[1,2], Professor Kristina Johnell[3], Professor J Simon Bell[4], Dr Sara Garcia-Ptacek[2,5], Professor Johan Fastbom[2], Professor Peter Nordström[6], Professor Maria Eriksdotter[2,7]

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Behavioural and psychological symptoms of dementia (BPSD) are common. Psychotropics, such as antipsychotics, anxiolytics and antidepressants, are often used to manage BPSD; however, they are Associated with significant adverse effects. The aim of this study was to investigate whether prescribing of acetylcholinesterase inhibitors (AChEIs) prevents or delays the subsequent initiation of psychotropic medication in people with Alzheimer's disease (AD) and Lewy body dementia (LBD).

This was a data linkage study of 17763 people with AD and LBD, who did not use a psychotropic at the time of dementia diagnosis, registered in the Swedish Dementia Registry (SveDem) from 2007 to 2015. Data on AChEI use, psychotropic use and comorbidities were linked using nationwide registers. Propensity-score matched Cox proportional hazards models were used to compute hazard ratios (HRs) and 95% confidence intervals (CIs) for the Association between time-dependent AChEI use and risk of psychotropic initiation.

During a median follow-up period of 2.6 [quartiles 1.3 – 4.2] years, 9959 people initiated a psychotropic. Compared with matched controls, AChEI users had a lower risk of antipsychotic (HR: 0.85, 95%CI: 0.75–0.95) and anxiolytic (HR: 0.76, 95%CI: 0.72–0.80) initiation. In sub-analyses, this Association remained significant at higher AChEI doses, and in AD but not LBD. There were no Associations between AChEI and initiation of antidepressants or hypnotics.

AChEI use may be Associated with lower risk of antipsychotic and anxiolytic initiation in AD, particularly at higher doses. Further investigation into AChEIs in BPSD management in LBD are warranted.

MS HEIDI WELBERRY
University of New South Wales

Transitions through aged care in the last five years of life among those with dementia

Ms Heidi Welberry[1], Scientia Professor Henry Brodaty[2,3], Dr Sebastian Barbieri[1], Dr Benjumin Hsu[1], Professor Louisa Jorm[1]

[1]Centre for Big Data Research in Health, UNSW, Sydney, Australia, [2]Centre for Healthy Brain Ageing, UNSW, Sydney, Australia, [3]Dementia Collaborative Research Centre, UNSW, Sydney, Australia

Aged care policy in Australia has increasingly focused on home and community-based care (HCBC). For those with dementia, staying at home is challenging due to the debilitating nature of symptom progression and it is uncertain whether HCBC is useful for this group towards the end of life.

Survey data collected in 2006-2009 from the 45 and Up study, a prospective cohort of 267,000 people from New South Wales, Australia were linked1 to: Hospitalisations, Deaths, Aged Care data; and Pharmaceutical Benefits Scheme claims2 for the period 2006-2014. We compare patterns of movement through aged care states (Home Support, Home Care, Respite, Permanent Residential Aged Care (PRAC) and Hospitalisation) within the last five years of life for a dementia cohort and age and sex-matched control group.

Those with dementia were more likely to use all forms of care but duration of use was longer for home support and PRAC only. Use of PRAC increased from 6 to 66% within the dementia cohort over the five years before death, and from 3 to 21% among controls. In the last year of life, HCBC use increased among controls (from 12 to 16%) but declined (from 14 to 10%) among those with dementia, mainly as a result of transitioning to PRAC.

Dementia-specific aged care trajectories were dominated by PRAC. Declining HCBC use suggests higher levels of care were needed by most dementia patients at the end of life.

[1] via the Centre for Health Record Linkage and Australian Institute of Health and Welfare

[2] Provided by the Department of Human Services

CONSUMER INVOLVEMENT IN RESEARCH PRESENTATIONS

HARRY DOUGLAS
Presenting with Dr Kate Smith

Items of the Good Spirit, Good Life quality of life tool for older Aboriginal Australians

Harry Douglas is a Gunnai man from south eastern Victoria, and a carer for his mum with dementia and other Aboriginal elders. He is working on the Good Spirit Good Life project with Melbourne University and the University of Western Australia. This personal and work based experience in caring for people with dementia is invaluable for ensuring the research project is collaborating effectively with older Aboriginal participants. This project is developing a package to identify and improve the quality of life of older Aboriginal Australians, including people with dementia. Harry is working closely with Aboriginal people with dementia and service providers in Melbourne and surrounds to ensure that the items of the Good Spirit Good Life tool reflect the wellbeing priorities of older Aboriginal people. He will discuss this process of collaboration with the community and service providers, resulting in the main quality of life themes that have informed the questions of the tool. He will also present the final items of the tool, with co-presenter and co-researcher Kate Smith.

VAL FELL
Presenting with Dr Lyn Phillipson

What happened to Respite?

Providing a range of respite options for people with dementia and their carers has traditionally been considered a core aspect of a well-functioning aged and disability care systems. In an ideal context, supporting informal carers and people with dementia to age in place involves providing access to a broad range of support including flexible respite services in a variety of settings.

Policy and program reforms in Australia are significantly transforming the aged and disability care service sectors, towards a more individualised, consumer directed and market based approach to service delivery. In the context of this fundamental re-design of these systems, what has happened to respite for carers?

In this paper, we will present the results from a content analysis of new national programs to shine a light on how planned and emergency respite have been included in new and continuing national programs including: the Home Care Support Program, Home Care Packages, Commonwealth Care Respite Centres; the Carers Gateway and Integrated Care Plan and the National Disability Insurance Scheme. We will also reflect on the results from over a decade of collaboration on local respite research and advocacy in the Illawarra (NSW) highlighting the insights this has provided to address the challenges facing people with dementia and their carers who identify the need for respite.

This paper provides a timely analysis of the interface between new and continuing national aged, carer and disability programs and their capacity to support access to flexible respite. Results highlight the need for a more integrated approach to respite policy development and service provision to support people with dementia and their carers. It also highlights the value of academic and community partnership in research to promote community impact and benefit.

THERESA FLAVIN

Effective involvement of people living with dementia in research – supported participation

I propose to outline the direct impact of fully integrating consumers into the supported decision- making project, the effectiveness of the resources developed as an output for public dissemination as a result of good integration and lessons learned on effectively working with consumers in a research setting.

PHIL HAZEL
Presenting with Ms Catherine Andrew

Beyond the role of research participant: collaborative consumer involvement as a member of the research team

This paper will detail my research roles: (i) initially as a research participant dealing with the impact of symptoms of dementia on my job; and (ii) co-researcher and presenter of my insights and experiences of extending workforce participation by way of employer support and reasonable adjustment. I will detail the benefits and challenges of being involved in collaborative research and share tips about reasonable adjustment strategies that support the consumer as a co-researcher.

TARA QUIRKE

The Cognitive Decline Partnership Centre (CDPC) at University of Sydney is a federal and industry supported research model with a vision to improve the lives of people with dementia. The Centre has worked closely with the NNIDR, and this presentation will provide overview of the Centre through four voices representing management, residential aged-care partners, consumers, and researchers. The speakers will share individual and group experience and learnings from their participation in this vibrant research centre that has supported and funded thirty-two (32) research teams all addressing contexts of care for people with dementia.

The Centre's collaborative processes facilitated identification of unmet needs, and research priorities for improving care for people with cognitive and related functional decline in Australia. Project grants were awarded to teams expected to include implementation into policy or practice within their scope of work. The Centre worked broadly across eight contexts of care: service model options; pathways and navigation; planning for later life; attitude and culture; clinical guidelines development; functional decline; medication management; and workforce development and education.

Research was funded under a contributory partnership model, with research teams expected to include consumers ie. people with dementia and/or their carers, and industry representatives, across all stages of the research cycle from Protocol development to final reporting. This meant that research outcomes, outputs, and interventions were developed in collaboration with consumers, industry, policy leaders, and health Professionals; enabling implementation of research-informed systems and attitude change to impact care for people with dementia in Australia.

BOBBY REDMAN

Involving those with the lived experience in dementia research means we all win

The involvement of those with the lived experience participating in dementia research provides benefits for everyone involved. Whether it be sitting on steering committees; reviewing surveys / questionnaires; or providing guidance in the preparation of materials to be used with participants, it helps to ensure that respectful and clear communication is used. By providing the filters to ensure that the research is dementia friendly, the participants are better able to respond to questions and use materials, thus providing more accurate responses, with a reduced level of stress for the participants. It also provides the researchers with a greater understanding of the dementia condition and how to better interact with those living with dementia.

However, the most beneficial effects appear to come from hands on involvement, such as in The Dementia Lifestyle Coach study, with benefits to not only the participants, but also to those living with dementia assisting in the research and the researchers. For the participants, these includes a better understanding and acceptance of their diagnosis, and the ways and means of living well with dementia. The peer supporters working in the study reported that alongside the provision of a supportive network, they experienced an increased sense of purpose and greater confidence regarding their own ability to maintain a positive lifestyle and improved organisational skills which helps them to maintain function. Finally, the benefits reported by one the researchers, who reported a change in perspective based on viewing dementia though the humanitarian lens rather than the more common perspective of economics and cost to the community. Giving hope that that in working together people living with dementia, researchers, doctors and other health Professionals will build understanding and a better future for all.

EILEEN TAYLOR

Presenting with Dr Jacki Liddle

Technology teams: Bringing the experts together to make technology that works for people

While many people hope that technology will support people living with dementia with safety, independence and participation, technology has not yet achieved this potential. Researchers and developers have recognised the importance of engaging users in the process of creating and evaluating technologies.

The Florence project aims to develop technology with people living with dementia and their care partners to support communication and participation. Lived Experience Experts are involved in guiding the project, being part of research activities, assisting in analysing findings, and sharing these findings with the community.

Part of the research project involves being part of design teams, supporting their learning about living with dementia, sharing my perspectives on technology and providing feedback on different versions of prototype designs. This is a team approach where we work together to try to create technology that works well for people. It requires challenging stereotypes, providing insights into strengths, interests and needs, and testing to see what is actually usable and acceptable. It is clear that people living with dementia and their care partners are an essential and valuable part of the technology team. We have worked together on a range of technology ideas including ways of connecting with people, calendars, reminders and prompts and making music more accessible. We have also talked about technologies that are currently available for people with dementia and our hopes and concerns with these including robots, monitoring systems and medication reminders.

In this presentation, we want to share the process including what has worked well, what we have learned and what our next steps are.

EILEEN AND DUBHGLAS TAYLOR

A Participant Reflection of Clinical Dementia Research

Research is an important part of our modern world and particularly medical and social research offers the promised of hope for people living with a dementia and their care partners and families. People diagnosed with dementia enter as Research participants full of this hope and expectations either for themselves or for the future of their families and others.

Participants are immediately asked to provide their informed consent to participate in clinical research, potential participants are encouraged to any risks, potential benefits, procedures, and alternatives. Yet it is likely that potential participants do not necessarily "informed consent" requirement. Does their lack of understanding undermine the validity of informed consent. Perhaps a better understanding needs to be provided that helps to appreciate how the generalized knowledge will benefit others in the future, and to the extent to which participating in the study will alter what participants do and what happens to them in the future. This could be done with training prior to and during the research with a compressive follow-up procedure that includes a debriefing and support at the end of the trial. Minimizing the use of technology and preferring a face-to-face conversation, especially if the trial abruptly ends. In this presentation, we want to explore the costs and benefits of researchers adding a training and follow-up process based on what we have learned and what any next steps could be.

POSTER ABSTRACTS

Prevention

DR JANE ALTY
Wicking Dementia Research and Education Centre

Cognitive Reserve not associated with age or gender in baseline Tasmanian Healthy Brain Project

Dr Jane Alty[1], Mr Aidan Bindoff[1], Dr Kimberley Stuart[1], Dr Shannon Klecociuk[1], Professor James Vickers[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

Background: Cross-sectional investigation of cognitive aging may be confounded by age and gender related cohort effects. Access to education and cognitively stimulating life activities is Associated with higher cognitive test scores, and may provide a 'cognitive reserve' (CR) that buffers against the effects of age-related brain pathology. Differences in access to education and cognitively stimulating life activities may confound estimated trajectories of normal cognitive aging, as these are presumed to have varied over generations and between genders.

Aim: To assess the relationships between age, gender and CR.

Method: 565 healthy older adults (68% women; median age 60 years, IQR 55-65) completed a baseline assessment of estimated premorbid cognitive function, a self-report questionnaire on years of school education completed, and the Lifetime of Experiences Questionnaire to gauge lifetime participation in cognitively stimulating activity. These measures were combined to form a proxy measure of CR.

Results: adjusting for age, there was a significant positive correlation between CR and cognitive test scores; but contrary to expectations, there were no significant effects of age or gender (or their interaction) on CR.

Conclusion: lifetime participation in cognitively stimulating activity is Associated with cognitive function, but the hypothesis that age and gender would be Associated with CR was not supported in this study. As participation in the study is voluntary, this may reflect a stratification of CR unrelated to age or gender in this cohort.

MS LISA BRANSBY
The Florey Institute of Neuroscience and Mental Health

Relationship between Perceived Stress, Stressful Life Events and Cognition in a Sample of Middle-Aged Adults

Ms Lisa Bransby[1], Dr Rachel Buckley[1,3,4,5], Dr Nawaf Yassi[1,2], Dr Yen Ying Lim[1]

[1]The Florey Institute of Neuroscience and Mental Health, Parkville, Australia, [2]Department of Medicine and Neurology, Royal Melbourne Hospital, Parkville, Australia, [3]Department of Neurology, Massachusetts General Hospital and Harvard Medical School, Boston, USA, [4]Center for Alzheimer Research and Treatment, Department of Neurology, Brigham and Women's Hospital, Boston, USA, [5]Melbourne School of Psychological Sciences, University of Melbourne, Melbourne, Australia

Background: Stress is Associated with cognitive dysfunction and increases risk for Alzheimer's disease (AD)-related cognitive decline. Using a remote online assessment platform, we aimed to further investigate this relationship in a large group of middle-aged adults with a family history of dementia.

Method: Participants (n=1384) aged 40-70 with a first- or second-degree family history of dementia enrolled online in the Healthy Brain Project (healthybrainproject.org.au) and completed the Perceived Stress Scale (PSS), the Depression Anxiety and Stress Scale (DASS), the Cogstate Brief Battery and the Cambridge Neuropsychological Test Automated Battery (CANTAB) Paired Associate Learning task. Participants completed the PTSD Checklist for DSM-5 (PCL-5) if they reported a stressful life event (SLE) in the past month.

Result: We observed small, significant relationships between perceived stress and attention (β=-0.0178, $p<.001$), memory (β=-0.0199, $p<.001$) and learning (β=-0.0136, $p=.021$). Participants who reported an SLE did not show worse cognitive performance than those who did not report an SLE. In participants who reported an SLE (n=191), those who reported higher levels of perceived stress performed worse on attention (Cohen's d=0.42), and learning (Cohen's d=0.29).

Conclusion: Higher levels of perceived stress were Associated with poorer cognitive function. This relationship was exacerbated further if individuals had experienced an SLE. This suggests that individuals' ability to moderate perceived stress following an SLE has more important implications for cognition than the event itself. Our results are consistent with those observed in in-clinic studies and support the use of a remote online platform to investigate the relationship between stress and cognition.

MISS ELLIE BUCHER
Wicking Dementia Research and Education Centre

Effects of sleep disruption and neuroplasticity on amyloid-β in a mouse model of Alzheimer's disease

Miss Ellie Bucher[1], Mr John McManus[1], Associate. Professor. Anna King[1], Professor James Vickers[1], Dr Matthew Kirkcaldie[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

Alzheimer's disease (AD) is characterised by progressive accumulation of amyloid-beta (Aβ), thought to arise from an imbalance between the generation and clearance of Aβ. The present study explored the effects of increasing Aβ production and impairing sleep-Associated clearance pathways in the APPswe/PSEN1ΔE9 mouse model of AD. Weekly alternating-row whisker trimming and a moderate sleep disruption protocol (8h on an orbital shaker, activated in intervals averaging 30sec on/90sec off) were employed to induce cortical plasticity, and disrupt clearance, respectively. 120 mice (60 male) were allocated to one of four conditions; subjected to either trimming or sham, and either sleep disruption or sham from eight weeks of age, until endpoints of either three, six, or nine months. Immunohistochemistry was used to label Aβ in the mouse cerebral cortex of the three month cohort. There were no significant effects of any manipulation. Six and nine month cohorts will be included in the final analyses (in progress). However, Arc expression was elevated in all conditions, compared to control, indicating an increase in plasticity in response to both whisker trimming and sleep disruption. This suggests that whilst the experimental treatments induce structural changes in the brain, they do not hasten the onset of pathology in this model. Given that sleep disorders are Associated with increased risk of AD in humans, and that people with AD often experience disturbed sleep, the outcomes of this study may have implications for the treatment of sleep related issues in individuals at risk of, or showing signs of AD.

DR ISABELLA CHOI
University of Sydney

Attitudes towards learning your personal dementia risk profile: A focus group study with at-risk adults

Dr Isabella Choi[1], Dr Rochelle Einboden[1], Dr Cynthia Forlini[1], Professor Nick Glozier[1], Professor Sharon Naismith[1]

[1]University of Sydney, Sydney, Australia

Background: A key question in dementia risk reduction and prevention is how to engage people to address potentially modifiable risk factors. Awareness of personal dementia risk profiles may motivate individuals to reduce their modifiable risk factors, but it may also cause unintended distress. This study explores the opinions of adults at risk of developing dementia about learning their personal dementia risk profile.

Method: Four focus groups were conducted (n=15) with community-dwelling middle-age and older- adults without diagnosis of dementia to explore their attitudes towards learning their personal risk and risk factors of dementia. Focus groups were transcribed and analysed thematically.

Results: Participants described learning their personal risk profile was an important motivator for making lifestyle changes to lower their risk and making plans to manage future care. They also described potential challenges of knowing risk such as coping with anxiety, depression, denial, or feeling helpless that they could not lower their risk. Participants offered differing opinions on the preferred way of learning about their risk (e.g. from a GP or anonymously online), but they emphasised the importance of the risk profiling tool in providing personalised information and resources to support them to lower their risk.

Conclusion: Although participants welcomed and described the benefits to learning their personal dementia risk profile, it appears that a "one size fits all" tool may not be suitable to all, and it is important to tailor the personal feedback and provide resources to support risk reduction.

MS NICOLE EE
University of New South Wales

Age-related changes in decision-making: a systematic review

Ms Nicole Ee[1, 2, 3]

[1]University Of New South Wales (UNSW), Sydney, Kensington, Australia, [2]Neurosciecne Research Australia (Neuroscience Research Australia), Sydney, Randwick, Australia, [3]Australian Research Council Centre of Excellence in Population Ageing Research (CEPAR), Sydney, Kensington, Australia

Background: Decision-making is an integral part of daily life and the capacity to make advantageous decisions is fundamental to autonomy and wellbeing. While age differences in decision-making patterns are well documented, disparate individual experimental studies, heterogeneous methodologies and outcome measures have made it difficult to ascertain the real-world impact of cognitive ageing on decision-making. This paper sought to synthesize the evidence on age-related change in older adult decision-making.

Methods: A systematic review was conducted to evaluate the evidence on age-related changes in economic, social, and health and safety related decision-making. EMBASE, MEDLINE and PsycINFO were searched from inception to 15 January 2019. No language restrictions were imposed. All articles returned by the search were screened by two independent reviewers according to pre-determined eligibility criteria. Experimental and observational studies reporting on the relationship between normal cognitive ageing, age-related changes in decision-making, and any associated health and wellbeing outcomes were included. Discrepancies were resolved through discussion and consensus.

Results: One hundred and twelve articles were identified at the full-text screening stage. A large proportion of studies investigated economic decision-making with the Iowa Gambling Task or the Ultimatum game. Eight studies reported on social decision-making, and only four reported on health and safety related decisions. Remaining studies focused on other processes (e.g. pre-decision information search, risk aversion, discounting, and adaptive decision-making). Due to methodological heterogeneity meta-analysis was not feasible.

Conclusions: Despite evidence showing age differences in a range of decision-making processes, its impact on health and wellbeing outcomes in older adults remains unclear.

MRS HANNAH FAIR
Wicking Dementia Research and Education Centre

Impacts of the Preventing Dementia MOOC beyond those educated: the diffusion of knowledge and behaviour

Mrs Hannah Fair[1], Dr Shannon Klekociuk[1], Dr Claire Eccleston[1], Dr Kathleen Doherty[1], Mr Aidan Bindoff[1], Professor James Vickers[1], Dr Maree Farrow[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

It is estimated that 28 - 48% of dementia cases are attributable to key modifiable risk factors, but several studies suggest low public awareness of this potential for dementia prevention. Effective public health strategies need to be developed to address this gap. A successful public health campaign will diffuse through interpersonal connections within a community, reaching individuals who would otherwise not access the information and increasing the adoption of risk reduction behaviour. The Wicking Centre developed the Preventing Dementia Massive Open Online Course (PD MOOC) to provide accessible education about modifiable risk factors for dementia; this course has attracted over 64,000 enrolments since 2016. 72% of the 3,596 participants who completed the PD MOOC feedback survey in 2018 indicated that they had already applied knowledge gained from this MOOC. They were asked how they had applied this knowledge and a natural-language processing algorithm was used to identify common themes. Sharing information with family, friends and colleagues was among the most prevalent themes. Participants and/or those they shared information with had altered their behaviour to reduce their dementia risk. For example, one participant, a 43-year-old female aged care administrator, reported that she shared risk reduction information with her diabetic mother who subsequently changed her diet. Understanding the characteristics of those who share dementia prevention information, the connections through which they share this information and the lifestyle changes being made will aid in the development of a public health campaign to reduce dementia risk and prevalence across society.

DR CAMILLA HOYOS
University of Sydney

Sleep disruption and circadian rhythm alterations in older people with depression

Dr Camilla M Hoyos[6], A/Professor Chris Gordon[2], Professor Simon Lewis[1], Dr Zoe Terpening[3], Dr Louise Norrie[4], Professor Ian Hickie[1], Professor Sharon Naismith[5]

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Background: Depression in older people occurs commonly and is Associated with underlying brain change and progression to dementia. While sleep disturbance is commonly documented in those with lifetime depression, it is unclear whether circadian misalignment also exists.

Methods: 34 older people meeting DSM-IV criteria for lifetime major depression (mean age = 63.9 years), and 30 healthy controls (mean age = 65.7 years) underwent a 3-night protocol including dim light melatonin onset (DLMO) assessment and overnight polysomnography (PSG). DLMO, area under the curve for total melatonin secretion and phase angle of entrainment (DLMO - mid-point of sleep) were computed. Sleep latency, wake after sleep onset, number of arousals and latency to rapid eye movement sleep were derived from PSG.

Results: Participants with depression had a significantly longer phase angle of entrainment than controls (6.82h±1.45 *vs.* 5.87h±1.60, p=0.02, Cohens-d=0.62). There was a small to moderate yet non-significant difference in DLMO times, with those with depression having an earlier DLMO of 34±27 minutes (20:36±1:48 *vs.* 21:10±1:48, p=0.22, Cohens-d=0.32). There was no statistical difference in melatonin area under the curve between groups. Sleep latency, latency to rapid eye movement sleep and nocturnal arousals were greater in those with depression compared to controls (all p<0.05).

Conclusions: In older people with lifetime major depression and mild residual symptoms, both circadian misalignment and sleep disturbance are evident. These changes warrant evaluation and treatment even when symptoms are remitted particularly since sleep-wake disturbance is Associated with cognitive decline, treatment responsiveness, depression recurrence and dementia.

DR SCHERAZAD KOOTAR
Neuroscience Research Australia

To investigate the Association between cortisol levels and memory impairments in animal and cohort studies

Dr Scherazad Kootar[1], Dr AnaRita Salgueiro-Pereira[3], Dr Ingrid Bethus[3], Dr Helene Marie[3], Professor Kaarin Anstey[1,2]

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Stress, a prominent risk factor for Alzheimer's disease (AD), activates the hypothalamus-pituitary-adrenal axis (HPA axis) which results in high levels of cortisol (in humans) and corticosterone (in rodents). Evidence shows that high cortisol/corticosterone mediated activation of glucocorticoid receptors (GRs) present on the hippocampus and prefrontal cortex is negatively associated with overall cognitive performance and synaptic plasticity. The effect of amyloid-beta oligomers (Aβo) on modulating hippocampal synaptic plasticity is evident, but the functional relationship between these oligomers and GRs at synapses is still mostly unknown.

To explore the Association between corticosterone levels and memory impairment we used the AD transgenic

Tg2576 mouse model (Tg+). Blood corticosterone and episodic memory were measured in these mice. High levels of plasma corticosterone and impairment in episodic memory was observed in the Tg+ mice at 4 months as compared to the controls, indicating an Association between high corticosterone levels and memory impairment. Furthermore, using ex-vivo electrophysiology, our results suggest that hippocampal GRs mediate Aβo-induced deleterious effects on long-term potentiation - an important physiological response to memory consolidation. In order to explore the relationship between cortisol levels and its effect on memory in humans, we are examining the longitudinal data from a cohort of adults aged 60 years and over. The preliminary data from this study will be presented at the forum.

DR LOUISE LAVRENCIC
Neuroscience Research Australia

Dementia incidence and risk factors for cognitive decline in older urban and regional Aboriginal Australians

Dr Louise Lavrencic[1], Ms Hannah Derrig[1], Ms Gail Daylight[1], A/ Professor Kim Delbaere[1,2], Professor Gail Garvey[3], Dr Thi Yen Hill[1,4], Dr Danielle Lasschuit[1,4], Professor Brian Draper[2,4], Professor Robert Cumming[5], Dr Simon Chalkley[6], Professor Peter Schofield[1], Professor G. A. (Tony) Broe[1,2], Dr Kylie Radford[1,2]

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Aboriginal Australians are disproportionately affected by dementia, with incidence in remote populations approximately double non-Indigenous populations. However, dementia incidence and risk factors in the urban/regional Aboriginal population need to be investigated. We assessed a representative sample of Aboriginal Australians aged 60+ years from 5 urban/regional communities, at baseline (N=336) and 6-year follow-up (N=165; n=68 died before follow-up). Dementia and mild cognitive impairment (MCI) were diagnosed based on clinical assessment and consensus review. Biomedical/psychosocial lifecourse risk factors (baseline assessment) were examined for cognitive decline (intact at baseline, to MCI/dementia at follow-up) using logistic regression analyses. ApoE genotyping was available for 89 follow-up participants. There were 16 incident dementia cases (12 probable/possible Alzheimer's disease), with an incidence rate of 17.55 per 1000 person-years (95% CI: 10.03-28.50). Dementia incidence was similar to a remote Aboriginal population, with a comparable age-adjusted rate of 29.73 per 1000 person-years (95% CI: 15.16-44.30). Education was a significant protective factor for cognitive decline (OR=4.05). In a multivariable model, only older age (OR=3.05), male sex (OR=3.68), unskilled work (OR=3.93) and hearing loss (OR=4.55) remained significant risk factors. ApoEε4 allele frequency (a risk factor for Alzheimer's disease) was 24.4%, which is higher than European/US prevalence figures (~14%); ApoEε4 was borderline Associated with cognitive decline (p=.050). These findings provide the first evidence for greater dementia incidence in Aboriginal Australians from urban/regional areas (where the majority of Aboriginal people reside); and shed light on risk factors for late-life cognitive decline in this population, which is important for targeted prevention strategies.

DR MATTHEW LENNON
University of New South Wales

Mid-life hypertension and Alzheimer's dementia – A systematic review and meta-analysis

Dr Matthew Lennon[1,2], Dr Steven Makkar[1,2], Dr John Crawford[1,2], Professor Perminder Sachdev[1,2,3]

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Background: Hypertension is an established risk factor for stroke and vascular dementia but recent meta-analyses looking at the Association between Alzheimer's disease (AD) and hypertension have found no significant Association. These meta-analyses included a number of short term studies starting in late life which very likely obscured the real effect of mid-life hypertension. We examined the Association of AD with mid-life hypertension, by including only studies with a sufficiently long follow up duration and by clearly defining the type of hypertension.

Methods: Relevant studies were found by searches of MEDLINE, EMBASE and PubMed. Study outcomes were grouped by measures of blood pressure and definition of hypertension (e.g. Systolic hypertension >140 mmHg or >160 mmHg, diastolic hypertension or blood pressure measured in 10 mm Hg increments).

Results: Literature search found 7 eligible studies. There was a significant Association between systolic hypertension (>160 mm Hg) and AD (HR 1.25, 95CI 1.06 – 1.47, p=0.0065). Similarly, for systolic hypertension >140 mm Hg there was a smaller but still significant Association (HR 1.18, 95CI 1.02 – 1.35, p=0.021). For diastolic hypertension, all four studies found no significant Associations between diastolic hypertension and AD, and these data could not be pooled due to heterogeneity in reporting.

Conclusions: Our study found that midlife stage 1 and stage 2 systolic hypertension is Associated with increased risk of AD by 18 and 25 percent respectively, although no Association was found for diastolic hypertension.

MR JOHN MCMANUS
Wicking Dementia Research and Education Centre

Examining gene expression following sleep disruption and induced plasticity in Alzheimer's model mice

Mr John McManus[1], Ms Ellie Bucher[1], Associate Professor Anna King[1], Professor James Vickers[1], Doctor Matthew Kirkcaldie[1]

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The progressive accumulation of amyloid beta (Aβ) peptides in Alzheimer's disease (AD) is subject to its production and clearance. During sleep, accumulated brain metabolites including Aβ clear via glymphatic pathways. The effects of increasing Aβ production and impairing sleep-Associated clearance were examined in a mouse model of AD. Weekly alternating-row whisker trimming was used to induce plasticity in the right hemisphere somatosensory cortex, in addition to a moderate sleep fragmentation protocol. 60 male and 60 female mice assigned to one of four groups receiving whisker trimming,

sleep disruption, both or neither (control) from 8 weeks until the cohort reached 3, 6 or 9 months. Relative gene expression was determined for plasticity-related genes *Gap43* and *Arc*; *Aqp4*, encoding aquaporin protein responsible for glymphatic clearance of Aβ; and *APP*, encoding the amyloid precursor protein (APP). Current data represented by incomplete groups indicate no significant difference in the expression of *Aqp4*, *Gap43* or *APP* mRNA following either manipulation when compared with age-matched controls. Preliminary results indicate significant increase in the expression of *Arc* in all treatment groups, with no substantial difference noted amongst other target genes. Interestingly, chronic disruption of sleep did not appear to impact the expression of *Aqp4* in affected mice. Ongoing studies intend to confirm these findings and examine the relationship between expression and prevalence of the translated protein. Understanding the molecular biology of Aβ accumulation and the value of sleep in its clearance may even provide new lifestyle and therapeutic targets for the prevention.

DR MORGAN NEWMAN
The University Of Adelaide

Can the zebrafish help us understand the molecular mechanisms of inherited Alzheimer's disease?

Dr Morgan Newman[1], Miss Nhi Hin[2], Dr Stephen Pederson[2], Associate Professor Michael Lardelli[1]

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Despite over 100,000 publications on Alzheimer's disease (AD), there is still disagreement about what actually causes the disease. To prevent or delay AD onset we must understand its underlying molecular mechanisms. We know that inherited (familial) cases of AD (fAD) are caused by mutations in either the *APP*, *SORL1* or *PSEN* genes. Our research team are world leaders in using zebrafish to investigate these genes. For human disease modeling, zebrafish enable sensitive detection of changes in gene and protein expression that occur due to disease mutations. We have generated fAD-like mutations in the zebrafish and are analysing the mutant brains as they age by monitoring their gene and protein expression and also by observing their responses to stress. Our analysis of young adult fish brains has highlighted changes in energy metabolism, inflammation, hypoxia, oxidative stress and other cellular systems as being early effects of fAD mutations. Importantly, these factors are all known to be involved in the late onset, common form of AD. Intriguingly, when aged mutant fish are exposed to low oxygen (hypoxia) they show an "inverted" pattern of gene response which is reminiscent of the differences seen between healthy human brains and brains of people with mild cognitive impairment and AD. These results support that our zebrafish models can be revealing about both fAD and late onset AD. Our analysis suggests that young pre-AD brains are under energy stress, followed by an "inversion" into the full disease state.

MR GONGBU PAN
Wicking Dementia Research and Education Centre

Association of Alzheimer's disease polygenic risk score with changes of cognitive function in older adults

Mr Gongbu Pan[1], Associate Professor Anna King[1], Professor James Vickers[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

Background: Previous studies show evidence that more than 21 genetic variants and polygenic risk were Associated with the Alzheimer's disease (AD). But the relationship between Alzheimer's disease polygenic risk scores (ADPRS) and cognitive function was unclear due to the lack of longitudinal data. This study investigated the potential Association between ADPRS and changes in cognitive function Associated with ageing.

Methods: The TBHP is an ongoing longitudinal prospective study of 459 healthy older adults. Participants with available genotype data (N=326) were included in analysis. ADPRS was calculated by using sets of AD susceptibility variants identified by a meta-analysis of GWAS data. The cognitive function domain z-scores at baseline and year 1, 2 and 3 were calculated using factor analysis (principal components extraction method). Single factor scores for episodic memory, working memory, executive function, and language processing domains were combined by using factor coefficients via regression analysis. Linear mixed-effects model analysis was performed to investigate the Association between ADPRS and cognitive function longitudinally.

Results: The ADPRS was significantly Associated with the decline of language processing z-score over 36 months (β= -0.09 per one ADPRS; p=0.044). There were no Associations between ADPRS and longitudinal changes in other cognitive domains. Additionally, a negative interaction between ADPRS and age was found for working memory (p=0.045).

Conclusions: ADPRS may influence changes in specific cognitive domains in older adults. Age may be an important effect modifier of the genetic influence on changes in working memory.

MR ANDREW PHIPPS
Wicking Dementia Research and Education Centre

Dysregulation of the neuronal epigenome occurs prior to pathology-onset and evolves with progressive amyloidosis

Mr Andrew J Phipps[1], Mrs. Katherine Giles[2], Associate Professor Timothy Mercer[3], Professor James C Vickers[1], Associate Professor Mark Robinson[4], Doctor Phillippa C Taberlay[5], Doctor Adele Woodhouse[1]

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Therapeutic development is currently hampered by an incomplete understanding of Alzheimer's disease (AD) mechanisms. The epigenetic machinery (including histone modifications) is at the interface between our genes and the environment and is well positioned to be a mechanistic link. Neuronal dysfunction underlies many of the symptoms of AD, yet few studies focus on neuronal epigenetic alterations in AD. We examined H3K4me3 and H3K27ac histone modifications using ChIP-seq in forebrain neurons from 3, 6 and 12 month old wild-type and APP/PS1 mice, representing pre-pathology, pathology-onset and pathology-rich time-points (n=30 total, n=5/genotype/timepoint). There was an increase in H3K27ac and H3K4me3 marking at promoters pre-pathology in APP/PS1 neurons. Enhancers and super-enhancers were differentially enriched for H3K27ac marking between APP/PS1 and wild-type neurons pre-pathology and at pathology-onset. Unlike TSS and enhancers, super-enhancers followed a different pattern of enrichment in APP/PS1 *versus* wild-type neurons across amyloidosis. A partial recapitulation of a pre-pathology histone landscape also occurred in APP/PS1 neurons from pathology-rich brains; >23% of differentially H3K4me3 and H3K27ac marked sites were shared and >70% of these shared sites were consistently enriched at both time-points. Gene ontology analysis annotations were distributed between pathways that were: 1) Unique to healthy aging, 2) Specific to amyloidosis and 3) Altered in healthy aging and dysregulated with amyloidosis. This data provides insight into the epigenetic dysregulation occurring in neurons in a milieu of amyloidosis. Our long-term goal is to identify the epigenetic changes that drive neuron dysfunction and degeneration in AD and discover effective therapeutic targets.

DR JOANNE RYAN
Monash University

Identifying risk and resilience factors to cognitive decline and dementia - ASPREE

Dr Joanne Ryan[1], Professor. Elsdon Storey[1], Professor. Anne Murray[2,3], Professor. Robyn Woods[1], Dr. Trevor Chong[1], Dr. Christine Burns[2,3], Professor. Jeff Williamson[4], Professor. Rory Wolfe[1], Dr. Jessica Lockery[1], Dr. Suzanne Orchard[1], Ms. Brenda Kirpach[2,3], Professor. Christopher Reid[5], Professor. Mark Nelson[6], Professor. John McNeil[1], Professor. Raj Shah[7]

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Background: Large prospective studies of deeply-phenotyped individuals, with regular assessments of cognitive function and rigorous dementia diagnosis, will enable better characterisation of factors Associated with both risk of and resilience to cognitive decline and dementia.

Methods: ASPirin in Reducing Events in the Elderly (ASPREE) is a randomised placebo-controlled trial of daily low-dose (100 mg) aspirin. Eligibility criteria included age ≥70 years (≥65 years for US minorities groups) without cardiovascular disease, physical disability or dementia, and with a Modified Mini-Mental State examination (3MS) score >77. Participants underwent regular systematic assessment of general cognition, language/verbal fluency, delayed recall, attention and processing speed. Dementia diagnosis was adjudicated by an international expert panel according to DSM-IV criteria.

Results: 16,703 Australian and 2,411 US participants were recruited. Mean cognitive scores at baseline varied according to race/ethnicity, country, age, education and gender. Over a mean 4.7 years of treatment, aspirin compared to placebo did not prolong disability-free survival (a composite of death, dementia or persistent physical disability); component analysis showed no independent effect of aspirin on dementia. Although the treatment phase of the trial has ended, all individuals will continue to be followed with regular cognitive testing and adjudicated dementia diagnosis as part of the ASPREE-XT (extension) cohort study.

Conclusion: Given the depth and breadth of high quality data which has been gathered, and will continue to be obtained on such a large population of older individuals, this study will provide a valuable resource to study both protective/resilience and risk factors for cognitive decline and dementia.

MR DIMITRIOS SAREDAKIS
University of South Australia

Feasibility study using virtual reality to reduce apathy

Mr Dimitrios Saredakis[1], Dr Tobias Loetscher[1], Associate Professor Hannah Keage[1], Megan Corlis[2]

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Apathy contributes to a poorer quality of life, particularly for patients in aged care facilities. If untreated, apathy results in a faster rate of cognitive decline and increased burden on the carer. Despite a high prevalence rate, apathy is a poorly understood symptom, occurring in those who are both cognitively healthy and impaired. Reminiscence therapy is a promising non-pharmacological intervention based on a person's past experiences and can involve conversations around items such as photographs or music that the person relates to and can remember. The use of virtual reality may be able to provide a more realistic and

immersive experience that could increase the efficacy of reminiscence therapy and reduce a person's level of apathy. We will report the results of a feasibility study in which we determined the challenges involved in using a virtual reality intervention in an aged care facility and the acceptability of virtual reality technology regarding the use of head-mounted displays in older adults.

DR JOYCE SIETTE
Macquarie University

Associated social factors for cognition of older adults receiving community aged care services

Dr Joyce Siette[1], Professor Andrew Georgiou[1], Professor Johanna Westbrook[1]

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Introduction: Although social networks play a role in slowing the development of dementia in the general population, much is unknown about the sub group of older adults receiving home- and community-based aged care. We aimed to identify the Associations between cognitive function and interpersonal relationships in older adults receiving community care services.

Methods: Older Australians (n=178) receiving community aged care services in NSW were asked about their social networks, health-related quality of life and assessed for cognitive function. Service use and sociodemographic variables were also collected. The primary outcome was cognitive function, measured by the Telephone Interview for Cognitive Status-Modified (TICS-M). Multiple regression analyses were performed to ascertain the Associations between quality of life, social network size and relationship status, demographics and cognitive impairment.

Results: The sample had a mean age of 80.4± 6.7 years and the majority (65.8%) was female. A third (37.6%) had cognitive impairment and reported moderately high social networks (M=33.5, SD=11.8). Having increased contact with friends and high quality of life were significant predictors of better cognitive outcomes, while age, gender, number of family and friends were not associated with cognition.

Discussion: Our findings suggest that maintaining a socially active lifestyle with friends in later life may benefit cognitive function. This has important implications for community aged care interventions targeting social isolation to improve cognitive function.

DR KATE SMITH
University of Western Australia

Co-development of a dementia prevention and risk management program for Aboriginal Australians (DAMPAA)

Dr Kate Smith[1], Ms Christianne White[1], Dr Paula Edgill[1], Dr Kay Cox[1], Dr Barbara Maslen[1], Professor Leon Flicker[2], Dr Dina LoGiudice[3], Ms Deborah Woods[4], Professor Keith Hill[5], Professor Julie Ratcliffe[6], Mr Kevin Taylor[1], Professor Dawn Bessarab[1]

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Dementia is highly prevalent in Aboriginal Australians, however we have identified that many dementia risk factors are modifiable. These include head injury, hypertension, previous stroke and poor mobility.

Working in partnership with three Aboriginal Community Controlled Health Services (ACCHS) and older Aboriginal people in urban and rural Western Australia, we are developing an Aboriginal Health Worker led ACCHS based dementia risk management and prevention program for Aboriginal Australians (DAMPAA). Program development has been informed by existing best practice guidelines, Elders yarning groups, Theory of Change workshops, and a 2 week program pilot, prior to the DAMPAA randomised controlled trial.

The DAMPAA program enablers identified in three ACCHS worshops (23 participants total): provide transport, 2 part-time health workers at each site, take blood pressure and blood glucose at each session, encompass popular local sporting activities, link into community sport clubs, access students, flexibility around participant work commitments, assessment period split over two sessions. Enablers identified in 2 men's and 2 women's yarning groups (19 participants total) include: Health worker phone calls for motivation, encourage a buddy system for home sessions, family involvement for support, later morning start for caring responsibilities, dancing and water aerobics, no cost, and group education. Pilot results will also be presented.

There was a high level of service provider and Aboriginal Elder interest in participating in an Aboriginal co-developed brain health program. The Theory of Change framework can be used for co-development of Aboriginal health programs to strengthen partnerships, participation, promote enablers, and identify potential barriers.

DR HAMID SOHRABI
Edith Cowan University

Cognitive and CSF biomarkers Resilience in Autosomal Dominant Alzheimer's disease: Contribution of Education Years

Dr Hamid Sohrabi[1,2], Dr Michael Weinborn[1,3], Professor Christoph Laske[4,5], Dr Petra Graham[6], Mr Kevin Taddei[1], Dr Samantha Gardener[1], Dr Pratishtha Chatterjee[2], Dr Stephanie Rainey-Smith[1], Dr Belinda Brown[7], Dr Xiong Xu[8], Professor Chengjie Xiong[8], Dr Jason Hassenstab[9], Professor Anne Fagan[9], Professor Tammie Benzinger[10], Professor Virginia Buckles[9], A/Professor Roger Clarnette[11], Dr Tejal Shah[2], Professor Colin Masters[12], Dr Michael Weiner[13], Professor Nigel Cairns[14], Professor Martin Rossor[15], Professor Nick Fox[15], Professor Neill Graff-Radford[16], Professor Stephen Salloway[17], Professor Jonathan Vöglein[18], Professor Johannes Levin[19], Professor James Noble[20], Professor Peter Schofield[21,22], Professor Randall Bateman[9], Professor John Morris[9], Professor Ralph Martins[1,2]

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Background: Educational and vocational achievements, as proxies to cognitive reserve (CR), may delay functional disabilities and biomarkers changes in late-onset Alzheimer's disease (AD). However, this relationship has not been reported in autosomal dominant AD (ADAD). This study examined years of education as a predictor of global cognition, dementia severity and changes in CSF bio-markers in ADAD families with mutations in one of the three genes (APP, PSEN 1 and PSEN 2) causing early onset dementia.

Methods: Data from the Dominantly Inherited Alzheimer Network (DIAN; Data Freeze 11) cohort carrying the mutation were used in analysis. Linear, ordinal models were used to examine the effects of years of education on Clinical Dementia Rating (CDR) scale, Mini Mental State Examination (MMSE; reversed and natural logarithm taken; higher scores worse), CSF β-amyloid$_{42}$, total tau, and phosphorylated tau$_{181}$. The CDR scores were treated as ordinal categories (normal= 0.0; mild cognitive impairment=0.5; dementia= ≥1). All models controlled for age, gender, *APOE* ε4 status and PiB PET amyloid load. A random intercept for family was used to control for the correlation induced by including members of the same family in the model.

Results: Data of 261 mutation carriers, on average 38.6 (SD=10.9) years old at baseline (144 women and 117 men) from 136 families were included. Education was positively Associated with CSF β-amyloid$_{42}$ ($p<0.05$) and log reversed MMSE ($p<0.001$) [Figures 1 and 2], and negatively with total tau ($p<0.001$), and phosphorylated tau$_{181}$ ($p<0.005$). Every additional year of education was associated with lower (better) log reverse MMSE scores (-0.08, 95%CI:-0.12,-0.04). Odds of being in a higher global CDR score (>0.5) were significantly lower for every additional year of education ($p=0.004$, odds ratio [OR] 0.78, 95%CI: 0.66, 0.93).

Conclusions: Our cross-sectional findings showed a significant relationship between education, cognitive impairments and CSF markers of AD in mutation carriers. Specifically, years of education, as a proxy for CR, was significantly related to global cognition (MMSE), dementia severity (CDR), and CSF β-amyloid$_{42}$, total tau, and phosphorylated tau$_{181}$. These findings lend further support to the CR hypothesis in accounting for the discrepancy in functional and biomarkers outcome measures in ADAD.

PROFESSOR CHRISTINE STIRLING
University of Tasmania School Of Nursing

A Re-AIM real world evaluation of a multi-modal dementia risk reduction program

Professor Christine Stirling[1], Ms Helga Merl[2], Ms Indra Arunachalum[3], Dr Carolyn King[1], Ms Ashlee Turner[1]
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This study evaluated the efficacy of a community-based Memory Wellness Program focused on improving physical activity, nutrition, cognitive stimulation and socialisation. Dementia risks were targeted in older adults by increasing health literacy and encouraging health promoting behaviours.

Methods: Across eighteen locations in three states and a territory of Australia 179 older adults aged 65 years and over participated in a nurse-led program involved goal-setting, education, group activity, and introduction to the use of iPads and Misfit activity trackers. A mixed methods evaluation design used pretest-posttest data, with paired t-test analysis on all clinical data, and qualitative interviews with seventeen participants and staff.

Results: Engagement in the program was Associated with improved cognition, lowered BP and stress, increased engagement with technology and a trend towards reduced feelings of loneliness. Participants main motivations for undertaking the program were to improve memory, meet new people and improve technology use and computer literacy, with most participants reporting that these goals had been met through the program.

Discussion and Implications: This evaluation of a community-based Memory Wellness Program demonstrated increased cognitive function in older adults presenting with concerns about their cognition and memory. The evaluation had more external validity but less internal validity than a randomised control trial. The statistically significant results and medium to large effect sizes suggest that further research is warranted to assess

the efficacy of multi-modal community-based programs for improving memory and mental health with a focus on dementia risk reduction in older adults.

DR PAUL STRUTT
Macquarie University

Hearing loss and Dementia Incidence in Australia: Findings from the Sydney Memory and Ageing Study

Dr Paul Strutt[1], Professor Amanda Barnier[1], Professor Greg Savage[2], Professor Viviana Wuthrich[2], Professor Brian Draper[3], Scientia Professor Henry Brodaty[3]

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Interventions targeting risk factors for dementia have the potential to delay or prevent a third of dementia cases. Addressing midlife hearing loss could prevent up to 9% of new cases, the highest of any potentially-modifiable risk factor identified in the 2017 commissioned report in The Lancet. In Australia, hearing loss is the second-most common health condition, affecting 74% of people aged over 70. Estimates suggest that people with mild hearing loss are twice as likely to develop dementia, and people with severe hearing loss are five times more likely to develop dementia. While an Association between hearing loss and dementia has been established internationally, less is known about these Associations for older adults in Australia. Using data from the Sydney Memory and Ageing Study (MAS), in which 1,037 adults aged between 70-90 years were enrolled and completed biannual assessments from 2005-2017, we present the first known Australian-based report of hearing loss and dementia incidence using a large longitudinal Australian cohort. Our primary investigation will determine the Association between self-reported hearing difficulties and incident dementia in the MAS cohort. This analysis is based on data gathered from participant medical history, performance on neuropsychological tests, and consensus diagnostic outcomes across the first 12 years of the study. Benefits Associated with self-reported use of hearing aids will also be discussed. This study is an important first step in understanding the role of hearing loss, a significant and potentially-modifiable risk factor for dementia, on cognitive trajectories in older adult Australians.

DR KIMBERLEY STUART
Wicking Dementia Research and Education Centre

Is stress associated with dementia risk? A systematic review

Dr Kimberley Stuart[1], Dr Christine Padgett[2]

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Background: It has been estimated that one third of dementia cases may be preventable through modifiable lifestyle interventions. Epidemiological evidence suggests a link between stressful life events and ageing-related cognitive decline and dementia, however inherent methodological limitations in examining subjective and biological measures of stress separately leads to interpretive constraints.

Aim: The aim of this study was to conduct a systematic review of the literature that has investigated the Association between stress and dementia risk, in order to synthesise and evaluate the evidence from both epidemiological and experimental studies utilising human participants.

Methods: We conducted a systematic review of cohort, case-control, longitudinal prospective or retrospective studies examining the Association between stress and risk of developing dementia. Studies were identified from a systematic search across major electronic databases from inception to September 2018.

Results: Overall, 24 studies were identified including a total of 1, 102, 764 participants with age ranges from 30 to 80 years old. There was considerable heterogeneity in the definition and measurement of stress. The identified studies could be broadly classified as having operationalised stress as biological, psychological, clinical, or environmental, with most reporting a significant positive Association between stress and dementia risk.

Conclusions: Preliminary analysis shows consistent evidence that biological and clinical measures of stress is Associated with an increase in dementia risk.

DR JAY JAY THAUNG ZAW
University of Newcastle

Neurovascular coupling is impaired in mildly hypertensive older women

Dr Jay Jay Thaung Zaw[1], Professor Peter Howe[1], Dr Rachel Wong[1]

[1]University of Newcastle, Callaghan, Australia

Background: Hypertension-induced microvascular injury is a major contributor to vascular dementia. However, no studies have ascertained the extent to which mild hypertension affects cerebral microcirculation and cognition. Using the American Heart Association's 130/80 mmHg threshold for stage-1 hypertension, we investigated the impact of hypertension on neurovascular coupling and cognitive performance in postmenopausal women without overt disease.

Method: Baseline data was obtained from a two-year intervention trial in 146 postmenopausal women aged 65±1 years who underwent a battery of 10 cognitive tests. Compliance of large and small systemic arteries was assessed with Cardiovascular Professoriler. Transcranial Doppler Ultrasound was used to determine responsiveness of cerebral arteries to cognitive tests (neurovascular coupling). Central adiposity was assessed using Dual Energy X-ray Absorptiometry. Fasting blood lipids were also measured.

Results: Of the 146 women, 54 were hypertensive (141±1/75±1 for SBP/DBP) and slightly older (67±1 years) than the normotensives (64±1 years, 114±1/64±1 for SBP/DBP). The hypertensive group had higher BMI, central adiposity and triglycerides and lower compliance of small (-33%) and large (-20%) arteries. Their neurovascular coupling was significantly lower during tests of processing speed (-31%) and cognitive flexibility (-26%). However, cognitive performance did not differ. SBP was negatively Associated with neurovascular coupling during tests of processing speed ($r=-0.332$, $p<0.001$), cognitive flexibility ($r=-0.294$, $p=0.002$) and overall cognition ($r=-0.326$, $p=0.001$).

Conclusion: Despite having similar cognitive performance, impaired cerebrovascular responsiveness was observed in stage-1 hypertensives compared with normotensives. Both blood pressure and central adiposity can contribute to this dysfunction. Preventive strategies to reduce risk factors are crucial for maintaining optimal cerebrovascular function

DR JAY JAY THAUNG ZAW
University of Newcastle

Cerebrovascular, cognitive and glycaemic benefits of long-term resveratrol supplementation in postmenopausal women

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Introduction: Due to declining estrogen levels, the impact of vascular ageing that contributes to poor cerebral perfusion affects postmenopausal women adversely. Our 14-week pilot study showed that resveratrol, a phytoestrogen found in skins of grapes and berries, improved cognition and cerebrovascular function in postmenopausal women. We now aim to confirm these benefits in the first ever long-term study with resveratrol.

Method: Postmenopausal women aged 64±1 years, not on hormone replacement therapy, were randomised to take 2×75mg resveratrol or placebo for 12 months (n=141). Blood pressure, compliance of large and small arteries and fasting glucose, insulin and lipids were examined. Cognitive performance was assessed by a battery of 10 cognitive tests. Neurovascular coupling capacity (NVC) was measured with transcranial Doppler ultrasound that assessed vasodilator responsiveness of cerebral arteries during cognitive tests.

Results: Resveratrol group outperformed in verbal recall (d=0.352, p=0.039), pattern comparison (d=0.446, p=0.004) and trail making tasks (d=0.373, p=0.041). By domains, there were significant improvements in cognitive flexibility (d=0.294, p=0.015) and overall cognitive performance (d=0.351, p=0.004). Compared to placebo, resveratrol attenuated decline in NVC by more than 60% (p=0.014), particularly during task of attention (d=0.362, p=0.035). Importantly, the relative improvement in NVC correlated with reduction of fasting blood glucose (r=-0.340, p=0.004). No other changes were observed in systemic vascular function or cardio-metabolic biomarkers.

Conclusion: Confirming our pilot results, these data highlight the potential for long-term resveratrol treatment to restore cognitive deficits by attenuating declining cerebrovascular function in postmenopausal women. Moreover, the accompanying improvement in glycaemic control, even in a non-diabetic cohort, highlights the multifaceted benefits of counteracting vascular ageing with resveratrol.

MRS LUCIANA THEODORO DE FEITAS
Queensland Health

A combined cognitive and exercise program for older adults with mild cognitive impairment: preliminary findings

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Background: Fourteen percent of people with mild cognitive impairment may progress to dementia. Dementia is a leading cause of disability worldwide including Australia, meaning effective interventions are urgently needed to prevent or slow the progression of the disease and its overall burden to the person, community and health services. This pilot-study aimed to identify the feasibility and acceptability of a combined cognitive and functional-task based exercise program to delay the onset of dementia in people with mild cognitive impairment.

Method: A mixed methods approach was used. Individual interviews were conducted with caregivers and participants of the ten-week intervention program. Quantitative data included cognitive and functional assessments performed pre- and post-intervention such as Neurobehavioral Cognitive Status Examination, Verbal Fluency Test, Verbal Learning Test, Trial Making Test A and B, Lawton Instrumental Activities of Daily Living Scale and Problems in Everyday Living Test.

Results: Approximately 80% of the 23 participants completed the program demonstrating its acceptability. Interim results show significant improvements in several cognitive and functional areas. The improvements demonstrate the combined cognitive and exercise program is beneficial for people at risk of dementia. The qualitative findings suggest the program is viewed positively by participants and caregivers. Benefits described by the participants are evident through occupational performance e.g. developing strategies to remember tasks such as taking medication.

Conclusion: The combined cognitive and exercise program is acceptable and feasible. However, identifying people with mild cognitive impairment needs substantial research to develop sustainable pathways in primary care in Australia.

MISS ASHLEE TURNER
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Obesity and oxidative stress in older adults 'at-risk' for dementia: A magnetic resonance spectroscopy study

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Background: Obesity is an independent modifiable risk factor for dementia, increasing both inflammation and oxidative stress in the body. Glutathione, an endogenous antioxidant, is a marker of oxidative stress and has been implicated in the pathophysiology of neurodegenerative disease. This study aimed to investigate the relationship between obesity and in-vivo brain glutathione concentration in older adults 'at-risk' for dementia. We also aimed to explore the influence of physical activity on the relationship between obesity and glutathione in this cohort.

Methods: Two-hundred and twenty-two older adults 'at-risk' for dementia underwent comprehensive medical, neuropsychological and psychiatric assessment. Glutathione was assessed via magnetic resonance spectroscopy in the left hippocampus and the anterior and posterior cingulate cortex. Body mass index (BMI) was calculated and classified as healthy (BMI<25) or overweight/obese (BMI>25).

Results: The overweight/obese group had significantly greater glutathione in the hippocampus (t=-2.60, p=.011) compared to the healthy BMI group. Glutathione did not correlate with physical activity levels, however, in the overweight/obese group, a higher BMI was Associated with lower physical activity levels (r=-.26, p=.002). No group differences in glutathione were observed in the anterior or posterior cingulate.

Conclusion: This study demonstrates that oxidative stress is evident in a key brain region Associated with memory function in overweight/obese individuals 'at-risk' for dementia. Additionally, outcomes further support the role of physical activity in maintaining a healthy body weight and highlights this as an important therapeutic intervention for overweight/obese individuals. Future research should explore the longitudinal relationship between BMI and oxidative stress, and response to interventions.

DR RACHEL WONG
University of Newcastle

Can resveratrol reverse cognitive and vestibular dysfunction in late-stage postmenopausal women?

Dr Rachel Wong[1], Ms Jay Jay Thaung Zaw[1], Mr Hamish Evans[1], Emeritus Professor Peter Howe[1]

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Introduction: Evidence of an Association between vestibular dysfunction and cognitive impairment in older adults may explain the increased risk of falls observed in the dementia population. Building upon our body of evidence that resveratrol, a phytoestrogen present in grapes and berries, can improve cognitive performance in populations at-risk of dementia, we aim to evaluate the reversibility of cognitive and vestibular deficits in older women with resveratrol supplementation.

Method: One hundred and forty one postmenopausal women aged 65±1 years were randomised to take resveratrol (2 x 75mg/day) or placebo for 12 months. Changes in cognitive performance included tests for executive function, semantic, verbal and visuospatial working memory. As a proxy for vestibular function, participants assumed and maintained five poses for 50 seconds each with and without eyes open, on both solid and foam surfaces. Anterior-posterior postural sway information was obtained wirelessly from an accelerometer worn at waist level to determine somatosensory and vestibular efficiency.

Results: Compared to placebo, resveratrol supplementation elicited an improvement in overall cognitive performance (d=0.35, p=0.004). Among late-stage postmenopausal women (>10 years of amenorrhea; age 69±1 years), overall cognition was significantly improved compared to the placebo group (d=0.346, p=0.013). Enhanced postural control was also evident in our cohort (d=0.584, p=0.012); much of this improvement was observed only in late-stage postmenopausal women (d=0.696, p=0.01).

Conclusion: An important study finding is that the benefits of resveratrol on cognition and vestibular function extends to those in the late postmenopausal stage where their responsiveness to prophylactic interventions has not been as successful as in younger postmenopausal women. Our findings warrants further evaluation for reducing falls and dementia risks in the elderly.

MISS LIDAN ZHENG
Neuroscience Research Australia

The International Research Network on Dementia Prevention (IRNDP)

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The International Research Network on Dementia Prevention (IRNDP) is a multinational network that brings together researchers working on dementia risk reduction from across the globe. The network focuses on facilitating knowledge translation, capacity building and collaboration, in addition to generating new knowledge on dementia prevention. The IRNDP is governed by an international Leadership Committee of dementia experts and a high level Independent Advisory Board of academics, global opinion leaders and stakeholders. It is also a flagship project of the Dementia Centre for Research Collaboration (DCRC). The work of IRNDP is aimed at providing resources to inform governments and private organisations on strategies to reduce risk factors for dementia and to develop international and nation-specific guidelines. As part of this, the IRNDP collates and consolidates existing research findings on dementia risk factors and interventions to reduce risk via an online evidence repository. The IRNDP also supports emerging researchers in the field of dementia risk reduction by providing opportunities for information sharing and mentorship through a community of scholars. Current outputs include a bespoke website https://coghealth.net.au/ with an evidence hub, academic publications including editorials and special issues, online and face to face dissemination of research results, links into and support for early career and low and middle income country researchers and facilitating public messages on dementia risk reduction via translation.

Assessment and Diagnosis

MR MUSTAFA ATEE
Curtin University

Changing Practice: The PainChek® Story

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Pain is highly prevalent amongst people with dementia (PwD), with up to 80% of patients experiencing pain at any time. However, pain often remains undetected and undermanaged for various reasons including the inability of patients to self-report pain, misconceptions around pain perception in PwD, and a lack of a "gold standard" for pain assessment in this vulnerable population.

The PainChek® is evidence-based and clinically useful multi-platform, multi-modal, and hybrid pain assessment system that is accessible on various digital infrastructures. PainChek® is a TGA-cleared Class 1 medical device which uses artificial intelligence (AI), smart automation, and cloud computing to assess pain in people who are unable to verbalise, such as those with advanced dementia. The system consists of a point-of-care (POC) smart device enabled App linked to a web admin portal (WAP), which centralises data collection. The App uses automated facial recognition and analysis in conjunction with other observer-rated clinical pain behaviours to identify the presence and intensity of pain. Such a novel method is validated in clinical studies as means of addressing the subjective and multi-dimensional nature of pain in PwD. A key functionality of the App is its ability to graph and profile changes in pain of individuals over time. This functionality allows perform longitudinal assessments, and provides temporal patterns of pain intensity and clinical manifestations of pain, which are important elements of comprehensive pain evaluation procedures. This paper aims to provide an overview of the PainChek® system, and its role in ensuring optimal pain assessment practices.

DR PIERRICK BOURGEAT
CSIRO

MilxCloud: a web-based platform for PET and MR quantification

Dr Pierrick Bourgeat[1], Dr Vincent Dore[1,3], Dr Parnesh Raniga[1], Dr Olivier Salvado[1], Professor Colin Masters[2], Professor Chris Rowe[3], A/Professor Victor Villemagne[3], Dr Jurgen Fripp[1]

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Background: Visual reading of PET and MR images is part of the standard of care for supporting the diagnosis of neurodegenerative diseases. Visual reading can however be subjective, and with MR images, is typically limited to the identification of gross changes in the mesial temporal lobe and ventricles in Azheimer's disease, or the in the frontal lobe for FTD. When reading Aβ PET images, separating negative from positive subjects can also be challenging, especially when different tracers are used. We introduce MilxCloud, a publicly available cloud computing platform for PET (CapAIBL) and MR quantification (CurAIBL). These tools facilitate visual inspection with quantitative values, z-score maps, and normative graphs in relation to a reference population.

Methods: CapAIBL is a PET-only method tool that allows quantification of FDG and all Aβ PET tracers without the need of a corresponding MRI. Results are presented in terms of SUVr and Centiloid.

CurAIBL implements a pipeline that segments and parcellates brain MR images. Cortical GM and hippocampal volumes are reported on a graph with confidence intervals for an aged-matched normal population. Computed z-score maps of cortical thickness are displayed over a normalised template.

Both tools provide key quantitative values, graphs and mesh rendering on a pdf report which is emailed to the user at the end of the procedure.

Conclusion: CurAIBL provides an efficient clinical inspection and quantitative tool for MR imaging and complements PET assessments with CapAIBL, offering a comprehensive neuroimaging tool for the assessment of Alzheimer's disease and other neurodegenerative conditions. Both tools are available at milxcloud.csiro.au

MS RACHEL BRIMELOW
University of Queensland

A Balanced Mental Health Score Card for Residential Aged Care: Development and Validation

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Background: Mental health symptoms are highly prevalent within Residential Aged Care (RAC), as are dementia and cognitive impairment. However, there is currently no tool within the RAC sector to monitor treatment, environment, and care practices that influence resident mental wellbeing at the facility level.

Aim: To develop a concise sector appropriate self-assessment tool to quantify mental health treatment and care practices and clinical outcomes within RAC using a balanced scorecard (BSC) approach.

Balanced Scorecard: The BSC is a strategic management tool adapted to many industries providing information on areas of strategic importance to assess current system performance and to guide future planning using a balanced set of indicators.

Development: Indicators across the four perspectives (internal processes, learning and growth, client outcomes, and resources) will be developed through consultation with sector experts, clinicians and community engagement. Both systematic and non-systematic reviews have been conducted to identify factors relevant to mental wellbeing. Community involvement will be obtained through focus groups pre and post indicator development. The Delphi method will be used to ascertain key indicators of facility level factors using both RAC staff and research experts in the field. Feasibility testing will comprise inter-rater and test-re-test reliability.

Conclusion: Solutions that encompass aspects of ongoing quality improvement monitoring could provide evidence for the purposes of meeting accreditation standards, identifying staff training needs, increasing identification of gaps in current services at the individual RAC facility level and providing facilities an opportunity to evaluate their current approaches and move towards developing optimal mental health supports.

DR SAMANTHA BURNHAM
CSIRO

Comparison of the Natural History of Neocortical Aβ-Amyloid, Hippocampal Volume and PACC in Sporadic AD

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The pathological processes and clinical/cognitive decline Associated with Alzheimer's disease (AD) occur gradually. Evidence suggests that biomarkers of these processes do not reach abnormal levels concurrently, but, do so in an ordered, sequential manner. It is paramount to understand the sequential ordering and progression of the various markers to effectively understand the natural history of the disease and adequately time disease-specific therapies.

We applied our method for obtaining longitudinal disease trajectories from short term data[1, 2] to Neocortical Aβ-amyloid, Hippocampal volume and the Preclinical Alzheimer's Cognitive Composite (PACC) using a minimum of three assessments. We used data from the same AIBL individuals (N=209) collected at the same time points to ensure consistency. This resulted in three curves detailing the natural history of neocortical Aβ-Amyloid, Hippocampal volume and PACC. To allow comparison between the curves, all three parameters were aligned to the median values in the mild-AD participants.

Whilst loss of Hippocampal volume was initiated prior to decline on PACC, after the abnormal threshold for Aβ-amyloid was reached, there were no significant differences in the trajectories of Hippocampal volume and PACC (Figure 1). Abnormal thresholds for Aβ-amyloid, Hippocampus volume and PACC were reached, respectively, at 17.43, 7.54 and 5.26 years prior to the respective median values of the mild-AD participants. The threshold for abnormal Aβ-amyloid was reached a decade prior to that of Hippocampal Volume and PACC. These results offer further insight into the natural history of the disease, providing critical data to inform the design and timing of clinical trials.

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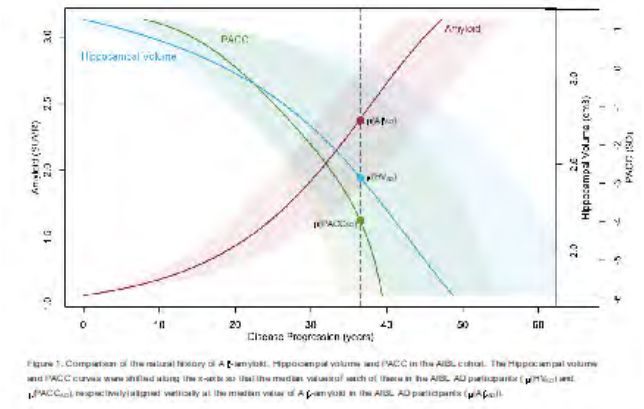

MR ANISUZZAMAN CHOWDHURY
Wicking Dementia Research and Education Centre

Development of aptamer-based point of care device for measuring biomarkers of neurodegeneration in the blood

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Proteins from the brain can be detected in the cerebrospinal fluid and blood and can be used as biomarkers to indicate brain health or neurodegeneration. Blood-based biomarkers are ideal due to accessibility, invasiveness and cost compared to other fluid biomarkers. We aim to develop a point-of-care device for detecting biomarkers in neurodegenerative disease which will enable rapid and regular monitoring of brain health. However, detecting brain proteins in the blood relies on bio-detectors such as antibodies, which can be unstable and expensive to produce. Aptamers are single-stranded oligonucleotide (DNA or RNA) molecules, which can bind to target molecules with high affinity and specificity. They can be generated from random oligonucleotide pools through a process known as systematic evolution of ligands by exponential enrichment (SELEX) and they are a promising rival for antibodies in diagnostics, therapeutics, and biosensing due to their natural characteristics. The application of aptamers to the field of biomarkers for neurodegeneration has been limited, although they have been developed as tools to investigate biomarkers such as amyloid beta peptide, total tau protein, and α-synuclein. The aim of the current study is to select and characterize DNA aptamers against neurodegenerative disease proteins (e.g.; BDNF, NfL, Tau etc.) using SELEX. We have begun by immobilizing protein for selection and designing a ssDNA library with a randomized 40-60 nucleotide region. The development of point-of-care devices for neurodegenerative disease will have a huge impact on diagnosing and monitoring neurodegeneration in clinical studies as well as in future treatment strategies.

DR KAREN CROOT
University of New South Wales

Measuring computer attitudes and experience in an older Australian adult sample in the CogSCAN Study

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Early identification of cognitive impairment in older adults is critical for timely and accurate diagnosis and intervention, and relies on objective cognitive data. There is an urgent need to develop neuropsychological assessment methods that are efficient and accessible while maintaining appropriate psychometric standards. Computer-administered neuropsychological tests potentially allow large-scale cognitive screening and monitoring. There is, however, little research on the extent to which experience with and attitudes to computer technologies affect the validity, reliability and acceptability of computerised cognitive tests in the older adult population, including individuals with mild cognitive impairment (MCI) and dementia.

The CogSCAN Study is a systematic, independent evaluation of four prominent computerised neuropsychological assessment instruments, currently in progress. CogSCAN aims to identify computerised cognitive tests that are sensitive and specific in detecting MCI and mild dementia in older Australians, taking into account their computer experience and preferences. This paper describes *The CogSCAN Computer Experience and Opinion Questionnaire*, which investigates computer anxiety, comfort with computers, computer self-efficacy, positive and negative attitudes to computers, and familiarity with computer and other technologies, and reports data collected to date using this measure. Sixty-five community-living older adults (72.3% female, mean age 72.5 years, mean years education 14.7) have participated in the study. 53.2% reported "quite a lot" or more experience with a computer and 20% reported finding computers intimidating. Results from this questionnaire will later be used to investigate the extent to which older adults' previous levels of computer experience and attitudes influence performance on a range of computerised tests.

DR VINCENT DORE
CSIRO

Automated reporting of tau PET quantification on brain surface

Dr Vincent Dore[1]

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Background: In the recent years, there has been an increasing number of tau imaging studies. Automatic quantification of tau scans has thus become a priority.

Method: Two hundred and forty-three participants from the AIBL study underwent tau imaging with either ^{18}F-AV1451 (n=83) or ^{18}F-MK6240 (n=140). PET scans were quantified using CapAIBL with a tau specific atlas. Three tau masks: Mesial-temporal (*Me*), temporoparietal (*Te*) and the Rest (*R*) of the neocortex. In each regional mask, the cortical area higher than a specific threshold (AV1451: Neocortical 1.25SUVR, Me 1.35SUVR, Te 1.30SUVR, R 1.25SUVR, and MK6240: Me 1.3SUVR, Te 1.28SUVR, R 1.11SUVR) was extracted. Measures of tracer retention and measures of extent were combined in a single measured denominated CenTauR [SUVR * (1+ %_of_area_higher_than_threshold)].

Results: Mild cognitive impaired (MCI) and AD participants had significantly higher global and regional tau Z-score SUVR when compared to HC. CenTauR Z-scores were also

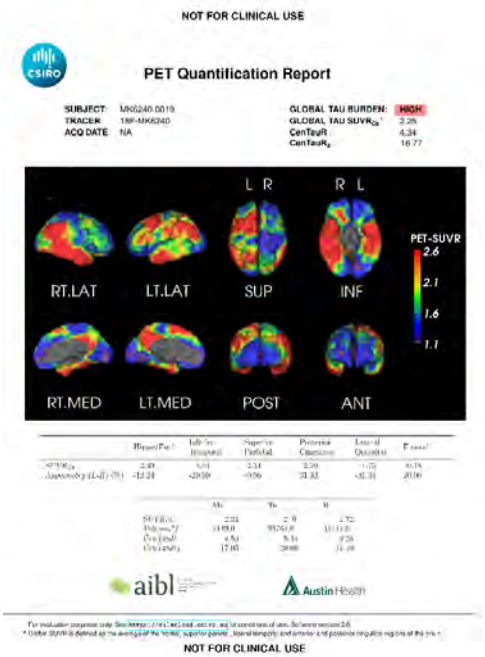
significantly higher for MCI and AD when compared to HC. SUVR and CenTauR Z-scores were highly and similarly Associated with MMSE (r>0.46) and Episodic memory (r>0.46).

The resulting CapAIBL report provides not only the surface projection of cortical tracer retention, but also Z-scores generated using Ab-HC. It also provides global and regional tau measurements as well as their Associated CenTauRs.

Conclusion: Our tau reporting tool discriminates well between MCI, AD and HC. CenTauR Z-score, which captures the degree of tau deposition and its extent, provide high effect size when comparing groups and allow the combination of results obtained with different tau tracers.

1**Diag**	2**NC**	3**MCI**	4**AD**
5**Sample size**	6178	730	816
9**Gender (M)**	1080	1112	1210
13**Age**	1475.2	1573.5	1670.1*
17**Centiloid**	1815.9	1967.2***	20105***
21**Nctx. SUVR$_z$ (Z-score)**	220.4	232.1***	2412.1***
25**Me SUVR$_z$ (Z-score)**	260.5	272.9***	286.6***
29**Te SUVR$_z$ (Z-score)**	300.4	312.6***	3213.5***
33**R SUVR$_z$ (Z-score)**	340.3	351.2*	368.7***
37**Nctx. CenTauR$_z$ (Z-score)**	380.5	392.8***	4015.0***
41**Me CenTauR$_z$ (Z-score)**	420.6	434.3***	449.7***
45**Te CenTauR$_z$ (Z-score)**	460.6	473.6***	4817.6***
49**R CenTauR$_z$ (Z-score)**	500.4	511.7**	5210.6***

Table1: Demographic of the population, * p-value<0.01, ** p-value<0.001, *** p-value<0.0001compare to NC.



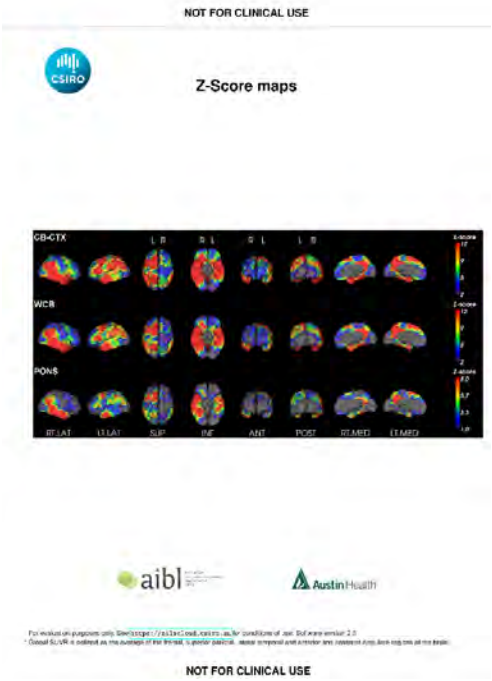


Figure1: CapAIBL report of a ^{18}F-MK6240 scan

DR ANGELA D'ROZARIO
University of Sydney

NREM Sleep Neural Oscillations and Executive Dysfunction in Older Adults at Risk of Dementia

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Sleep spindles and slow wave brain activity (SWA) are distinct features of non-rapid eye movement (NREM) sleep that are critical for sleep-dependent cognitive processes. Marked reductions in these neural oscillations occur in individuals on the dementia spectrum, beyond that seen in normal ageing. Deficits in spindles and SWA during sleep are Associated with impaired overnight memory consolidation in older adults at risk of dementia. These deficits may also underlie executive dysfunction observed in this at-risk population however this has not been previously investigated.

Older adults (n=49, mean age 66.2 yrs) with non-amnestic mild cognitive impairment (naMCI) or subjective memory complaints (SMC) attended the sleep laboratory for an overnight sleep study. All-night electroencephalogram (EEG) recordings at frontal (F3-M2, F4-M1 electrode sites) and central (C3-M2, C4-M1) brain regions were analysed to quantify sleep spindle density (events per min) and SWA (EEG delta power 0.5-4 Hz) in NREM sleep. Correlations between these EEG measures and performance on tasks of executive function were examined.

Lower SWA during NREM sleep at frontal brain regions significantly correlated with worse response inhibition on the colour-word interference test (CWIT) (F3-M1, r=-0.40, p=0.04; F4-M2, r=-0.32, p=0.03). Lower sleep spindle density was Associated with poorer working memory on the digit span (frontal region, F4-M2, r=0.36, p=0.04) but better response inhibition on the CWIT (central region C4-M1, r=0.30, p=0.01). Spindles and SWA during sleep may have utility for predicting cognitive function in older adults at-risk of dementia. Deficits in SWA could be targeted for sleep-enhancing therapeutic interventions to slow cognitive decline.

MR PETER FRANSQUET
Monash University

Blood based epigenetic biomarkers of dementia: evidence, diagnosis and pre-clinical detection

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Australia has an aging population, and the number of individuals living with dementia is rising. Due to obstacles caused by the wide range of different diseases that cause dementia, diagnosis may take years, with many individuals remaining undiagnosed. Timely, accurate diagnosis would reduce the stress Associated with not knowing, as well as allow for early treatment, managing dementia symptoms. Thus, a minimally-invasive, easily measurable, blood-based biomarker would have greatest utility in population-wide diagnostic screening.

Epigenetics marks, including DNA methylation (DNAm) and microRNA, are implicated in dementia. To assess the utility of these marks as a biomarker, we systematically reviewed evidence for an Association with dementia in the blood (DNA methylation (77 studies), microRNA expression (45 studies)). We found there are many inconsistencies and challenges within these fields, limiting concordant findings to date.

With the aim to ascertain both preclinical and diagnostic biomarkers of dementia, we carried out a longitudinal genome wide DNAm analysis, using 120 peripheral blood samples from a randomised, double blind, controlled study. Blood was collected at baseline where all participants were assessed as not having dementia, as well as approximately 3 years after. Where present at 3 years, dementia status was adjudicated by an international panel of clinical specialists, using cognitive/functional assessments, medical records, and blood tests and brain scans.

Our findings suggest DNAm signatures at specific gene regions could potentially be used as preclinical and diagnostic dementia biomarkers, although statistical significance was lost after adjusting for multiple testing. Future studies will aim to replicate these findings.

DR MOJTABA (MJ) GOLZAN
University of Technology Sydney

Retinal and cerebral zinc transporter 3 levels in the APP/PS1 mouse model of Alzheimer's disease

Mr Venkata Allam[1], Dr Newsha Raoufi[1], Professor Paul A. Adlard[2], A/Professor Olga Shimoni[1], Dr Mojtaba (MJ) Golzan[1]

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Synaptic zinc, and its Associated transporter protein zinc transporter 3 (ZnT3), have been proposed to have a significant role in beta-amyloid aggregation and the Associated development of Alzheimer's disease (AD). However, the lack of direct and non-invasive access to the brain's structure has limited the development of an *in-vivo* approach to study the role of ZnT3 in the pathogenesis of AD. As the retina is known to be an extension of the brain, we studied ZnT3 in the retina of 14 month old APP/PS1 and wild type (WT) mice (n=7/group) to determine whether it reflects the ZnT3 depletion observed in the AD brain. Immunoblotting, immunofluorescence and real-time PCR were used to quantify ZnT3 protein (normalised to GAPDH) and mRNA levels (normalised to β-actin) in both brain and retinal tissues. ZnT3 protein levels were slightly reduced in the brain and retina of APP/PS1 mice compared with WT mice (-15% vs -10% decrease; p=0.2). We did not observe any significant difference in retinal and cerebral ZnT3 distribution and mRNA levels between WT and APP/PS1 mice, however, this may be due to the small sample size or the fact that we used whole brains for ZnT3 analysis (rather than specific regions of interest – such as the hippocampus). As the retina is an accessible zinc-rich tissue, our ongoing work on the visualisation and quantification of retinal ZnT3 levels may provide insight into the cerebral regulation of ZnT3, and hence be of relevance to interrogating mechanistic processes in AD that may also have diagnostic merit.

DR INGA HAMEISTER
University of New South Wales

Establishing national assessment standards for cognitive decline and dementia in Australia: ADNeT's Memory Clinics consortium

Dr Inga Hameister[1], Dr Nicole A. Kochan[1], Professor Sharon Naismith[2], Dr Stephanie Ward[3], Professor Henry Brodaty[1], Dr Jurgen Fripp[4], Professor Susannah Ahern[3], Professor Christopher Rowe[5,6], Professor Perminder Sachdev[1,7]

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Memory clinics are specialised centres for the comprehensive assessment of patients with cognitive disorders. In 1997, Victoria introduced a state-wide network

of Cognitive, Dementia and Memory Services (CDAMS), in a first effort to harmonise the assessment of individuals with cognitive decline and dementia and thereby improve quality. Nationally, however, Memory Clinics remain diverse, with limited collaboration. In 2018, the NNIDR-NHMRC provided funding for the Australian Dementia Network (ADNeT), with one objective being the establishment of a collaborative Memory Clinics consortium (ADNeT-MC). ADNeT-MC's major objective is to harmonise diagnostic standards and facilitate the diagnosis process for clinicians and patients. The aim is to ensure that all Australians have access to high quality dementia assessments, irrespective of their geographical location and socioeconomic status. The consultation process for the development of a standard assessment protocol has begun. A platform for data acquisition, storage and sharing will be developed. By linking the individual Memory Clinics to the ADNeT Clinical Quality Registry, ADNeT will, for the first time, be able to provide a comprehensive picture of Australia's dementia care services and the clinical and demographic profiles of Australians living with dementia. Both will inform future health care needs. Additionally, a large normative database can be established to facilitate the formation of a trial ready patient cohorts. Issues of data confidentiality, consent for participation, matching patients to appropriate trials, and the use of data for research are currently being addressed. At the Australian Dementia Forum, the latest developments of the ADNeT-MC initiative will be presented.

ASSOCIATE PROFESSOR HANNAH KEAGE
University of South Australia

A meta-analysis of delirium, cognitive impairment and dementia outcomes in over 90000 CABG patients

Ms Danielle Greaves[1], A/Professor Peter J. Psaltis[2], Mr Tyler.J. Ross[1], Dr Daniel Davis[3], Dr Ashleigh Smith[1], Ms Monique Boord[1], A/Professor Hannah Keage[1]

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Background: Increasing numbers of older adults are undergoing invasive cardiothoracic surgeries, including coronary artery bypass grafting (CABG). CABG confers improved cardiovascular event outcomes for patients, but Associations with cognitive outcomes are less clear. Our aim was to pool estimates of cognitive impairment across the literature relative to time (from pre- to post-CABG) and diagnosis (cognitive impairment, delirium and dementia).

Methods: A systematic search using four databases was undertaken. 215 studies incorporating data from 91,829 patients were used to estimate the prevalence of cognitive impairments pre- and post-CABG, including delirium and dementia post-CABG, using random effects meta-analyses.

Results: Pre-surgical cognitive impairment was seen in 19% of patients. Post-operatively, cognitive impairment was seen in around 43% of patients acutely; this resolved to 19% at 4-6 months and then increased to 25% of patients between 6-months to 1-year post-operatively. In the long term, between 1 and 5-years post-operatively, cognitive impairment increased and was seen in nearly 40% of patients. Post-operative delirium was apparent in 18% of CABG patients which increased to 24% when a diagnostic instrument was utilized alongside clinical criteria. Dementia was present in 7% of patients 5-7 years post-surgery. Estimates varied relative to the cognitive, delirium and dementia classification method employed.

Conclusion: Cognitive impairments are major issues in CABG patients, even prior to surgery. Delirium is seen in around 1 in 4 CABG patients, and stands as a possible modifiable risk factor for late-life dementia. Estimated dementia rates following CABG are likely low due to not statistically accounting for attrition.

DR MATTHEW KIRKCALDIE
Wicking Dementia Research and Education Centre

Making the most of Alzheimer's models: accurate measurement of amyloid from microscope images using ImageSURF

Dr Matthew Kirkcaldie[1], Mr Aidan O'Mara[1], Associate Professor Anna King[1], Professor James Vickers[1]

[1]Wicking Dementia Centre, Hobart, Australia

Although the relationship between amyloid β (Aβ) pathology and the symptoms of Alzheimer's disease (AD) is still contested, much research into the cause and progression of AD depends on laboratory models of Aβ deposition in the brain. Images of Aβ deposits are often quantitated to evaluate the outcome of these studies, but this process can be subjective and inconsistent, due to diffuse boundaries and imaging variations such as minor rightness variations. To address this issue and provide more consistent measurement, we have developed ImageSURF, an open-source ImageJ plugin, which uses machine learning techniques to consistently identify and measure Aβ pathology across varying image conditions. We compared ImageSURF to image thresholding, a widely used quantitation technique, to assess its reproducibility, accuracy and generalizability when used on Aβ pathology images. ImageSURF measured deposits significantly more faithfully, and with significantly greater generalizability, than optimized thresholding. In addition to its superior performance in capturing human evaluations of pathology images, ImageSURF is able to quantitate image sets of any size in a consistent and unbiased manner, without requiring additional blinding, and can be retrospectively applied to existing images. The training process yields a classifier which can be shared as supplemental data, allowing fully open methods and data, and enabling more direct comparisons between different studies. We hope that this freely available tool will be used by the research community to improve the quality and reliability of measurement in studying the pathological basis of this devastating disease.

PROFESSOR SIMON LEWIS
University of Sydney

Validation of divergent neural dysfunction in iRBD patients separated using clinical phenotyping

Professor Simon Lewis[1], Dr Kaylena Ehgoetz Martens[1], Dr Elie Matar[1], Dr James Shine[1], Mr Joseph Phillips[2], Professor Ron Grunstein[1], Professor Glenda Halliday[1]

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It is currently thought that nearly everyone with idiopathic

REM sleep behaviour disorder (iRBD) will ultimately develop a synucleinopathy that is either Parkinson's disease (PD) or Lewy body dementia (LBD). Recent work suggests that quantitative motor assessments, such as the alternate tapping test and gait measures, predict *when* and *which* of these two diseases an individual iRBD patient will develop some 3-5 years prior to formal diagnosis. Detailed clinical phenotyping of 23 iRBD patients was used to derive measures intended to explore, which type of Lewy Body disease an individual might develop (PD or LBD) and how soon this transition might occur. The 'Phenotype Conversion Score' was based on the ratio of motor signs to colour vision discrimination (a measure of higher order perception). In contrast, the 'Pathology Severity Index' took an aggregate of weighted scores for known predictors of disease transition (i.e. hyposmia, colour discrimination and motor examination). Of the 23 iRBD patients, the Phenotype Conversion Score revealed 9 with a dominant *motor* phenotype, whilst the other 14 patients had a dominant *perception* phenotype. Interestingly, follow up of the iRBD cases assessed in this study identified that 1 with a motor phenotype and 1 with an intermediate phenotype subsequently converted to PD (one of whom had a Pathology Severity Index of >1 standard deviation). Although 4 of the perception iRBD cases had Pathology Severity Indexes of >1 standard deviation, none have transitioned to date. Validation of divergent neural dysfunction was confirmed by utilising the patterns of functional MRI connectivity obtained from the iRBD patients along with 17 healthy age matched controls whilst performing a validated virtual reality gait paradigm. Perception dominant iRBD patients had a loss of connectivity within the frontoparietal network, whereas motor dominant iRBD patients had a loss of frontostriatal connectivity. Furthermore, an increasing Pathology Severity Index was Associated with increased basal ganglia connectivity across the iRBD cohort. Taken together, this study demonstrates divergent task-related brain connectivity in iRBD patients with different clinical phenotypes that are likely to represent the neural underpinnings of the earliest neurodegenerative changes occurring in Lewy body diseases. Future longitudinal work is required to determine whether these clinical and/or functional MRI signatures will be able to distinguish progression to PD or LBD.

DR CRISTIAN LEYTON
University of Sydney

Dissociated Involvement of Middle and Inferior Longitudinal Fascicle in Logopenic Aphasia and Posterior Cortical Atrophy

Dr Cristian Leyton[1], A/Professor Nikos Makris[2], A/Professor Brad Dickerson[2], Dr Jessica Collins[2]

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The logopenic variant of primary progressive aphasia (lvPPA) and posterior cortical atrophy (PCA) are progressive neurocognitive syndromes, often caused by Alzheimer's disease (AD), that present with distinctive neurocognitive-anatomical profiles. Whereas lvPPA is characterised by prominent language decline and atrophy in the left temporo-parietal junction, PCA exhibits a range of visuo-spatial deficits Associated with bilateral atrophy of the occipital and posterior parietal and temporal cortices. Despite these seemingly clinical-anatomical differences, several clinical series describe overlapping deficits attributed to atrophy of the left posterior parietal and temporal cortices. However, altered connectivity can also play a role in the emergence of cognitive symptoms, as damage to white matter tracts connecting epicenters of maximal atrophy with an intact distant region can affect the performance that it subserves. Accordingly, we investigated microanatomical changes in the Middle Longitudinal (MdLF) and Inferior Longitudinal (ILF) Fascicles, key white matter bundles that connect respectively parietal and occipital lobes with the anterior temporal pole, a key region for semantic integration. We selected 21 lvPPA, 14 PCA and 23 control participants who underwent diffusion tensor imaging (DTI) tractography to reconstruct the MdLF and ILF and extract tract-specific DTI metrics (fractional anisotropy, radial diffusivity, mean diffusivity and axial diffusivity) to assess white matter changes. Whereas participants with lvPPA had more involvement of the left MdLF and left ILF, the right ILF was more affected in PCA, suggesting that extensive white matter damage in temporal-occipital/parietal pathways that may contribute to language deficits in lvPPA, in particular naming impairment.

DR TOM MORRIS
Dementia Centre

Behavioural clusters in dementia: A large cross-sectional Australian study

Dr Tom Morris[1], Conjoint A/Professor Colm Cunningham[1]

[1]Dementia Centre, Sydney, Australia

Behaviours commonly observed of people living with dementia (PWD) rarely occur in isolation, but rather in "clusters" or "syndromes". The number and type of behavioural clusters vary in the literature, but typically include those Associated with mood, psychosis, frontally mediated behaviour, physical behaviour, hyperactivity and hypomania. Not only may such clusters represent a shared aetiology (be they biological, environmental, or otherwise), but treating clusters may be more efficacious and efficient than treating behaviours individually.

The accurate identification and understanding of behavioural clusters is especially important for behaviour management services such as Dementia Support Australia (DSA). However, to date no study has investigated whether PWD who experience behaviours that warrant specialist interventions demonstrate the same, or distinct, behavioural clusters compared to a general dementia population.

This paper reports on a large cross-sectional analysis of behavioural clusters observed in PWD. Specifically, 4,371 PWD referred to DSA for behavioural support were administered the Neuropsychiatric Inventory (NPI), a reliable and valid measure of behaviour in dementia, at intake into DSA services. A principal component analysis of the NPI, based on eigenvalues greater than 1 and a varimax rotation, revealed 5 distinct behavioural clusters: 1. Psychotic (delusions, euphoria, hallucinations); 2. Hyperactive (aggression, disinhibition, irritability); 3. Apathy and eating behaviour (apathy, eating disturbance); 4. Mood (depression, anxiety); and, 5. Physical behaviour (motor disturbance, night-time behaviour).

We report these findings in the context of other reported clusters and how DSA could use this information to better support individuals living with dementia.

DR TOM MORRIS
Dementia Centre

Prevalence of pain and behavioural correlates in people living with dementia

Dr Tom Morris[1], Dr Raj Anand[1], Conjoint A/Professor Colm Cunningham[1]

[1]Dementia Centre, Sydney, Australia

Pain is very common for people living with dementia (PWD) in residential aged care, with some estimates suggesting up to 80% of PWD experience some type of chronic or acute pain at some time. Pain is also one of the most frequently implicated factors that lead to persisting and severe responsive behaviours. In fact, the experience of pain remains the single greatest cause of behaviours referred to the behaviour management service Dementia Support Australia (DSA).

This poster discusses the prevalence of pain and Associated responsive behaviours in a sample of 4,371 clients visited by DSA. This analysis revealed 51.5% of clients experienced some type of pain, and of these 16.6% were found by the PainChek application to be in severe pain. An analysis of behaviours as measured by the validated Neuropsychiatric Inventory (NPI) demonstrated that DSA clients in pain had significantly more types of behaviour, more severe behaviour, and more distressing behaviours for carers (all *p*'s <.0001). Further, analysis of the specific domains of the NPI, controlling for the effects of age and sex, showed (in descending order of contribution) the following behaviours as being significantly associated with pain: aggression, depression, eating behaviour, night-time behaviour, and aberrant motor behaviour.

We report these findings in the context of the importance of ongoing pain assessment in PWD, and how treating pain appropriately can lead to a large and meaningful reduction in responsive behaviour and improvement in quality of life.

MRS SLADANA PAVKOVIC
University of Tasmania

Consumer Consultation on a blood test for brain health and neurodegenerative diseases

Mrs Sladana Pavkovic[1], Mrs Anna King[2], Mrs Maree Farrow[3]

[1]Honours student, Hobart, Australia, [2]Associate Professor, Hobart, Australia, [3]Seniour Academic Lead - MOOCs - Wicking Res Educ Cen, Hobart, Australia

Consumer consultation is an important part of the research process that can have significant impacts on eventual clinical practice by incorporating the real needs of end-users. We are investigating consumer opinions on a blood test for brain health and neurodegenerative diseases in order to inform the ethical research and clinical use of an inexpensive and non-invasive diagnostic biomarker test once such a tool is fully developed. After seeking consumer feedback on draft questions for our survey, we recruited participants in the October 2018 Preventing Dementia Massive Open Online Course (n = 2403, mean age = 50.5 years, 89% female, 50% with a family history of dementia). 78% of survey respondents said they were likely or very likely to have a blood test to determine whether they would develop dementia and 90% to determine if an intervention or treatment was suitable for them. However, when asked how likely they thought others in the community would be to have a blood test, these dropped to 49% and 65% respectively. Respondents with a family history of dementia reported a higher likelihood to have a blood test to determine whether they would develop dementia in future ($\chi^2(4, n=2367) = 29.5$, $p < 0.001$). 85% of respondents preferred to be informed of their blood test result face-to-face as opposed to by telephone or email, and 92% preferred face-to-face follow up support following a positive result. These findings can improve the ethical management of pre-diagnostic, diagnostic and post-diagnostic procedures for pre-symptomatic neurodegenerative disease.

MRS MANUELA PIETZUCH
Wicking Dementia Research and Education Centre

Functional connections strength is not disrupted in APOE and BDNF polymorphisms in older adults

Manuela Pietzuch[1*], Aidan Bindoff[1], James C. Vickers[1]

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Functional connectivity has been reported to be reduced in overt Alzheimer's disease (AD) and could, therefore, be a potential biomarker of early brain changes Associated with this condition. The objective of this study was to identify group differences in functional connectivity between individuals with polymorphisms of the brain-derived neurotrophic factor gene (BDNF Val66Met) and apolipoprotein E (APOE) genes in older adults without dementia. Using resting-state fMRI, the brains of 77 healthy, older adults (mean age = 60.5 years, SD = 6.2) from the Tasmanian Healthy Brain Project were scanned. Functional resting-state networks were identified using independent components analysis and dual regression. Fourteen relevant resting-state networks were detected characterizing the entire sample. Adjusting for age and cognitive reserve, we used general linear models (GLM) and partial correlation to investigate edge strength between subject groups. There were no significant differences in functional networks between *APOE* ε4 carriers (n=35) compared to ε3 homozygotes (n=42), p = 0.37, and no significant differences in *BDNF* Met carriers (n=36) compared to Val homozygotes (n=41), p = 0.07. Although, studies suggested that *APOE* ε4 and *BDNF* Met carriage may be useful predictive biomarkers of functional connectivity impairments in AD, the results of this study showed that the genotype did not predict decreased functional edge strength in healthy older adults.

PROFESSOR CONSTANCE DIMITY POND
University of Newcastle

Communicating the diagnosis of dementia: a general practice approach

Professor Constance Dimity Pond[1], Dr Karen McNeil[1]

[1]Discipline of General Practice, University of Newcastle, Australia

Background: General practitioners (GPs) are frequently hesitant to break the news of possible dementia to a patient. Reasons for this include GP, patient and system factors. As part of a literature review funded by the Cognitive Decline Partnership Centre, our team explored the issue of communication about the diagnosis of

dementia. We found that there are established models for communicating health information, including the ask-tell-ask model dialogue, which may prove useful in this situation.

Aims: This poster aims to describe an adaptation of the ask-tell-ask model for use by GPs in breaking the news of dementia

Methods: The ask-tell-ask model will be described. A possible adaption developed for use by GPs will be outlined. Potential GP uses will be explored, including in initial work-up before a definitive diagnosis is determined. GPs practised the model in an education session at a GP conference in 2018, and qualitative feedback from this audience will be described.

Summary: the ask-tell-ask model of communicating health information has been adapted for use by GPs in communicating the news of dementia. Initial trials of the model have been promising and further research is needed to trial the model in the dementia setting.

DR SARAH RUSSELL
James Cook University

Prevalence of Dementia in the Torres Strait: Results and Implications

Dr Sarah Russell[1], Mrs Rachel Quigley[1], Mrs Betty Sagigi[3], Dr Gavin Miller[2], Dr Edward Strivens[1]

[1]James Cook University, Cairns, Australia, [2]Queensland Health, Cairns and Hinterland, Australia, [3]Queensland Health, Torres and Cape, Australia

Introduction: Recent studies in older Aboriginal Australians have identified high rates of dementia and Associated problems of ageing including high rates of falls, frailty, incontinence, and vision and hearing impairment. These conditions were present on a background of complex medical comorbidities and chronic disease. As a result, older Aboriginal Australians are at greater risk of excess disability, reduced quality of life and earlier entry into residential aged care facilities, usually away from country and family. Even though Torres Strait Islander communities have similar socioeconomic disadvantage and poorer health outcomes as Aboriginal communities, rates of dementia and problems of ageing are unknown. The aim of this study was to assess dementia prevalence and problems of ageing in people aged over 45 living in the Torres Strait.

Methods: A total of 323 Torres Strait residents (37% male) aged 41 to 93 years (*M*=64.6, *SD*11.2) participated. Participants were administered a survey assessing health, function and psychosocial domains and also underwent a comprehensive Geriatric Assessment.

Results: Results of the dementia prevalence study are described elsewhere. This paper describes the high rates of associated problems of ageing identified. Results showed that over 44% of the sample were identified as needing further investigation for falls risk; 25% for incontinence; 13% for depression; and 10% for pain and for anxiety.

Conclusions: Results highlighted the need for assessment and management of these conditions. Nevertheless, although there are high rates of problems of ageing found in these communities, many are amenable to intervention, preferably within a multidisciplinary team.

DR KAIKAI SHEN
CSIRO

White Matter Hyperintensity and β-amyloid burden in a cognitively normal preclinical cohort

Dr Kaikai Shen[1,2,3], Dr Pratishtha Chatterjee[2], Dr Ying Xia[1], A/Professor Kathryn Goozee[4], Dr Jurgen Fripp[1], Dr Samantha Burnham[1], Professor Ralph Martins[2,3]

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Background: The white matter hyperintensity (WMH) comorbidity is thought to contribute to the development of Alzheimer's disease (AD) in addition to the deposition of Aβ-amyloid (Aβ) pathology (Roseborough et al., *Alzheimers Dement* 13: 1154-1167, 2017). WMH lesions are found in FLAIR imaging with increased T2-weighted signal, indicating pathology not only commonly observed in vascular dementia, but also prevalent in AD. In this study, we investigated the relationship between WMH assessed by FLAIR imaging and Aβ burden in a cognitively normal cohort.

Methods: Ninety-eight (33 M, 24 *APOE*ε4 carriers) cognitively normal subjects aged 60-90 (mean 78.4±5.5) years from the KARVIAH cohort were examined. The WMH lesion was segmented on FLAIR images using HIST*. Subjects' Aβ burden was quantified on FBB PET by the standard uptake value ratio (SUVr) computed using CapAIBL†, with Aβ-positivity defined as SUVr1.35. We performed a partial correlation between age and WMH volume controlling for sex and *APOE*ε4 carriage to assess the aging effect on WMH, and a logistic regression on the Aβ positive status with WMH volume as explanatory variable, controlling for age, sex, and *APOE*ε4 carriage to ascertain the relationship between WMH and amyloid status. *,†https://milxcloud.csiro.au/

Results: The WMH volume was higher among *APOE*ε4 carriers (6618mm^3) than non-APOE-ε4 carriers (4448mm^3), although this did not reach significance (t=1.18, p=0.247). The partial correlation analysis showed a marginal correlation between age and WMH volume (CC=0.20, p=0.049). The logistic regression showed an inverse correlation between WMH and Aβ-positivity (t=-2.16, p=0.031).

Conclusions: An inverse correlation between WMH and Aβ was previously reported among the normal as well as the AD population (Provenzano et al. *JAMA Neurol* 70:455–61, 2013). In a scenario where Aβ deposition and WMH have additive yet independent effect on the development of AD (Roseborough et al. 2017), the inverse correlation may be resulted from the 'explaining away' phenomenon that the observation of Aβ-positivity would explain away WMH when conditioned on the cognitively normal diagnosis of our cohort. Thus our results are consistent with independence between the effects of WMH and Aβ deposition on AD.

DR CLAIRE SHEPHERD
Neuroscience Research Australia

Disease and mutation-specific increases in T lymphocytes in FTLD-tau

Dr Claire Shepherd[1], Ani Lack[1], Professor Jillian Kril[2], Professor Glenda Halliday[3]

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Inflammation, in the form of reactive astrocytes and microglia, has long been observed in the brain of individuals with frontotemporal lobar degeneration (FTLD). Recent genetic, blood and in vivo transgenic mice research has further highlighted a role for immunity in the etiology of the disease, most notably T lymphocyte activation and regulation. We performed quantitative immunohistochemical analysis of CD4- and CD8-positive T cells on formalin-fixed, paraffin-embedded sections of the superior frontal cortex in individuals with various forms of FTLD-tau, including; 9 cases with corticobasal degeneration (CBD – 4R tauopathy), 9 cases with Pick's disease (PiD – 3R tauopathy), 7 cases with mutations in the microtubule Associated protein tau (MAPT – all 4R tauopathies including CBD) and 10 age and sex matched controls. Our results showed that CD8-positive, cytotoxic T-cells were significantly upregulated in PiD cases compared to controls (p=0.000). Both PiD (p=0.014) and MAPT (p=0.020) cases had significantly increased levels of CD4-positive T cells compared with controls. No changes in either CD4- or CD8-positive T cells were seen in the brains of individuals with sporadic CBD and no effect of age or post-mortem delay was seen in any group. This is the first study to investigate the role of T lymphocytes in FTLD-tau. The results demonstrate significant increases in cytotoxic and T-helper cells that do not appear to be specific for tau pathology *per se* but are more likely to be Associated with disease-specific mechanisms, thereby highlighting further mechanistic differences underlying these different forms of FTLD-tau.

ASSOCIATE PROFESSOR ADAM VOGEL
University of Melbourne

A review of olfactory function in frontotemporal dementia

Ms Courtney Lewis[1,3], Professor Dennis Velakoulis[5], Professor Mark Walterfang[5], A/Professor Amy Brodtmann[4,6], A/Professor Adam Vogel[1,2,3,4]

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Background: Olfactory impairment is a symptom of many psychiatric and neurological disorders, including Alzheimer's disease (AD) and Parkinson's disease (PD). A growing body of evidence suggests that the clinical syndromes resulting from frontotemporal lobar degeneration (FTLD) may also present with olfactory deficits. The clinical phenotypes of frontotemporal lobar degeneration include behavioural variant frontotemporal dementia and primary progressive aphasia (PPA), further divided into progressive non-fluent aphasia (PNFA) and semantic dementia (SD). Commonly assessed olfactory domains include detection threshold, quality differentiation, identification, familiarity, and to a lesser extent, hedonic and edibility judgement. The characteristics and complexity of each olfactory domain necessitates specific neural networks, cortical regions and hemispheric lateralisation. Olfactory domains can, therefore, be affected differently within and between neurological conditions. Methods: Here we review and summarise the literature on olfaction in FTD as it pertains to the domains of olfaction. Results: The clinical syndromes of FTD are thought to retain olfactory detection and discrimination function, a key difference between FTD and AD or PD. Individuals with FTD most prominently demonstrate deficits in olfactory identification. BvFTD may be susceptible to hedonic processing deficits; however, more evidence is needed. No significant differences in olfactory domain function have been found between the FTD groups. Conclusion: Early evidence suggests that olfactory impairments are present in all syndromes Associated with FTLD pathology. Improved knowledge of olfactory function across the FTD spectrum may provide diagnostically important information and enhance our understanding of other associated symptoms, such as changes in eating behaviour.

ASSOCIATE PROFESSOR ADAM VOGEL
University of Melbourne

An assessment of semantic olfactory processing and eating behaviours in frontotemporal dementia

Ms Courtney Lewis[1,3], Professor Dennis Velakoulis[5], Professor Mark Walterfang[5], A/Professor Amy Brodtmann[4,6], A/Professor Adam Vogel[1,2,3,4]

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Background: Frontotemporal lobar degeneration (FTLD) refers to the pathological process of a group of syndromes in which progressive atrophy occurs in the frontal or temporal lobes of the brain. The clinical phenotypes of FTLD are collectively known as frontotemporal dementia (FTD). Aberrant changes in eating, secondary to cognitive and behavioural deficits, are a common and significant outcome of FTLD. Olfactory function is also thought to be impaired as FTLD pathology affects many of the neural regions responsible for integrating semantic knowledge with olfactory information. Individuals with FTD primarily demonstrate impairment in the identification of flavours and odours. Early evidence suggests hedonic and edibility judgement may also be affected. The effects of semantic olfactory impairment on aberrant eating behaviour remains unclear. Objective: We aimed to characterise semantic olfactory deficits in FTD and evaluate the relationship between semantic olfactory function with eating behaviour, cognition, gender and disease duration. Methods: Forty individuals with FTD (bvFTD, SD and PNFA) completed the Appetite and Eating Habits Questionnaire (APEHQ), Mini Mental State Exam (MMSE) and a novel olfaction assessment. Fifty healthy controls completed the olfaction assessment only. We developed the Semantic assessment of OlfActory Processes (SOAP) to assess the olfaction domains: free identification, recognition, hedonic valence and edibility judgement. Results: Impaired associative olfactory function may contribute to reported

eating behaviours such as mealtime rigidity, bolting of food and diet preference changes. Gender may play a role in the sparing of semantic olfactory processes. Findings may contribute towards differentiating FTLD from other pathologies.

R MICHAEL WALLER
University of Queensland

Using linked data to identify dementia records using the Australian Longitudinal Study on Womens' Health

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Background: The Australian Longitudinal Study on Women's Health (ALSWH) includes a cohort of women followed-up from 1996 through self-reported surveys and routinely collected administrative data. Researchers have developed a method to identify records of women with dementia in this cohort.

Method: The following datasets have been used to construct a listing of all known dementia records in this cohort; Self-reported data (including free text response, information of proxies, and responses received through participant management records), Pharmaceutical Benefits data, Cause of death records, Aged care data (including assessments and funding instrument data), and Hospital admissions data (not available from Victoria). Data linkage was used to collate these records of dementia and estimate a date of diagnosis based on the first available notification date.

Results: Over the first 20 years of the Study, 28% of women (3,482 out of 12,432) had a record of dementia. The largest source of dementia records was the aged-care data, with 75% of dementia records identified from this source. The next most common source was the cause of death data (45%).

Discussion: The data linkage techniques employed have produced credible estimates of the cumulative incidence dementia. The techniques used may provide a template of how linked data sources can be used to generate a registry of dementia cases at a State or national level. Having now developed this resource, researchers can apply to use the dementia records identified through the ALSWH study to answer questions regarding womens' health both before and after dementia diagnosis.

MS ROCHELLE WATSON
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Dementia is the second most feared condition among Australian health service consumers

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Background: Community awareness of dementia is crucial for early detection, addressing stigma, and optimising care. Previous international research found the proportion of people reporting dementia as the condition they fear the most had the greatest increase over time than other illnesses.

Aims: To explore among Australian health service consumers the diseases they fear the most and differences in the reasons for fearing cancer versus dementia.

Methods: A cross-sectional survey of people attending outpatient clinics at one Australian hospital. Participants were asked which health condition they most feared from a list of the leading causes of fatal burden in Australia, and the three most important reasons for their choice.

Results: Of 355 participants, the most feared condition was cancer (34%) followed by dementia (29%). For participants aged 65 years and over only, dementia was selected as most feared. The top reasons for selecting cancer were: shortened length of life (69%), physical symptoms and side effects (57%), and emotional impact (43%). The top reasons for selecting dementia were: emotional impact (60%), practical issues (59%), and social impact (40%). Only 16% reported shortened length of life as a reason for fearing dementia.

Conclusion: Increasing prevalence may contribute to fear of dementia, even among younger people for whom it is not a leading cause of fatal burden. More community education may be needed regarding the impact of dementia on life expectancy and preventative health behaviours. Findings highlight the importance of a supported diagnosis process given many individuals may have pre-existing fears about dementia

Intervention and Treatment

DR RACHEL ATKINSON
Wicking Dementia Research and Education Centre

Does TDP-43 pathology cause axon traffic problems?

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Frontotemporal lobar degeneration (FTLD) is the second most common cause of younger-onset dementia. Alterations to the TDP-43 protein are found in a majority of FTLD cases, characterised by mislocalisation of the protein from the nucleus to the cytoplasm. There is also distinctive loss of axons in the white matter of FTLD brains. We are interested in how alterations to TDP-43 may contribute to axonal loss using the eye as a novel way to model these changes. Adeno-Associated virus (AAV2) was used to deliver wildtype (WT) TDP-43 and TDP-43 with a mutation in the nuclear localisation signal (NLS), to replicate disease conditions, to retinal ganglion cells (RGCs) of C57Bl6 mice (n=15 per group). Histological analysis after 3 months demonstrated that both TDP-WT and TDP-NLS transduced ~60% of RGCs, with WT-TDP expression confined to the nucleus and TDP-NLS expressed throughout the cytoplasm. TDP-NLS expression resulted in axonal pathology including a significant increase ($P<0.05$) in degenerative axonal profiles in optic nerves compared to vehicle controls. Electron microscopy revealed that degenerative profiles resulted from accumulation of autophagic vesicles. Autophagic vesicles are formed in the axon terminal and transported back to the cell body (retrograde transport). Thus our data suggests that mislocalisation of TDP-43 results in disruption to retrograde transport. Our future studies will investigate specific transport cargos affected by TDP-43 pathology. Identifying how axons degenerate following mislocalisation of TDP-43 will aid in targeting therapeutics to stabilise and maintain function of axons in diseases like FTLD.

MR JAMES BENDER
Wicking Dementia Research and Education Centre

Excitotoxic pathology: Description of a model in the visual system of mice

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Alzheimer's disease and other conditions causing dementia are Associated with disruption of neuronal circuitry through degeneration of both the axons and neuronal connections. Excitotoxicity is a pathological process known to occur in many of these diseases and has been shown to be capable of inducing axonal degeneration. To develop targets for therapeutic intervention, it is important to understand the mechanisms involved. This study aimed to characterize an *in vivo* model of excitotoxicity in the visual system of mice for therapeutic testing.

Intravitreal administration of a range of concentrations of the excitotoxin kainic acid (KA, n=41), or a vehicle control (PBS, n=13), was performed on adult mice. Optomotor analysis revealed that animals treated with 1nmole KA demonstrated a loss of visual acuity 1-day after surgery but had improved by 7-days, while any dose >1nmole KA resulted in an absence of response at every timepoint after surgery ($p<0.001$). The performance of animals given PBS or <1mM KA was not significantly affected ($p=0.343$). 7-days after excitotoxin exposure, retinal immunohistochemistry revealed an increased immunolabelling for the astrocyte marker GFAP ($p<0.001$) and disruption in markers Associated with the cytoskeleton in retinal ganglion cells (RGC). In the optic nerve, transmission electron microscopy and histology techniques revealed glial infiltration and alterations to the cytoskeleton in RGC axons distal to the site of excitotoxin exposure, indicating that the injury propagates throughout the axon. The future impact of this research is to develop a rapid *in vivo* screening platform for mechanistic studies and testing therapeutic interventions against excitotoxic neurodegeneration.

DR BILL BENNETT
Wicking Dementia Research and Education Centre

Aged mice retain their motor learning ability, which can be enhanced by transcranial magnetic stimulation

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Introduction: We are interested in whether there are intrinsic differences in connectivity in young adult brains and aged brains, in the absence of disease conditions such as dementia. Using sophisticated live imaging and two-photon microscopy, we use transgenic mice with fluorescent neurons to directly image the connections between neurons, known as synapses, in the cerebral cortex of a living mouse. We can track changes in specific synapses, dendritic spines, over days to weeks in the mature adult (7-10 months) and very old brain (22-24 months). Transcranial magnetic stimulation (TMS) is a novel form of non-invasive brain stimulation, which can induce long-lasting changes in connectivity in the human brain. In this study, we investigated the effects of TMS in the adult and aged mouse brain.

Methods and Results: We compared synaptic plasticity (spine density and turnover) in the mature adult and aged brain. After establishing baseline synapse dynamics over a few days, we gave a single round of TMS as a complex pulse train (intermittent theta burst) using a rodent-specific coil, overlying the mouse brain. In mature adults, TMS induced an increase in spine turnover of ~19%. In the aged animals, we saw a similar baseline turnover and an equivalent increase in turnover post-TMS. In both cases, the effect of TMS was transient.

Conclusions: In this population of excitatory neurons, the aged brain maintains similar baseline synaptic dynamics compared to the younger adult brain and responds to TMS with changes in connectivity with the same direction, magnitude and duration.

DR BILL BENNETT
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Live imaging of dendritic spine plasticity with transcranial magnetic stimulation – findings in aged mice

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Introduction: We are interested in whether there are intrinsic differences between young adult brains and aged brains, in the absence of disease conditions such as dementia. Transgenic mice with fluorescent neurons allow us to directly image synapses in the cortex of a live animal, using a sophisticated two-photon microscope. We used this cutting-edge technique to track changes in synaptic connectivity (plasticity) over days to weeks, in both young adult and very old mice. Transcranial magnetic stimulation (TMS) is a novel form of non-invasive brain stimulation, which can induce long-lasting changes in plasticity in young adults. We sought to find out whether TMS would have similar effects in aged brains.

Methods and Results: We compared plasticity (spine density and spine turnover) in young adult (3-7 months old) and very old (22-24 months) mice. After establishing baseline values over a few days, we gave a single round of TMS as a complex pulse train (intermittent theta burst) using a rodent-specific coil. In young adults, TMS induced an increase in spine turnover of ~19% within 24hrs. In the aged animals, we saw no significant difference in baseline turnover compared to young adults, and we saw the same increase (~19%) in turnover within 24hrs of TMS. In addition, the effect of TMS upon turnover seems to be quite transient.

Conclusions: We see little or no difference in baseline spine density or turnover between young adult and very old mice. Furthermore, the response to TMS appears to be similar in both groups, with turnover transiently boosted

DR PRASHANT BHARADWAJ
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AMPK activator PRKAG2 is elevated in AD brain and is associated with increased Aβ accumulation

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Previous studies of AD brain shows a marked up-regulation of lysosomal activity, including extensive involvement of various acid hydrolases such as cathepsins B and D with Aβ protein deposits. In addition, The AD brain also shows abnormal activation of nutrient sensing kinase AMP-activated protein kinase (AMPK), which is an important regulator of autophagy. AMPK is a heterotrimeric protein complex composed of a 3 subunits including a noncatalytic regulatory gamma subunit PRKAG2. Recent findings show that PRKAG2 has an important role in regulating stress induced autophagy by AMPK and polymorphisms in PRKAG2 are Associated with cognitive impairment and metabolic dysfunction in old age. The main aim of this study was to determine the expression levels of PRKAG2 and whether it correlates with increased autophagy and Aβ levels in the AD brain.

Gene and protein expression analysis of PRKAG2 was conducted in post-mortem brain tissues of patients with AD, FTD (Frontotemporal dementia), LBD (Lewy body dementia) and in healthy controls. Autophagy markers LC3B-I, BECLIN1 and ULK3 were significantly elevated in the AD brain as compared to healthy control and other dementias showing the abnormal activation of autophagy. Gene transcription and protein levels of PRKAG2 was significantly increased in hippocampus and frontal cortex in AD. More importantly, PRKAG2 protein levels were associated with increased Aβ accumulation and BECLIN1 in all brains. In summary, our findings suggest that increased PRKAG2 may be an important contributing factor to lysosomal dysfunction and Aβ accumulation in AD brain.

PROFESSOR THOMAS BORODY
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Treatment of Alzheimer's disease with combined antibiotics

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Introduction: Alzheimer's disease (AD) is an incurable neurodegenerative disease characterised by impaired cognition with a pathogenesis hypothesised to be a multifactorial process that may involve bacterial infection. Chlamydia pneumoniae (Cpn) has been detected in the brains of patients with AD and implicated in pathogenesis. We report two patients with AD, treated with antibiotics targeting Cpn.

Case One: A 72 y/o male with a 4y history of AD with short-term memory loss, Mini Mental State Exam (MMSE) score of 18/30 who required high level nursing care was initially commenced on rifabutin, minomycin and roxithromycin with good short term response. He was then commenced on doxycycline, Septrin Forte and metronidazole and by 6 months showed marked improvement, being able to recognise friends, hold and comprehend conversations, follow instructions and complete simple tasks.

Case Two: A 79 y/o female Professional horse-rider with a 15y history of memory loss, MMSE score of 19/30, and diagnosis of AD. She was unable to recognize friends, showed irritability, could not tell the time, unable to ride nor do the shopping. Six months after commencing clarithromycin, rifaximin and sporonox, she was able to drive, shop, ride her horses, and showed significant improvement in cognitive function and memory. Her MMSE score increased to 26.

Conclusions: The response of these patients indicates that treatment of AD with combined antibiotics targeting Cpn may be effective in alleviating symptoms and provides further evidence for an infective cause. The role of combined antibiotics in the management of AD should be further investigated.

MS ALISON BOWMAN
University of Newcastle

Junior Medical Officers' knowledge of implementation of advance care directives (ACDs) for people with dementia

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Aim: To determine Junior Medical Officers' (JMOs') knowledge of : (1) the legal validity of advance care directives (ACDs) when making healthcare decisions for persons with dementia; and (2) the correct order in which people should be approached as 'person responsible' if a patient is unable to of consent to their own treatment.

Design: A cross-sectional survey was conducted with JMOs on clinical rotation at two tertiary public hospitals in New South Wales. Participants completed a pen-and-paper survey which included 6 true/false knowledge questions, regarding the legal validity of making treatment decisions and enacting ACDs in different situations. Participants were also asked to rank in order (1-4) who should be approached as 'person responsible' when a patient is not capable of consenting to their own treatment (*Spouse or Partner; Close friend or relative; Guardian; Unpaid Carer)*.

Results: Data collection is ongoing. To date 96 surveys have been completed (response rate 42% - 59% female; 48% post-grad year 4; 94% have provided care to a patient with an ACD). For the 6 questions related to enacting of ACDs, the participants answered an average of 2.57 correctly (SD= 1.13) No participants scored all questions correctly. Only 16% of participants ranked the order of 'person responsible' hierarchy correctly; 17% ranked all incorrectly.

Conclusion: There are significant gaps in the knowledge of JMOs who may be required to treat patients with dementia presenting to hospital with ACDs. These findings suggest there is a need to improve training to JMOs in this area.

DR CLAIRE BURLEY
University of New South Wales

Economic costs of behaviours and psychological symptoms of dementia (BPSD): A review of the literature

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Behaviours and psychological symptoms of dementia (BPSD) affect ≤90% of people living with dementia and strongly correlate with functional and cognitive impairment (Cerejeira et al., 2012). BPSD can cause high levels of distress for people living with dementia, families, care partners and staff; as well as impose a significant financial burden on society. However, little research has been done to calculate the specific costs Associated with BPSD using consistent methodological approaches.

We identified thirty papers that investigated dementia costs and BPSD. The cost of dementia increased significantly as the severity of BPSD increased (as shown by Neuropsychiatric Inventory (NPI) and/or Cohen-Mansfield Agitation Inventory (CMAI)); and was intertwined with activities of daily living, cognition and level of dependence. Several psychosocial interventions were cost-effective in reducing BPSD.

Study types varied (cohort, cross-sectional, intervention, etc.) and although some used similar measures to investigate costs (Client Service Receipt Inventory (CSRI) and the Resource Utilization in Dementia (RUD)), dementia severity (Mini-mental State Examination) and BPSD (NPI/ CMAI), methodological approaches to calculate Associated costs varied considerably (e.g., group comparisons, linear regressions). These approaches will be presented in more detail.

We will provide recommendations for costing approaches and highlight how robust approaches to determine BPSD costs can be developed through interdisciplinary research. By determining clinical and cost-effectiveness of targeted interventions for reducing BPSD, we anticipate that we can provide compelling arguments for service providers to adopt such interventions.

DR MONICA CATIONS
Flinders University

Health Professional perspectives on barriers to broad acceptance of rehabilitation for people with dementia

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Background: Unlike other progressive neurological conditions and despite increasing demand from key advocates, multidisciplinary rehabilitation is not incorporated into the usual care pathway for dementia. This is despite increasing demand from key advocates. Clinician views regarding the relevance of rehabilitation in dementia care are not well known. This qualitative study explored the perspectives of health Professionals regarding barriers to provision of multidisciplinary rehabilitation programs for people with dementia.

Methods: Sixteen health Professionals from a variety of settings and Professional backgrounds were purposively sampled using maximum variation sampling. Semi-structured interviews were conducted to explore attitudes towards the care of people with dementia and beliefs about the feasibility and value of multidisciplinary rehabilitation in this population. Thematic analysis was used to identify themes.

Results: Participating clinicians acknowledged problems with existing dementia care pathways in Australia, but rarely conceptualised rehabilitation as relevant to this pathway. Analyses yielded two main and related themes: (1) Difficulty defining worthwhile outcomes of a rehabilitation program for people with dementia, and; (2) Perceived barriers to rehabilitation participation in this population. Clinicians felt that achievable outcomes for people with dementia were not sufficiently worthwhile for investment.

Implications: Broader acceptance of multidisciplinary rehabilitation as relevant to dementia care will require a reframing of practice that both educates health Professionals regarding the outcomes that may be achievable for people with dementia and persuades staff to appreciate that the investment is worthwhile.

MS ELISA CHOUDERY
University of Newcastle

Working with people with dementia and their carers–Speech and Language Pathologists' experiences and perceptions

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Background: Rates of dementia diagnosis are increasing. One area affected by dementia is communication impacting quality of life for people with dementia and those they interact with. As communication is a fundamental requirement for every person, Speech-Language Pathologists (SLPs) have comprehensive knowledge and expertise to provide support for people with dementia and their carers. The research presented investigated current clinical practice of Australian SLPs working with people with dementia at a time where services for ageing populations are being reviewed at a national level through the Royal Commission into Aged Care Quality and Safety.

Aims: The aim of this study is to investigate experiences and perceptions of SLPs when working with adults with dementia, their carers and other health Professionals, and to identify factors that influence the treatment and service decisions.

Method: A cross-sectional survey of SLPs is conducted in Australia using a specifically designed web-based survey. The survey explores areas of clinical practice including education and training, referrals, assessment, diagnosis and intervention.

Results & discussion: Preliminary results about approaches and patterns of SLP services and patterns will be presented and considered in light of current and future developments in practice in dementia care. It is anticipated that these results will be used to guide further research regarding speech pathology services delivered as part of a multidisciplinary team in dementia care which may include development of specific Professional guidelines, education and training to support SLPs to implement dementia-related services.

DR PETA COOK
University of Tasmania

How are Cancer Treatment Recommendations and Decisions Reached With/ For Older Adults with Dementia?

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In healthcare, health risk assessments are influenced by technical 'objective' measurements of the physical body and disease; the values that underlie Professional practices; the organisations healthcare Professionals work for; and subjective belief systems of individual healthcare Professionals. As a result, cancer treatments prescribed for older adults can be tempered by personal views about a patient's age and other health conditions or comorbidities that they may have. Drawing from interviews undertaken with nine key staff members in a large cancer service, we examine how treatment recommendations and decisions are determined when older adults with cancer also have dementia; two health conditions more common in older age. This exposes that healthcare workers and Professionals view dementia in diverse ways, which are influenced by subjective understandings of the older adult's lived experiences of dementia and ageing. These beliefs serve to influence and guide how cancer treatment recommendations and decisions for older people with dementia are reached. This process is further layered with power, whereby the ability to influence such decisions are tempered by one's Professional status and their Associated understandings of autonomy (individual versus relational autonomy). As a result, this exposes the multifaceted influences on treatment decisions and recommendations, including the influence of social constructions of health, illness, and age.

DR SANETTA DU TOIT
University of Sydney

A global understanding of dementia care – creating an international learning experience

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Background: An ageing world population and global migration will profoundly impact future health care. Currently various issues Associated with the well-being, belonging and agency of older adults with advanced dementia living within residential care settings have been highlighted by the recent Royal Commission into *Aged Care* Quality and Safety in Australia. Therefore, occupational therapy (OT) students as part of the future healthcare work force need to understand our profession's role in addressing current and future challenges relating to the health and wellbeing of older adults. Method: Collaboration between four universities in Australia, South Africa, Sweden and the UK led to an opportunity for OT students to explore residential aged care from a global perspective. An intra-Professional critical OT perspective assisted OT educators to consider how to develop of a conceptual framework for facilitating on-line collaborative learning.

Results: This project connected health curriculum directly to the larger political, social and economic issues surrounding the profession and aged care agendas on a global level. Collaborative on-line learning activities were developed to support a shared understanding of older adults with advanced dementia as occupational beings and aide in the preparation of a future OT workforce. Authentic learning opportunities would enable students to uncover and take ownership of the contribution the profession of occupational therapy could bring to residential aged care.

Conclusion: Student engagement through digital platforms support the development of international and intercultural competence in dementia care approaches.

MR SAMUEL DWYER
Wicking Dementia Research and Education Centre

Characterisation of oligodendrocyte changes in a rodent Alzheimer's disease model

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Recent research in Alzheimer's disease (AD) has shown interest in the role of glial cells in AD pathogenesis. Studies have identified the presence of focal demyelination at amyloid plaque sites and alterations in oligodendrocyte populations in animal models of early AD. The aim of this study is to understand the effect of amyloid-beta (Aβ) on oligodendrocyte development and health, which may have subsequent effects on myelin and the degeneration of neurons. We firstly studied the effect of extracellular Aβ on oligodendrocyte development *in-vitro*. Trace analysis of mature oligodendrocytes that have been treated with 5μM Aβ shows significantly reduced branching, suggesting a more immature morphology compared to control. In addition, 1μM Aβ1-40 demonstrated a statistically significant increase in the number of MBP-positive oligodendrocytes and branches (n=10 cells per culture, 3 cultures per treatment, $p<0.05$), suggesting low concentrations of Aβ might have a potential role in oligodendrocyte maturation *in-vitro*. We have also examined alterations in the maturation of oligodendrocytes as well as myelination changes in a model of AD, the TgF344-AD rat. This model may provide a more suitable translational model of disease progression than common mouse transgenic models, as the TgF344-AD rat develops tau pathology as well as amyloid plaques. Alterations to oligodendrocyte populations in key brain regions impacted in AD progression were analysed using immunohistochemistry and protein analysis, alongside myelination changes using electron microscopy techniques. The outcome of this study is to highlight the potential role oligodendrocyte maturation and myelination alterations may have in the disease progression of AD.

MRS BARBORA FULOPOVA
Wicking Dementia Research and Education Centre

Exploring the dynamics of brain connectivity in an amyloidosis animal model of Alzheimer's disease

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Introduction: Synapses are points of communication between neural cells capable of neuroplastic adaptation Associated with learning and memory, and their dysfunction is a common feature in Alzheimer disease (AD). Axonal terminaux boutons are at the output sites of synapses, and reorganisation of these structures can lead to large-scale connectivity changes.

Aim and Methods: To investigate structural dynamic of terminaux boutons, we used cranial windows, two-photon microscopy, and non-invasive transcranial magnetic stimulation (TMS) in healthy transgenic adult mice (Thy1-GFP-M), and an amyloidosis mice model of AD (Thy1-GFP-M x APP/PS1). Longitudinal imaging was conducted in 48-hour intervals over 18 days, and TMS was delivered at day 10 using a rodent specific stimulation coil. Structural dynamics were measured as synaptic density (number of boutons per axon length) and synaptic turnover (proportion of gains and losses between 2 consecutive sessions), and then compared between pre- and post-stimulation timepoints.

Results: We found that density was unchanged across both healthy and amyloidosis groups, and did not change following TMS. Overall baseline pre-stimulation turnover was significantly ($p = 0.005$) lower in amyloidosis group compared to heathy group, and post-stimulation turnover was significantly ($p < 0.05$) increased for up to 8 days in both groups.

Conclusion: One round of TMS induced neuroplastic response of imaged excitatory neurons found in neuropil. Observed cells maintained their total presynaptic outputs post-stimulation, however, targets of these outputs were highly dynamic. Additionally, the post-stimulation increase of low baseline synaptic turnovers in amyloidosis group points to possible clinical applications of TMS in Alzheimer's disease.

MISS OLIVIA HOLLOWAY
Wicking Dementia Research and Education Centre

Microglia demonstrate a heterogenic inflammatory profile in an Alzheimer's disease mouse model

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The hallmarks of pathology in Alzheimer's disease (AD) are amyloid beta plaques and neurofibrillary tangles. Recently, microglia, the immune cells of the brain, have been hypothesised to play a role in AD, where they reportedly switch from anti-inflammatory to pro-inflammatory as disease progresses. This study investigated inflammatory microglial markers in an AD model of amyloid plaque formation to identify the shift in the microglial inflammatory profile and whether microglial morphology is tied to function. Spatial localisation in relation to plaque development was also investigated. Immunohistochemistry for anti- and pro-inflammatory markers; TREM2, CD40, CD14 and CD16 was conducted at 3-, 6-, and 12-months of age which correlated with an increasing plaque load (pathology) in mouse brains; (n=6 per timepoint). Data was analysed using two-way ANOVA with Tukey's post-hoc test for multiple comparisons. Significant morphological shifts were observed in AD mice at 6 and 12 months, where there was an increase in activated ($p<0.05$) and amoeboid ($p<0.05$) morphologies.

All inflammatory markers were significantly upregulated at 12 months ($p<0.05$), demonstrating heterogenic inflammation of both anti- and pro-inflammatory profiles. The increased inflammatory profiles occur simultaneously with morphological shifts suggesting a potential relation at late stage plaque development. Spatially, at 12 months there was significant increase in inflammation directly correlating to plaque location ($p<0.05$). Overall, these data suggest microglia display a heterogenic inflammatory profile throughout disease progression, which impacts future research in designing potential therapeutics for inflammatory cascades activated AD.

DR ABRAHAM KUOT

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Harmony in the Bush: An innovative personalised care model for dementia in rural residential care

Dr Abraham Kuot[1], Dr Vivian Isaac[1], Mrs Margaret Kimani[1], Dr Mohammad Hamiduzzaman[1], Professor Jennene Greenhill[1]

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There are creative ways to improve the quality of life, and decrease the stress, carer burden and staff workloads in residential care facilities. Harmony in the Bush is an innovative research study aims to co-design an effective model of care for dementia in residential facilities. Approximately 30% of Australians live in rural communities. Dementia is a major concern for many rural communities where there are ageing populations with poor access to health services. Many people rely on aged care facilities as their relatives experience progressive decline, particularly when they experience behavioural and psychological symptoms of dementia such as agitation and wandering. These symptoms are complex, stressful and costly aspects of care. Institutionalisation and antipsychotic medications have limited efficacy but are widely used in residential aged care. The study is funded by the Australian Government Dementia and Aged Care Services grant, and is a two-year, longitudinal, quasi-experimental design involving behaviour measurements, interviews, and focus groups in five different kinds of residential facilities to evaluate the model's effectiveness in various rural health contexts. They include small and large, private, public, not for profit, people from multicultural backgrounds and an Aboriginal specific facility. Our 'Ageing Well in Harmony' is a new model of care incorporating personalised care, non-pharmacological interventions and music for people with dementia (PWD). This presentation will include an overview of the study design and preliminary findings. This personalised model of care will have long-term positive outcomes for rural communities especially beneficial for PWD, carers, aged care staff and their workplaces.

MR ROSS LANGLEY

Wicking Dementia Research and Education Centre

A new method of tracking microglia motility and synapse interactions in vivo

Mr Ross Langley[1], Dr Jessica Collins[1], Associate Professor Alison Canty[1], Associate Professor Anna King[1], Dr Jenna Ziebell[1]

[1]Wicking, Hobart, Australia

Microglia are highly motile immune cells found within the brain and their dysfunction has been implicated in the progression of neurodegenerative diseases such as Alzheimer's disease (AD). As the brain's primary immune cell, they constantly survey their surroundings for signs of infection or any "waste" that needs to be cleared. In addition to this they also play a role in the wiring of the brain and have been found to periodically contact synapses, the communication points between neurons. Studies suggest that this is to monitor the functionality of the synapses. It is hypothesised that microglial processes may slow down in AD resulting in a build up of waste and disrupted synapse maintenance. We have developed a protocol that allows us to measure the movements of microglia *in vivo* using mice that express fluorescent proteins on both microglia and neurons allowing these synaptic interactions to be visualised. Following an imaging session, the movement of the microglia is tracked using a program known as Trackmate. This collects data on the speed of the processes, the distance covered and the contacts made with synapses. This is tracked throughout the animal's lifetime allowing us to see if microglia dysfunction occurs with ageing and/or at which stage of AD it occurs. This protocol is the first to allow for the collection of high volumes of microglia movement and synapse interaction data. This has the potential to give us new targets for therapeutics as well as a time period that these treatments will be most effective.

DR JACQUELINE YK LEUNG

Wicking Dementia Research and Education Centre

The role of TAR DNA binding protein 43 (TDP43) in white matter degeneration in dementia.

Dr Jacqueline YK Leung[1], Mr Samuel T Dwyer[1], Dr Rachel Atkinson[1], Professor James Vickers[1], Associate Professor Anna King[1]

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White matter degeneration is a pathological feature of frontotemporal dementia (FTD), although the mechanism of this degeneration is currently unknown. TAR DNA binding protein 43 (TDP43) aggregates have been found in oligodendrocytes; however, the role of TDP43 in oligodendrocytes and its effect on oligodendrocytes development and myelin production has not been determined. Our research hypothesises that TDP43 has a direct role in oligodendrocytes development; hence the dysfunction of TDP43 might potentially contribute to white matter degeneration observed in FTD. To examine this, we have utilised primary cultured oligodendrocyte precursor cells, where the TDP43 expression is manipulated using lentivirus (either overexpression of wild type; TDP43-WT, or nuclear-localisation signal mutation; TDP43-NLS). The morphology of cells was analysed using immunohistochemistry and tracing in Image-J.

Our preliminary data indicate that overexpression of TDP43-WT leads to a significantly ($p<0.05$) more complex cell morphology compared to non-transduced control cells ($n=20$). The expression of a mutant form of TDP43 leads to a less complex morphology when compared to non-transduced control ($n=10$). To examine this further in vivo, we utilise the Sox10-iCre/ERT2 transgenic mouse and AAV carrying the lox-sequence (e.g., lox-TDP43) to create a mouse model where the TDP43 expression is altered in an oligodendrocytes-specific manner. We aim to use this model to study the long-term changes in oligodendrocyte development and myelination in the presence of pathologic TDP-43.

Impact of this study: The data from this project suggest that alterations to TDP43 expression lead to a change in the developmental capacity of oligodendrocytes process in vitro. Thus altered TDP43 may have direct involvement in the mechanisms of white matter degeneration observed in FTD pathogenesis and indicate potential therapeutic targets through maintaining oligodendrocytes health.

DR JACKI LIDDLE
University of Queensland

Learning through making: What making technology with people with dementia taught a technology design team

Dr Jacki Liddle[1], Mr Peter Worthy[1], Mrs Eileen Taylor[1], Mr Dubhglas Taylor[1], Mr Ron Beleno[1], Dr Anthony Angwin[1], Dr Ben Matthews[1], Professor Janet Wiles[1]

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With technology expected to play an increasingly important role in supporting the participation, connection and wellbeing of people living with dementia and their care partners, different approaches to development and evaluation are required. Reviews indicate the quality of technology available has been affected by a lack of user-centred design approaches, a reliance on technology-, rather than person-focussed processes, and the impact a lack of detailed understanding of need.

Within a participatory design process, a research through design project was undertaken. A multidisciplinary design team comprised 12 designers and developers (10 students), two health Professionals and three lived experience experts. The team worked through a series of activities to gain insights, understand needs and each develop a piece of technology, to help one person, with one need. Developers worked with the team to develop prototype technology in an iterative process, get feedback and thereby improve the design throughout a 10 week period.

A range of prototypes were made including a connected calendar, streaming music in a familiar form, an encourager for managing apathy, and a personalised sensory cushion. Through examining the series of proposed technologies, and their improvements, the impact of working with lived experience experts was demonstrated. Challenging stereotypes and their impact on design, insights into needs, usability, and the complexity of living with dementia for individuals and their support networks were gained. Technology design changes reflected a deeper understanding of the nature of technologies, environments and individual preferences. These considerations for design can be incorporated into future technology design.

DR MELINDA MARTIN-KHAN
University Of Queensland

The eQC Project: Identifying Patients with Cognitive Impairment in Acute Care

Dr Melinda Martin-Khan[1], Professor Leonard Gray[1], Dr Nancye Peel[1], Ms Elaine Pascoe[1], Professor Ruth Hubbbard[1], A/Professor Tracy Comans[1], Dr Yvonne Hornby-Turner[1], Professor John Hirdes[2], Professor Amanda Henderson[1], Professor Julia Crilly[3], Professor Nicole Gillespie[1], Professor Brant Fries[4], Dr Veronique Boscart[5], Professor Elizabeth Beattie[6], Doctor Linda Schnitker[6], Dr Ellen Burkett[7], Mr Fred Graham[7]

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Introduction: The interRAI Acute Care (AC) nursing assessment tool was pilot tested in adult admitted hospital patients (aged 18 and over) and identified that 24.3% of patients had short term memory problems, common across all age groups, not just the elderly. For those patients who may have cognitive impairment (CI), it can be difficult to detect without the use of a screening tool. A strategy designed only for patients with CI adds significant burden. A "universal" system that also deals specifically with the issues related to CI is desirable. The aim of the eQC project is to conduct a large scale implementation and evaluation of an assessment and care planning system to improve the care and support of people with dementia in hospital.

Method: The interRAI AC (including clinical screeners) will be implemented as a facility wide nursing assessment system administered to all adult patients (18 years and older) at admission, reviewed at handover and discharge as part of a large scale hospital/s implementation. Quality Indicators will be scored automatically using assessment data.

Staff will identify patients with CI or dementia, and patients at risk of poor outcomes, using the electronically generated assessment data which is also linked to other hospital administrative data.

Conclusion: The interRAI AC is being implemented as as an electronic nursing assessment system to improve the care of patients with dementia (or CI). The project will examine nursing admission documentation time, the identification of patients with CI, delirium risk prevention activities and changes in care planning.

MEGAN MCSTEA
University of Queensland

Antimicrobial Resistance costs in the last years of life for patients with dementia in Queensland

Ms Megan Mcstea[1], Dr Tracy Comans[1], Dr Kim Huong Nguyen[1]

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The economic burden of Antimicrobial resistance (AMR) in the acute care setting has not been well quantified. There is a lack of information on whether patients with dementia have similar rates and costs of AMR.

Methods: We used AR-DRG and costs from the National Hospital Cost Data Collection, to analyse AMR identified patients in their last year of life. AMR related ICD-AM-10 codes were extracted from a matched cohort of patients identified having a diagnosis in the 5 years prior to death occurring in 2014-2015 or not.

Results: 1800 patients had at least one resistance code; Dementia vs non-dementia (10% vs 8%). 1240 (69%) patients also had a UTI ICD code. As the number of comorbidities increases so does the proportion with an AMR code.

The mean cost for a patient in public hospitals without identified AMR is $27,917(95%CI: $27,112–$28,723) vs an AMR patient, $48,567 (95%CI: $45,214 =–$51,919). There was no significant difference between the dementia and non-dementia groups. There was a significantly greater shortfall in revenue margin for AMR identified patients as compared to non-AMR patients. DRGs understate the cost of hospitalisation for AMR patients in particular those with dementia. After controlling for cofounders, AMR is associated with additional costs ($16,277, 95%CI: $13,627–$18,927).

Conclusion: Any record of AMR is Associated with increased hospital cost. AR-DRG's do not cover these costs and the level of disparity is significantly more than for non-AMR episodes. While AMR presentations are more prevalent for dementia patients, there is no significant difference in cost.

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DR HOANG NGUYEN
Wicking Dementia Research and Education Centre

Effects of interventions to improve dementia literacy: A systematic review

Dr Hoang Nguyen[1], Dr Daniel Terry[2], Dr Hoang Phan[1], Dr Kathleen Doherty[1], Professor Fran McInerney[1]

[1]University of Tasmania, Hobart, Australia, [2]Federation University, Ballarat, Australia

Aims: To review and assess evidence regarding the effects of interventions aimed at improving dementia literacy for different groups of non-health-Professionals.

Background: Low dementia literacy is linked to many undesirable health outcomes. Therefore, many interventions to enhance dementia literacy have been conducted. A systematic review of such interventions would inform policy and practice guidelines for promoting dementia literacy, and support the translation of dementia research into practice.

Design: Systematic review and meta-analysis

Method: A systematic search for relevant interventions with any date of the publication was conducted using a range of online databases (e.g. CINAHL, Embase, Medline, ProQuest, and PsycINFO) and hand-searching of reference lists. Eligible interventions were then identified with reference to the inclusion/exclusion criteria and the methodological quality assessment checklist. Meta analyses were conducted on comparable quantitative data using a random-effects model.

Results: The final review included 14 interventions, which were either randomised controlled trials, non-randomised controlled trials, or controlled before-after interventions. The interventions were conducted in Northern America (USA, Canada), Europe (Netherlands, France, UK), and Oceania (Australia). The intervention contents, approaches, settings, and outcome measures were varied. Evidence of improved dementia literacy in various aspects was found, and the intervention effects were strongest on knowledge of dementia-related issues.

Conclusion: There is evidence for the positive impact of dementia literacy interventions on different groups of non-health-Professionals. Best practices in intervention contents, approaches, and outcome measures should be examined to guide future interventions.

ASSOCIATE PROFESSOR LEZANNE OOI
University of Wollongong

Two-dimensional and three-dimensional stem cell models of Alzheimer's disease highlight cell type specific vulnerabilities

Associate Professor Lezanne Ooi[1]

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Induced pluripotent stem cells provide the opportunity to generate living neural cells that represent the genomes of late-onset Alzheimer's disease patients and test potential therapeutics in a pre-clinical setting. The utility of these models is highly dependent on the choice of cell type or combination of cell types / tissues generated and whether or not these show the critical disease phenotype(s). Published protocols for differentiation vary widely in the reported efficiency of target cell generation and suffer from reproducibility issues. Additionally, characterization of the cells by expression profile and functionality differs between studies and is often insufficient, leading to highly variable protocol outcomes. We assessed several two dimensional and three dimensional neural differentiations for dementia related phenotypes. From the same cells there are significant differences in the phenotype, including amyloid β, specific phosphorylated tau residues, synapse function, and neuronal excitability. Creating in vitro models of dementia with human stem cells is a useful research tool. However to enable their full potential, differentiation strategies need to be carefully planned and executed depending on the research question and the experimental read-out. Assessing neuronal function is essential to ensuring the appropriate developmental pathway and disease phenotype has been effectively recapitulated. Together our results highlight Alzheimer's disease relevant vulnerabilities in specific cell types.

DR YIJUN PAN
Tohoku University

Upregulating blood-brain barrier FABP5 as a novel way to restore DHA levels in AD brain

Dr Yijun Pan[1], Ms Yi Ling Low[2], Dr Joseph Nicolazzo[2], Dr Yuji Owada[1]

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Docoxahexanoic acid (DHA) is a cognitive-beneficial fatty acid, and lower brain DHA levels have been observed in Alzheimer's disease (AD) brains. Brain DHA is primarily derived from the plasma, and therefore we proposed that the reduced brain DHA levels in AD is partially due to impaired DHA transport mechanism at the blood-brain barrier (BBB). Our study highlighted the important

role of fatty acid-binding protein 5 (FABP5) in the BBB transport of DHA: 1) FABP5 siRNA transfection resulted a 21.7 ± 4.1% (n=3) reduction in FABP5 protein expression and 17.1 ± 2.7% (n=12) reduction in ^{14}C-DHA cellular uptake; 2) ^{14}C-DHA brain transport decreased by 40.0 ± 10.7% in FABP5$^{-/-}$ mice (n=5-6), and this was Associated with a 27.4 ± 10.3% reduction in endogenous brain DHA levels (n=3). Interestingly, FABP5 is downregulated (34.5 ± 6.7%, n=7-8) at the BBB of an AD mouse model (APP/PS1 mice), which is Associated with 42.1 ± 12.6% decrease in ^{14}C-DHA transport across the BBB (n=8 animals). Pioglitazone (5 µm, 72 hr treatment) increased FABP5 expression by 1.2-fold, which is Associated with a 1.3-fold increase in ^{14}C-DHA cellular uptake over 2 min. A significant 1.8-fold increase in ^{14}C-DHA BBB transport was observed in pioglitazone-treated C57BL/6 mice (40 mg/kg for 7 days, n=4). The current study therefore demonstrated that FABP5 is important in the BBB transport of DHA, and its downregulation at the BBB could contribute to lower brain DHA levels in AD. Upregulating FABP5 at the BBB using pioglitazone may restore brain DHA levels in AD.

DR SHARN PERRY
Wicking Dementia Research and Education Centre

Motor deficits in a neurofilament knockout mouse model of neurodegenerative disease

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Neurofilaments, part of the neuronal cytoskeleton, provide structural and mechanical support to neurons, where the neurofilament light chain (NFL) protein is essential for the formation of the neurofilament structure. In neurodegenerative diseases, neurofilaments form pathological aggregates in neurons, which can affect motor function and cognition. Previous research has shown NFL is involved in neurodegeneration, as 22-month-old mice with NFL removed (NFL-KO), showed locomotor deficits and altered spinal cord circuitry. The present study aimed to characterise the onset and extent of motor and cognitive deficits and spinal cord neurodegeneration in young (1 to 4-month-old) NFL-KO mice. NFL-KO and control mice performed behavioural tests every month for 4 months, to assess coordination, balance, strength and short-term memory. NFL-KO mice displayed abnormal motor and cognitive behaviours that were present at 1-month-old, and continued to deteriorate as the mice aged. Compared to control mice, NFL-KO mice had uncoordinated hindlimb movements in fine locomotor tasks and showed reduced hindlimb stepping precision and uncoordinated step cycles during balance tasks. NFL-KO mice recorded weaker forelimb grip strength, displayed abnormal motor tremors and were more apathetic than controls. Preliminary analysis of immunohistochemical labelled lumbar spinal cord sections from 6-month-old NFL-KO and control mice indicates altered motor neuron morphology in NFL-KO animals. Together, this data suggests NFL is necessary for normal motor function in young animals and is involved in the neurodegeneration of motor neurons, which is likely underlying the progressive motor deficits seen in NFL-KO mice.

DR EMILY REEVE
University of South Australia

Attitudes of older adults and carers in Australia towards deprescribing

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Introduction: Understanding of older adult and carer attitudes towards deprescribing will contribute to medication optimisation in practice which may reduce carer burden and drug-induced cognitive impairment. The aim of this study was to capture the attitudes and beliefs of older adults and carers towards deprescribing.

Methods: Self-administration of the validated revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire (older adult and carer versions). The rPATD plus questions regarding participant characteristics, self-rated health, trust in physician and health autonomy were distributed to adults aged ≥ 65 years old, taking ≥1 regular prescription medication and carers of older adults.

Results: Older adult participants (n=386) had a median age of 74 (interquartile range, IQR: 70-81), while carers (n=205) were aged 67 (IQR: 59-76) and were caring for a person aged 81 (IQR: 75-86.25) years old. Over 80% of carers reported that their loved one had 'memory problems'. Majority of older adults (88%) and carers (84%) agreed that they would be willing to stop one or more of their/their care recipient's medications if their doctor said it was possible. In a binary logistic regression model, a low Concerns About Stopping factor score was the strongest predictor of willingness to deprescribe in older adults (adjusted odds ratio (aOR)=0.12, 95% Confidence Interval (CI)=0.04-0.34), while excellent/good rating of physical health was the strongest predictor in carers (aOR=3.71, 95%CI=1.13-12.23).

Conclusion: Most older adults and carers are willing to have one of their/their care recipient's medication deprescribed although different predictors of this willingness were identified in these two groups.

PROFESSOR CHRISTOPHER ROWE
Austin Health, University Of Melbourne

The Australian Dementia Network Trial Screening Program

Professor Christopher Rowe[1,2], Dr Jo Robertson[3], Larry Ward[5], Doctor Vincent Dore[2,4], Associate Professor Victor Villemagne[2]

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Introduction: The Australian Dementia Network (ADNeT) aims to: 1) establish a Clinical Quality Registry for dementia;

2) enhance memory clinics; 3) establish a large cohort for research and clinical trials. Here we report on ADNeT clinical trial screening and recruitment to date.

Methods: Participants with MCI and mild Alzheimer's disease (AD) are being recruited from memory disorder specialists in Melbourne with plans to expand to other major cities later in 2019 as PET imaging facilities and referral networks are developed. Telephone then in-person screening of referrals identifies subjects with MMSE>22 and impaired word list recall who then proceed to beta-amyloid (Aβ) and tau PET imaging with NAV4694 and MK6240, respectively, and 3T MRI. Asymptomatic persons with preclinical AD will be added later in 2019.

Results: In 6 months 170 referrals were received and 68 passed screening. 45 have completed scans (27 MCI, 18 mild AD, age 72±8 yrs, 60% female). 61% of MCI and 100% of AD were Aβ+ve so suitable for AD trials. Tau imaging showed 33% of MCI and 81% of mild AD had cortical tau. When considering both scans in the AD group: 80% were Aβ+ve/Tau+ve and 20% Aβ+ve/Tau-ve. In the MCI group: 34% were Aβ+ve/Tau+ve, 28% Aβ+ve/Tau-ve, 33% Aβ-veβTau-ve, and 1 subject (5%) was Aβ-ve/Tau+ve.

Conclusions: The pilot ADNeT trial screening program is an effective approach to boosting clinical trial recruitment and consequently has attracted financial support from international pharmaceutical companies. This program will be extended to support AD clinical trials across the nation.

DR DUNCAN SINCLAIR

Wicking Dementia Research and Education Centre

Using cultured human neuronal cells to understand hormonal stress responses in Alzheimer's disease

Dr Duncan Sinclair[1], Mr Adoni Fiotakis[1], Dr Jana Talbot[1], Emeritus Professor Alan Mackay-Sim[2], Dr Anthony Cook[1], Associate Professor Anna King[1]

[1]University of Tasmania, Hobart, Australia, [2]Griffith Institute for Drug Discovery, Griffith University, Nathan, Australia

Stress hormone levels are reported to be higher in people living with Alzheimer's disease, while people who are exposed to particularly traumatic events are at increased risk of the disease. This implicates stress hormone dysregulation and/or maladaptive responses to life stress in Alzheimer's disease pathogenesis. Unfortunately, the impacts of Alzheimer's disease processes on stress hormone signaling, and vice versa, have not been investigated experimentally in humans.

Mechanistic studies of stress hormone signaling in Alzheimer's disease have historically been difficult because the glucocorticoid receptor, which mediates cellular stress responses, differs in size, abundance and function across cell types, species and developmental ages. Experiments reveal that different glucocorticoid receptor variants are expressed in rodent versus human brain and that cultured fetal neurons express undetectable levels of the receptor. Despite abundant receptor expression, human embryonic kidney cells display limited sensitivity to stress hormones.

Therefore, we have developed experimental models using human cells of neural origin to study stress signaling in Alzheimer's disease. These are olfactory neurosphere cells and induced pluripotent stem cell-derived neurons. We describe the characterization and utility of these cells for studying hormone-induced receptor nuclear translocation, gene transcription and cell death. Experiments to investigate the influence of Alzheimer's disease-related processes on these parameters are also highlighted. Ongoing work may have profound impact on dementia intervention and treatment approaches. Only by determining how and why life stress plays a role in Alzheimer's disease can therapeutics be developed which buffer stress in individuals who have, or are at risk of, the disease.

MS JOANNA SUN

University of Wollongong

Characteristics of the built environment for people with dementia in nursing homes in Asia

Ms Joanna Sun[1], Professor Richard Fleming[1]

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BACKGROUND: This scoping review explores the characteristics of the current built environment used to accommodate people with dementia in East and Southeast Asia. It is structured around the eight principles of design found in the Environmental Audit Tool High-Care. In addition, the review examines the level of knowledge and other influences contributing to the development of nursing homes in the region.

METHODS: The review was carried out utilizing the methodological framework recommended by Arksey and O'Malley. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses provided an overarching structural framework for the reporting process and the Population, Intervention, Comparison, Outcomes, and Context framework defined the scope of the review and focused on the research question. Six databases were accessed for the search, and 1,846 publications between 2001 and 2015 were retrieved.

RESULTS: A total of 48 articles from 9 countries met the inclusion criteria. All articles presented discussions that fundamentally included at least one principle of design and with some including all principles. The most prevailing principle discussed, found in 59% of all the articles was the need for familiarity for residents in the environmental design of facilities.

CONCLUSIONS: The review found that the eight principles of design, when applied with cultural sensitivity in countries in East and Southeast Asia can identify gaps in knowledge of the design for dementia enabling environments and suggest areas for improvement. An assessment tool based on the principles of design will be able to provide a guide for stakeholders in the design, development, or modification of nursing home environments.

PROFESSOR JAMES VICKERS
Wicking Dementia Research and Education Centre

Neurofilament-immmunoreactive neuritic degeneration in the human hippocampal-entorhinal pathways

Dr Jessica M. Collins[1], Associate Professor Anna E. King[1], Professor James C. Vickers[1]

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There has been considerable recent interest in the presence of brain proteins such as neurofilaments (NFs) in the blood as a biomarker of neurodegeneration. NFs are abundantly present in a subset of neurons in the brain, and in Alzheimer's disease (AD) they are selectively vulnerable to degeneration and their accumulation in dystrophic neurites is an early neuronal change Associated with amyloid beta plaque formation. The current study sought to examine NF-immunoreactive neuritic degeneration in the human hippocampal-entorhinal pathways in ageing, AD and Chronic Traumatic Encephalopathy (CTE) using the SMI-32 antibody. SMI-32 labels non-phosphorylated NF heavy subunits which are normally located in the somatodendritic compartment of neurons. We identified a variety of NF-positive neuritic pathologies across aging, AD and CTE, including neurites with altered morphology, ring-like structures of varying sizes, spheroids, intensely labelled cell bodies, sprouting neurons and cell bodies with neurofibrillary tangle-like structures. SMI-32-positive neurites showed thickening, large swellings, bulbs and wiggly- and corkscrew-like morphologies. The white matter tracts of AD cases demonstrated extensive SMI-32-positive axonal pathology and the subiculum of CTE cases had numerous NF-positive ring structures and spheroids. These preliminary results suggest that these brain regions are susceptible to a broad range of age- trauma- and disease-related changes. Ongoing analysis will decipher where these pathological changes cluster and how they are related to AD pathology and degeneration. By understanding the role of NFs in neurodegeneration we may be able to inform approaches to biomarker analysis and therapeutic development to prevent the progression of AD and other neurodegenerative conditions.

DR JUANITA WESTBURY

Wicking Dementia Research and Education Centre

The impact of interactive nurse and care staff education on psychotropic medication knowledge

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[1]University of Tasmania, Hobart, Australia

Over half of aged care home (ACH) residents have dementia. The majority experience 'changed behaviour', including agitation, psychosis and insomnia. Although Professional guidelines endorse detailed assessment and non-pharmacological strategies first-line, many residents are prescribed psychotropic medication, particularly antipsychotics and benzodiazepines, despite modest effectiveness, alongside adverse effects such as falls and stroke. One of the drivers of inappropriate use is thought to be inadequate knowledge about these medications.

Aims: Using the validated 10-question Old Age Psychotropic (OAP) quiz we aimed to:

1. Ascertain staff psychotropic knowledge, and
2. Assess the impact of two educational sessions.

Method: The OAP quiz was taken by registered, enrolled nurses and care staff at 150 ACHs at the start of an educational session, then repeated at the end of the second session, 3-months later. Baseline quiz results were analysed to assess overall psychotropic knowledge. Quiz score differences between sessions were statistically assessed.

Results: The OAP quiz was completed by 1273 participants at baseline. More than half answered questions relating to side effects and guidelines incorrectly, whereas questions about indication were answered correctly by over 70%. Average psychotropic knowledge scores differed significantly between the three participant groups. 780 participants took the quiz again at the 3-month session. OAP quiz scores were significantly higher at the 3-month training than at baseline, with the average number of correct answers improving from 51% to 75%, demonstrating an increase in psychotropic knowledge. Scores significantly improved for all levels of aged care staff ($p<0.01$), with carer scores improving as much as enrolled nurses.

DR ADELE WOODHOUSE

University of Tasmania

Recapitulation of a juvenile-like histone landscape in aged neurons

Mr Andrew Phipps[1], Ms Katherine Giles[2], Associate Professor Timothy Mercer[3], Professor James Vickers[1], Associate Professor Mark Robinson[4], Dr Phillippa Taberlay[5], **Dr Adele Woodhouse[1]**

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The greatest risk factor for dementia is increasing age. During healthy aging the activity of neurons underlie a range of cognitive trajectories from unimpaired to significant decline. The epigenome is the interface between our genes and the environment and comprises a highly interactive network of chemical moieties (including histone modifications). The epigenetic signature of each cell type is unique, yet few studies have examined the epigenome in aged neurons. We characterised H3K27ac and H3K4me3 histone modifications using ChIP-seq in forebrain neurons from 3, 6, 12, and 24 month (m) old C57/Bl6 mice (n=5/timepoint). H3K27ac and H3K4me3 marking was enriched at promoters and enhancers in neurons from juvenile (3m) and aged (24m) mice compared to neurons from adult mice (6m&12m). Gene ontology (GO) analysis annotated to synaptic and core molecular processes across life. Developmental GOs were unique to juvenile neurons, while annotations that were unique to adult neurons included axonal transport, protein folding and membrane depolarisation. GO pathways that were unique to aged neurons included apoptosis, autophagy and RNA processing. Surprisingly, we detected a partial recapitulation of a juvenile-like histone landscape in aged

neurons; >25% of H3K27ac and H3K4me3 differentially marked sites were shared between juvenile and aged neurons and >87% of these shared sites were consistently enriched in both juvenile and aged neurons. This work reveals epigenetic alterations that impact neurons across aging. Our long-term goal is to identify the epigenetic changes that drive neuronal dynamics in healthy aging and dysfunction in dementia to discover direct and indirect therapeutic targets.

Living with dementia

MRS AZAM BAZOOBAND

Wicking Dementia Research and Education Centre

Scoping Review of the Effectiveness of Participatory-Arts in the Community for Older People with Dementia

Azam Bazooband[1], Dr Helen Courtney-Pratt[2], Dr Kathleen Doherty[3]

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Purpose of the study: Participatory community arts programs have been shown to contribute to overall health and wellbeing and community-based arts engagement has been identified as a promising way to enhance social inclusion by providing opportunities for older people to share their emotions and experiences with their communities by using art. This study aims to explore and describe existing literature on participatory art activities that are inclusive of older people with dementia. It considers the tools used by researchers to evaluate effectiveness in order to inform future research.

Design and Methods: The Methodological Framework (Arksey and O'Malley (2005) for undertaking a scoping review article of was applied to this study. 15027 titles, abstracts and extracted data were identified and systematically screened. Collation, summarizing and reporting the results was carried out taking into account the research questions and according to predetermined criteria.

Results: 25 articles were included in the scoping review having met inclusion criteria, and 65% were published after 2010.The studies used qualitative (24%), quantitative (56%), or mixed methods (20%). The most common art form examined was music (48%). Various types of assessment tools were employed to assess the outcomes and "quality of life questionnaire" was amongst the most used evaluation tools. Arts activities were conceptualized and operationalized in several different ways.

Conclusion: This scoping review article was undertaken to explore the existing literature and possible measurement tools for assessing the effectiveness of participatory arts activities in the community that are inclusive of people living with dementia. The present study establishes a framework for analysing the outcomes of arts activities for older people with dementia in the community through gathering several used measurement tools in previous studies; however, demands more effort in this field. The scoping study outcomes suggest that further work is needed to establish a framework of assessment tools. Such tools can then be used by researchers evaluating the effectiveness of community-based arts activities that are inclusive of people living with dementia and enable comparison across studies.

DR SUSANNE BECKER

Wicking Dementia Research and Education Centre

Generating Community Conversations about Dementia

Dr Susanne Becker[1], Dr Helen Courtney-Pratt[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

Stigma and fear can contribute to isolation of those living with dementia and may result in their subsequent invisibility in the community setting. Dementia cafés are one way to engage the community to support those living with dementia. Although dementia cafés are currently available in communities, their primary purpose has been to provide networking and support groups for carers and/or people living with dementia. This pilot project draws on the history and delivery of death cafés in order to discuss what might be considered a social taboo, talking about dementia. In this research, the intention of our community café was to open the conversation about dementia for all and included those with a diagnosis, those worried about receiving a dementia diagnosis, those interested in prevention or seeking further information, and those caring for someone living with the impact of dementia. Four cafés were held, with 29 of approximately 80 that attended, contributing free text feedback, via postcard, about the café indicating why they attended and what they hoped to achieve by attending, together with suggestions for improvement. The findings suggest that an informal café conversation style initiative may be a useful tool to enhance dementia friendly initiatives and encourage people to openly share experiences, thoughts, and questions. The café may assist with general community knowledge about dementia and support for those with a diagnosis, and their families and friends. Extending the traditional dementia café model may have an impact on reducing the stigma and fear experienced when living with dementia.

DR JAMIE BRYANT

University of Newcastle

Preferences for timing of discussions about Advance Care Planning: Findings from a survey with carers

Dr Jamie Bryant[1], Dr Elise Mansfield[1], Dr Emilie Cameron[1], Laureate Professor Robert Sanson-Fisher[1]

[1]Health Behaviour Research Collaborative, University of Newcastle, Hunter Medical Research Institute, Callaghan, Australia

Aims: To determine in a sample of carers of people with dementia: (1) preferences for timing of discussions about advance care planning (ACP) following a dementia diagnosis; and (2) the characteristics Associated with a preference for healthcare providers to decide the right time to initiate discussions about ACP.

Methods: Eligible carers who were a primary source of support to a person with dementia were identified from

geriatrician clinic and aged care provider records and mailed a pen/paper survey. Participants were presented with information about the benefits and consequences of early and late discussions about ACP, and asked when they thought would be the best time for a health care provider to raise ACP following a dementia diagnosis. Consenting participants returned their survey using a reply-paid envelope.

Results: To date, 83 carers have participated. Almost one third of carers thought that ACP should be discussed when a healthcare provider thought appropriate. Slightly fewer thought that ACP should be discussed at the time of receiving a diagnosis (23%) or in the first few weeks following a diagnosis (23%). No carers thought ACP should not be discussed by healthcare providers at all. Those who preferred healthcare providers to decide the appropriate time to initiate discussions about ACP were more likely to be younger (OR=0.93, P=0.014). There was no significant relationship with sex, education or time since diagnosis.

Conclusions: All carers believe ACP should be discussed by healthcare providers following a diagnosis of dementia However, there is variability in preferences for timing of discussion

DR JAMIE BRYANT

University of Newcastle

Participation in future planning by persons with dementia: Findings from a cross-sectional survey of carers.

Dr Jamie Bryant[1], Dr Elise Mansfield[1], Dr Emilie Cameron[1], Laureate Professor Robert Sanson-Fisher[1]

[1]Health Behaviour Research Collaborative, University of Newcastle, Hunter Medical Research Institute, Callaghan, Australia

Aims: To explore in a sample of carers of people diagnosed with dementia: (1) rates of completion of advance care directives (ACD), Wills and appointment of substitute decision-makers by the person they support; (2) with whom ACP has been discussed; and (3) willingness to use an online resource to engage in ACP.

Methods: Eligible carers who were a primary source of support to a person with dementia were identified from geriatrician clinic and aged care provider records and mailed a pen/paper survey. Participants completed questions regarding completion of various future planning documents by the person they support, including whether these were completed before or after receiving a dementia diagnosis, and the types of Professionals who discussed ACP with them following a dementia diagnosis. Consenting participants returned surveys using a reply-paid envelope.

Results: To date, 83 carers have participated. Almost all participants reported that the person they support had made a Will, appointed an Enduring Guardian, and appointed an Enduring Power of Attorney (98-99%). However only 54% had completed an ACD. Discussions about ACP had most commonly occurred with geriatricians (51%), followed by GPs (49%), within families (40%), with lawyers (36%) and with nurses (23%). While more than three quarters of participants had access to the internet, only 47% reported they would use an internet-based ACP resource.

Conclusions: Despite being at high risk of future decisional incapacity, almost half of people with dementia do not have written ACD. Online ACP tools may be accessed by some, but not all, carers.

ASSOCIATE PROFESSOR MICHELE CALLISAYA

University of Tasmania

Interventions to improve physical function in people with dementia: A review of the evidence

A/Professor Michele Callisaya[1, 4], Dr Susan Hunter[2], Professor Manuel Montero-Odasso[3]

[1]University Of Tasmania, Hobart, Australia, [2]School of Physiotherapy, University of Western Ontario, , London, Canada, [3]Schulich School of Medicine & Dentistry University of Western Ontario, , London, Canada, [4]Monash University, Frankston, Australia

Background: Research in the field of dementia has traditionally concentrated on cognitive function. More recently there has been recognition that mobility is worse, and falls are higher, in people with dementia. The aim of this symposium presentation will be to outline the evidence for exercise interventions to improve mobility and reduce falls in people living with dementia.

Methods: Published systematic reviews, meta-analyses and randomised controlled trials (RCT) that examined exercise interventions aimed to improve mobility and reduce falls in community-dwelling people living with dementia were included. Data extracted included exercise frequency, intensity, time and type (FITT); group versus home-based setting, adherence and outcomes.

Results: Ten RCT met the inclusion criteria. The studies extracted included different types of exercise, intensity, program frequency, and length and mode of delivery (group vs home). The majority of studies included only small sample sizes and inadequate description of the exercise intervention in terms of the FITT principles, progression and adherence. The presentation will outline that there is preliminary evidence that mobility can be improved, and falls can be prevented, with a home-based exercise program for people living with dementia. What can be learned from current trials for clinical practice and recommendations for future studies investigating the topic will be discussed.

Conclusions: Despite higher levels of mobility impairment and falls in people living with dementia, there are very few high-quality clinical trials examining the role of exercise interventions to improve such outcomes

DR SANETTA DU TOIT

University of Sydney

Considering best care options for older prisoners with dementia

Dr Sanetta Du Toit1

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Introduction: The increased number of older people with dementia ageing in prisons poses a significant challenge for

correctional services. Existing work practices fail to meet the specific needs of prisoners with dementia who are a vulnerable group within the broader prison population. Little is known about the best method of responding to the needs of this growing sub-population of prisoners and there is an urgent need to understand the challenges Associated with support of prisoners with dementia as well as identification of optimal models of care.

Method: A scoping review was conducted to explore the extent, range and nature of publications on best care practices for prisoners with dementia. Literature was accessed using online databases and searching reference lists. Data were charted and sorted deductively into key themes.

Results: Eight themes were identified that could support better care practices for prisoners with dementia: (i) early and continuous screening for prisoners aged 50 years and over; (ii) staff training; (iii) specialised services and (iv) activities or programs; (v) specialised units or (vi) adaptations to current contexts; (vii) training younger prisoners to assist older prisoners with dementia; and (viii) early release or parole for older prisoners with dementia deemed at low risk of re-offending.

Conclusion: One of the implications of the international ageing prison population is higher numbers of people incarcerated with dementia. The potential mechanisms for improvements to the way prison services support this population identified here can guide further research into optimal and cost-effective models of care.

DR CYNTHIA FORLINI

University of Sydney

A scoping review of consumer preferences for participating in dementia research

Dr Cynthia Forlini[1], Ms Shivana Chandra[2]

[1]Sydney Health Ethics, University of Sydney, Camperdown, Australia, [2]Brain and Mind Centre, University of Sydney, Camperdown, Australia

Background: Valuable translational research benefitting the health, care and quality of life of dementia patients and their caregivers (i.e. consumers) is being limited by ethical and legal concerns such as adequate consent from persons with dementia and accessibility of novel technologies. The first step in determining whether and how to change the policies and practices governing dementia research is to understand how consumers prefer to engage with research. This study reviewed existing empirical evidence that identifies the preferences of dementia consumers with respect to participation in research.

Method: The review adhered to the PRISMA-P protocol for scoping reviews. A comprehensive literature search was performed using EMBASE, MEDLINE PsycINFO and SCOPUS databases yielding 2048 papers (1718 after deduplication). To determine eligibility of papers for analysis, the sample was filtered by (1) title and abstract, and (2) full-text. 37 papers were deemed eligible for analysis.

Results: Eligible papers were analysed according to six key themes: (1) motivations for participating in research, (2) recruitment of participants, (3) risk tolerance, (4) informed consent process, (5) use of technology, and (6) data sharing. Studies focused on the motivations for research participation, risk tolerance and the provision of informed consent. Limited research has been conducted on preferences related to data sharing and integration of technology.

Conclusion: There are limited empirical studies describing consumer preferences regarding dementia research presenting diverging findings. Potential reform of dementia research policy and practice will require a more consistent evidence base for consideration by advocates, policymakers and government.

MS MADELEINE GARDAM

Monash University

Shining light on consumer and carer engagement to develop a dementia clinical quality registry.

Dr Elizabeth Pritchard[1], Dr Darshini Ayton[1], Ms Madeleine Gardam[1], Ms Sandra Robinson[1], Mr Kevyn Morris[4], Ms Barbara Kain[5], Dr Stephanie Ward[1], Professor John McNeil[1], Scientia Professor Henry Broadaty[2], Professor Elsdon Storey[1], Associate Professor Arul Earnest[1], Associate Professor Robyn Woods[1], Professor Mark Nelson[3], Professor Jane Banaszak-Holl[1], Professor Danny Liew[1], Dr Joanne Ryan[1], Associate Professor Susannah Ahern[1]

[1]Monash University, Melbourne, Australia, [2]University of New South Wales, Sydney, Australia, [3]University of Tasmania, Hobart, Australia, [4]Consumer Representative, Wodonga, Australia, [5]Carer Representative, Melbourne, Australia

The Australian Commission on Safety and Quality in Healthcare (ACSQHC) identified the establishment of a clinical quality registry (CQR) for dementia as a priority in December 2016. A CQR provides benefits to those living with dementia and their carers by improving the quality and experience of care through benchmarking and monitoring of care outcomes.

This modified DELPHI study aimed to develop a set of clinical quality indicators (CQIs) based on evidence, patient and caregiver experience and clinician perspectives across the trajectory of care from diagnosis to end-of-life for the pilot dementia CQR.

An initial list of indicators were compiled from existing dementia registries, academic literature, and clinical practice guidelines. These were further refined by a working group with clinical dementia expertise. A panel of experts was recruited including consumer, carer, clinicians, and academics. Three phases occurred 1) online survey for scoring importance and validity, 2) one-day face-to-face discussion, and 3) final survey round to assess importance, validity and feasibility.

Thirty-three CQIs were initially presented. Following the DELPHI process, 22 indicators were confirmed. These CQIs will be tested initially in memory clinics and inform the data collection processes of the Australia Dementia Network registry (ADNet).

A dementia CQR is fundamental to ongoing monitoring and development of good quality consistent care across Australia. Consumers and carers play a vital part of ascertaining the best possible indicators for collection and need to be included in these projects from the beginning.

MS MINAH AMOR GAVIOLA

University of Newcastle

Implementing individualised music listening intervention: experiences and impact on older people with dementia

Mrs Minah Amor Gaviola[1], Dr Sophie Dilworth[2], Professor Isabel Higgins[1], Associate Professor Elizabeth Holliday[3], Associate Professor Kerry Inder[1]

[1]School of Nursing and Midwifery, University of Newcastle, Callaghan, Australia, [2]Hunter Aged Care Assessment Team, Hunter New England Local Health District, Australia, [3]Hunter Medical Research Institute, New Lambton, Australia

Background: Evidence demonstrates the comparable efficacy of individualised music listening with other more resource intensive interventions in improving a number of outcomes for people with dementia (PWD) especially behavioural and psychological symptoms of dementia (BPSDs).

Aim: To evaluate the impact of individualised music on agitation, quality of life, (QoL), engagement, and psychotropic medication use.

Design: Parallel mixed methods using pre-test post-test design and qualitative interviews.

Methods: Thirty-two older PWD (mild to very severe stage) were recruited from two residential aged care facilities (RACF) in regional NSW. Staff and family/guardian were trained and implemented the intervention over a 3-month period.

Measurements: At baseline and at the end of the 3-month implementation, agitation, QoL, and psychotropic medication use were measured using the Cohen-Mansfield Agitation Inventory, Dementia Quality of Life Questionnaire, and medical records respectively. The Homecare Measure of Engagement Staff-Questionnaire was administered during each month of implementation. Qualitative interviews were conducted with staff and carer at the end of the implementation.

Results: Twenty-two PWD completed the implementation. There was a significant improvement in QoL (p=0.032). Agitation improved among participants from one RACF. No significant differences were noted in psychotropic medication use. The PWD's engagement during the intervention increased throughout the implementation period. Qualitative interviews revealed the intervention's impact on the PWD: memory evoking, mood –enhancing, and calming effect.

Conclusion: Findings of this study support the promising impact of individualised music listening as a simple and meaningful non-pharmacological intervention for older PWD. Further larger studies evaluating other outcomes beyond BPSDs are warranted.

MR TIMOTHY GIBBONS

Wicking Dementia Research and Education Centre

Online Dementia Education: Exploring non-completion

Mr Timothy Gibbons[1], Dr. Kathleen Doherty[1], Dr. Vlasti Broucek[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

The Understanding Dementia Massive Open Online course (UDMOOC) was designed to improve understanding and awareness of dementia across a broad cross section of participants. The UD MOOC has a consistently high completion rate; however, a substantive number of enrolees do not complete the course. Given the benefits of the UD MOOC on improving awareness and understanding of dementia across health providers, carers and the broader community, we wished to explore the reasons for non -completion in this cohort.

While the reasons for low completion rates in online education are multifactorial, through examining the underlying reasons why completion rates are frequently so low in similar courses, four key areas of motivation were identified; student factors, content, learning design and delivery. We wished to explore these four factors together with indicators of motivation, perceived effectiveness, self-efficacy and demographic parameters to more fully understand non-completion in the UD MOOC cohort.

Our study design was broken down into four phases: identification of a participant cohort defined by patterns of non-completion, development of an online survey for non-completers addressing their reasons from non-completion across the four factors, telephone interviews with a subsample to further explore reasons of non-completion and analysis of this data in the context of course engagement data derived from their enrolment and progression data.

By taking this approach, we were able to explore non-completion based on motivations and learning behaviours to better inform future iterations, for better translational knowledge of dementia education and direct tangible outcomes in the workforce.

ASSOCIATE PROFESSOR LYN GOLDBERG

Wicking Dementia Research and Education Centre

Aspiring to learn: The impact of education on dementia understanding and care

Associate Professor Lynette Goldberg[1], Ms Dianne Baldock[2], Dr Terry Cox[3], Dr Thi Hoang[3], Ms Andrea Price[1], Dr Merylin Cross[3]

[1]Wicking Dementia Research and Education Centre, University of Tasmania, Hobart, Australia, [2]Circular Head Aboriginal Corporation, Smithton, Australia, [3]Centre for Rural Health, University of Tasmania, Launceston, Australia

Our two-year Department of Health/Dementia and Aged Care Services (DACS) grant has enabled eight Aboriginal students to study in the online Bachelor of Dementia Care (BDC) program developed by the Wicking Dementia Research and Education Centre at the University of Tasmania. The students also undertook a face-to-face

TasTAFE Certificate III qualification in Individual Support (Ageing, Home, and Community) in the first year of the grant. The integration of the two education approaches included practical experiences with people with dementia in a residential aged care setting complemented by placements within the Aboriginal community at-large. This has equipped the students with a vocationally-based qualification, insight into dementia care, and a pathway to continue higher education.

The integrated TasTAFE/BDC project was developed to address a community need to have Aboriginal community members qualified to provide education about dementia and guide care for those living with dementia. The success of the project was measured objectively through (i) the students' completion of the TasTAFE Certificate, (ii) the number of BDC units attempted and passed, and (iii) students' pre- and post-project scores on the validated Dementia Knowledge Assessment Scale (DKAS). Descriptive data were obtained from thematic analyses of students' reflections across each semester and community/education stakeholder feedback.

All students completed the TasTAFE Certificate and are successfully completing units in the BDC. This presentation will detail their achievements and experiences in the two different forms of study and the impact of the dissemination and implementation of their learnings within the community. Unanticipated positive outcomes will be highlighted.

DR PAULINE MARSH

University of Tasmania

Communal garden sites as enablers for RACF residents living with dementia to enhance QOL

Dr Pauline Marsh[1], Ms Hannah Fielder[1], Dr Helen Courtney Pratt[1]

[1]University of Tasmania, Hobart, Australia

As we age in Australia we are less likely to do two things: garden and socialising with others. That older people are less likely than people from younger age groups to be physically active or socially connected [1, 2] is a concern, because both of these activities can be important to ensure we live a good quality of life. This is because there are well-established and wide-ranging therapeutic benefits that come from spending time in green spaces - be they gardens, parks or extreme wilderness [3-5] – and from participating in the gentle exercise of gardening [6]. The positive impacts on health and wellbeing from social connectivity are also well-established, especially amongst older people [7, 8]. The concern is made greater by the fact that older people in Australia who are most vulnerable to social isolation are also those who are least likely to spend time gardening, that is, people who are living in residential aged care facilities (RACF). In an undesirable double bind, RACF residents, an estimated 52% of whom are living with dementia, [17] find themselves frequently indoors and disconnected from others [9]. Academic literature documents widespread concerns about the prevalence of loneliness amongst people living in RACFs [10, 11].

This Roundtable discussion uses the example of a recent study conducted in the south of Tasmania involving residents of a rural RACF. We aimed to understand how residents, including people living with dementia, access communal garden sites and whether this fostered the acts of gardening and social engagement. The research arose from concerns raised by members of a supported community gardening program, DIGnity. For the first 6 months of this unique therapeutic horticulture program, residents from the local RACF were regularly coming down the street to the community garden, accompanied by a lifestyle coordinator. An initial program evaluation confirmed they greatly enjoy participating. However, when the program recommenced after a winter break the residents did not return. When the project team enquired as to why, they were told it was due to a lack of staff and lack of resident interest. At the same time, the RACF had established its own garden within the facility, and employed a carer to conduct gardening activities with residents.

Was this alternative, on-site RACF garden a more suitable site, or a less-than adequate solution designed to accommodate institutional restrictions?

Using a process consent method, 13 semi-structured interviews were held with residents, family members and staff. The interviews reveal the multi-faceted way in which residents relate to and access communal garden sites and the important ways that people living with dementia were able to maintain their identities as gardeners, improve their quality of life and assuage loneliness. Importantly, they enabled people to find meaning and maintain their sense of self. However, accessing the communal garden sites both in and outside of the facility was not straightforward. Many barriers were highlighted concerning resources, infrastructure, attitudes and abilities.

We will discuss the implications of this research, and learn from each other's experiences of living with dementia and accessing communal gardening sites

DR NURUNNAHER NURUNNAHER

Flinders University

A meta-synthesis on experiences of persons living with dementia from Muslim and CALD background

Dr Nurunnaher Nurunnaher[1], Professor Lily Xiao[1]

[1]Flinders University, Adelaide, Australia

Cultural and religious beliefs of people with dementia and their family have a profound influence on the use of dementia care. Little is known about how Muslim people from CALD background live with dementia in Australia and around the world.

The review to examine and synthesise the best available research evidence from qualitative studies on the perspectives and experiences of persons with dementia and their family care from a Muslim and CALD background in high-income countries.

Methods: Meta-ethnography of qualitative studies was applied to the review. Meta-synthesis approach was used to form research questions and review objectives, systematically search literature, critically review qualitative studies and synthesize findings.

In total articles met the inclusion and exclusion criteria and were included in the study. Among these, only 4 articles included persons with dementia as participants. Three

overarching major themes were identified. Persons with dementia perceived dementia condition as the loss of their identity and personhood. Experience of dementia condition is mostly negative as they experience forgetfulness, feelings of loss of sense of belongings, of significance and recognition, and feelings of loss of autonomy. Person with dementia adapted with changes through emotion-focused coping strategies such as denying, tricking, ignoring, and feeling upset.

Conclusion: Persons with dementia from a Muslim and CALD background have unique living experience in a foreign land that have specific care and service delivery needs.

DR THERESA SCOTT

UNIVERSITY OF QUEENSLAND

Beyond mobility: needs and experiences of people living with younger onset dementia and driving cessation

Dr Theresa Scott[1], Dr Jacki Liddle[1], Professor Louise Gustafsson[2], Professor Geoffrey Mitchell[1], Professor Nancy Pachana[1]

[1]The University Of Queensland, St Lucia, Australia, [2]Griffith University, Australia

Stopping driving impacts mobility, independence, and wellbeing of older people living with dementia, however little is known about the experiences of people living with younger onset dementia. The impact of driving cessation may be experienced differently for younger people diagnosed with dementia. This study aimed to understand the needs and experiences of people living with younger onset dementia (YoD) who are adjusting to life without driving. This study explored these experiences through interviews with people with YoD, their family members, and community support workers. Interviews with six people living with YoD, four care partners, and two health Professionals were recorded, transcribed verbatim and thematically analysed. Themes discovered went beyond mobility loss to include identity, role, social cohesion and self-worth; and financial and relationship strain; lack of appropriate available services and transport alternatives; and unfair and overly taxing driver safety assessments.

The findings from this study have application to translating a proven driving cessation intervention for older adults with dementia to meet the needs of younger people with dementia, and to the development of guidelines to support people living with younger onset dementia who are adjusting to life without driving.

DR MORAG TAYLOR

Neuroscience Research Australia

Daily-life walking speed in community-dwelling older people with dementia compared to age-sex matched controls

Dr Morag Taylor[1,2,3], Dr Kimberley van Schooten[1,4], Dr Matthew Brodie[1,5], A/Professor Kim Delbaere[1,4], Professor Jacqueline Close[1,3], Ms Narelle Payne[1], Ms Lyndell Webster[1], Ms Jessica Chow[1], Mr Garth McInerney[1], Professor Susan Kurrle[2], Professor Stephen Lord[1,4]

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Aims: Quantifying daily-life walking speed in people with dementia may help identify individuals at risk of negative health outcomes and highlight opportunities for targeted interventions. We compared daily-life walking speed and walking speed reserve (WSR) in older people with and without dementia.

Methods: Thirty-eight participants with mild-moderate dementia (age: mean±SD=82±6years; 45% female) and 76 age-sex matched controls (1:2) wore a waist-mounted tri-axial accelerometer (DynaPort MoveMonitor, McRoberts) for 7-days, which estimated daily-life walking speeds. Steady-state clinical walking speed was assessed at usual pace over 2.4 to 10.0m. WSR was calculated as proportion of clinical walking speed ([(maximal daily-life [95th percentile] −clinical) ÷clinical] ×100).

Results: Participants with dementia had slower clinical (p<0.001), habitual daily-life (p<0.001) and maximum daily-life (p=0.002) walking speeds compared to controls. Participants with dementia had a restricted range of daily-life walking speed compared to controls (mean±SD=0.78±0.17m/s vs. 0.89±0.19m/s; p=0.002). Clinical (mean±SD=1.20±0.24m/s) and habitual walking speed (mean±SD=0.85±0.16m/s) differed significantly in controls (p<0.001), but not in participants with dementia (median=0.78m/s IQR=0.66-0.98 vs. median=0.72m/s IQR=0.66-0.80; p=0.122). Clinical walking speed was slower than maximum daily-life walking speed in participants with dementia (mean±SD=1.09±0.20m/s; p<0.001) but not in controls (mean±SD=1.23±0.23m/s; p=0.233). In participants with dementia WSR was higher than controls (median=37% IQR=18-60 vs. 2% IQR=-9-16; p<0.001).

Conclusions: Compared to controls, participants with dementia had slower daily-life and clinically-assessed walking speeds and less diverse daily-life walking speeds. Clinical gait speed more closely resembled habitual walking speed in participants with dementia and maximum daily-life walking speed in controls. These findings have assessment, functional (e.g. crossing roads) and training/ treatment implications

Care

BOLA ADEBAYO

Curtin University

Dementia care experiences in migrant aged care workforce

Bola Adebayo[1]

[1]Curtin University WA, Perth, Australia

Background: In high-income countries, an increasing number of people living with dementia in residential

aged care facilities (RACFs) are being cared for by an increasingly multicultural workforce.

Method: A national online survey was conducted among migrant care workers (n= 302) employed in RACFs in Australian major cities. Pre-existing and validated questionnaires including the Dementia Knowledge Assessment Tool Version Two (DKAT-2); Riverside Acculturation Stress Inventory (RASI); the Depression, Anxiety and Stress Scales-21 (DASS-21) were used to investigate migrant care workers 1) knowledge of dementia; 2) experiences of dementia care in RACFs; 3) psychosocial well-being; and 4) working conditions.

Result: Most participants have a good knowledge of dementia and dementia care.

Conclusion: Migrant care workers are valuable contributors to the aged care workforce. It is important to consider their cultural perceptions of dementia in relation to care provision. Additionally, their exposure to occupational psychosocial risk factors in conjunction with the challenges Associated with resettlement and dementia care that may negatively affects their mental health needs to be addressed.

ASSOCIATE PROFESSOR SUSANNAH AHERN

Monash University

The ADNeT Dementia Clinical Quality Registry – a milestone in monitoring and improving dementia care

Associate Professor Susannah Ahern[1], Dr Stephanie Ward[2], Dr Elizabeth Pritchard[1], Dr Darshini Ayton[1], Ms Madeleine Gardam[1], Ms Sandra Robinson[1], Professor Jane Banaszak-Holl[1], Professor Henry Brodaty[2], Professor Perminder Sachdev[2], Professor John McNeil[1], Professor Christopher Rowe[3]

[1]Monash University, Melbourne, Australia, [2]University of New South Wales, Sydney, Australia, [3]Florey Institute, Melbourne, Australia

The Australian Dementia Network (ADNeT) Registry and Clinical Trials Program was established with funding from the National Health and Medical Research Council (NHMRC) in 2018. A key activity of ADNeT is to monitor patients with dementia to better understand disease trajectory and to monitor clinical care. This will be achieved through the establishment of a national clinical quality registry (CQR).

An ADNeT CQR Steering Committee comprising clinicians, epidemiologists, funders, patients and carers, and researchers will oversee the activities of the registry, and its integration with other components of the ADNeT program. The ADNeT CQR is refining a set of clinical indicators to benchmark clinical care and a minimum dataset, informed by the work undertaken by a Pilot Dementia Registry, funded by the NHMRC National Dementia Institute for Research.

The initial source of referrals to the CQR will be from Memory Clinics and specialists in Victoria and New South Wales. Once initial piloting is complete, data collection will rollout nationally, creating a comprehensive database of all patients being diagnosed with dementia and mild cognitive impairment.

Building on models from European dementia registries, ADNeT CQR will also systematically collect process and outcome measures from patients and their carers to better understand needs at different stages of the disease. This presentation will introduce the ADNeT CQR and provide an overview of the project in its first twelve months. The active involvement of patients and carers through the development of the CQR will be highlighted.

DR ANNIE BANBURY

Central Queensland University

The impact on dementia caregivers from co-designing a peer support group program delivered using videoconferencing

Dr Annie Banbury[1], Dr Louise Byrne[2], Associate Professor Sonja Pedell[3], Professor Lynne Parkinson[1]

[1]Central Queensland University, Rockhampton, Australia, [2]RMIT University, Melbourne, Australia, [3]Swinburne of Technology, Melbourne, Australia

The population of informal carers for people with dementia and the need to provide carers support will continue to increase. Carers support groups and programs are commonly delivered in-person thereby limiting opportunities for attendance by rural carers and those who have difficulty in leaving the person cared for. Most studies using technology for social support have employed text-based discussion boards or chat-rooms, few have used real-time interactions, such a group videoconferencing. Delivering a carers support program by group videoconferencing may mitigate barriers for accessing support.

A co-design group consisting of six carers of people with dementia, in a range of circumstances and locations, were recruited to guide the development of a carers support program designed specifically for group videoconferencing. Support was provided for participants to use their own devices to access eight meetings by group videoconferencing. The co-design process used the Double Diamond Model and encouraged participants to share their knowledge, experience and insights into caring. All meetings were recorded and thematic analysis identified key themes. During the meetings participants mapped their care journeys, identified problems and solutions and prioritised issues for inclusion in the final program. At each stage of the analysis themes were fed back to the group for discussion. The final program includes a list of eight discussion topics comprising key carers skills such as advocacy and navigating the health and social care system and issues for discussion such as care managing and developing support networks. Insights were gained in how to organise and run meetings.

PROFESSOR ELIZABETH BEATTIE

Queensland University of Technology

The DCRC Developing Capacity in Dementia Care Research (CBCR) Initiative: Launching the Vision

Professor Elizabeth Beattie[1], Professor Lindy Clemson[2], Dr Elaine Fielding[3], Dr Catherine Travers[3]

[1]Queensland University of Technology, Brisbane, Australia, [2]University of Sydney, Sydney, Australia, [3]Dementia Centre for Research Collaboration, Brisbane, Australia

Background: Dementia care research capacity in nursing and allied health disciplines is at crisis point in Australia. Immediate investment to build capacity in disciplines fundamental to the provision of optimal care to people living with dementia and carers is essential to ensure care research flourishes.

Aim: To establish a tailored mentoring and skills development program for early-mid career researchers in nursing and allied health disciplines to: 1) expand the cadre of competitive researchers in care research, and 2) assist them to build robust independent research programs and join interdisciplinary teams.

Methods: An Expert Advisory Group including leading dementia care researchers informed program development. A rapid review of successful programs in relevant disciplines informed the mentoring strategy. Following extensive advertising and a careful selection process, including review by an independent panel, Fellows were selected.

Fellows' training and developmental needs were assessed using interviews and evaluation tasks, and an individualised program devised for each. Fellows were matched with one or more suitable mentors based on their research foci and needs. Mentors undertook online training in preparation for their role. High-level Sponsors from large teams were approached to facilitate team placement of Fellows.

A rigorous evaluation of impact and outcomes including Fellow engagement, productivity, achievements, mentor experiences and program costs is in progress.

Discussion: Program interest was high, indicating sector need. CBCR Fellows represent the breadth of dementia care research. Program challenges include availability of suitable mentors and sponsors, Fellow time to undertake program activities and limited funding to support activities

MS ANNALIESE BLAIR

Southern NSW Local Health District

Untangling complex relationships between organisations, staff and quality of dementia care and quality of life

Dr Katrina Anderson[1, 2], Ms Annaliese Blair[1, 2], Ms Jennifer Henderson[2]

[1]Aged Care Evaluation Unit, SNSWLHD, Queanbeyan, Australia, [2]Cognitive Decline Partnership Centre, Sydney, Australia

With the commencement of the Royal Commission into aged care, public debate continues about why some aged care homes provide excellent care while others provide poor care. One thing is clear - that residential aged care staff are at the centre of many recommendations. They can, after all be the most important people in a resident's social world.

The current mixed method, longitudinal study aimed to narrow down the most useful targets for intervening with staff to improve quality of life and quality of care for residents with dementia.

Participants: Older adults in residential care with dementia (n=251), their families/care partners (n=225), managers (n=12) and staff (n=228) of 12 residential aged care facilities were followed over 3 waves (baseline, 6 months and 10 months). Facilities ranged in size from 10 to 137 beds and were located from remote to metropolitan areas of NSW/ACT.

Methods: Surveys, interviews, file audits and live observations. Live observations of residents and care staff during care interactions were undertaken in order to rate the quality of the care provided and the effects of care on residents' quality of life. Organisational audits provided information on system variables including staff ratios, rostering practices and training.

Results will be presented with a focus on which aspects of residential care staff experience, practice, belief, policy or deployment it would be profitable to target in interventions aimed at improving the way care is carried out and, as a consequence, improving the lives of people with dementia in residential aged care.

MR JAY BORCHARD

Wicking Dementia Research and Education Centre

Predicting Completion of the Understanding Dementia Massive Open Online Course

Mr Jay Borchard[1], Dr Kathleen Doherty[1], Mr Aidan Bindoff[1], Professor Fran McInerney[1]

[1]Wicking Dementia Research & Education Centre, University of Tasmania, Hobart, Australia

Background: The Wicking Dementia Research and Education Centre developed the Understanding Dementia Massive Open Online Course (UD-MOOC) in response to the need for evidence-based dementia education for both family carers and health Professionals. While MOOCs allow for a more flexible approach to learning than traditional forms of education, completion rates are typically less than 10%. Completion rates for the UDMOOC have been consistently high since its inception, thus the current study aims to investigate key predictors of UD-MOOC completion.

Methods: Participants enrolled in a free 9-week online course focusing on dementia pathophysiology, symptoms, diagnoses, management, perspectives of those living with dementia and impacts on caregivers. UD-MOOC completion was defined as passing the final quiz with a grade of 70%.

Results: 50,276 participants enrolled in a UD-MOOC between 2014 – 2017. Of these, 42% completed the course. A generalised linear mixed model was used to examine

predictors of UD-MOOC completion. It was found that education, sector of occupation, and carer category were significantly predictive, where the predicted probability of completion was greatest for those holding a university degree, working in a hospital setting in a Professional carer capacity at ~ 50% (95% CI: 46 – 54%).

Conclusions: Despite low reported rates of MOOC completion generally, UD-MOOC completion rates are consistently high. This may be explained in part by the demographic profile of MOOC participants, and relevance of content to their employment. Qualitative research into the motivating factors underpinning enrolment and completion will further elucidate this.

DR MONICA CATIONS

Flinders University

Agents of Change: establishing Quality Improvement Collaboratives to improve adherence to Clinical Guidelines for dementia

Dr Monica Cations[1,2], Professor Maria Crotty[1,2], Professor Susan Kurrle[2,3], Professor Jana Anneke Fitzgerald[2,4], Professor Ian Cameron[2,3], Associate Professor Craig Whitehead[1,2], Dr Jane Thompson, Associate Professor Billingsley Kaambwa[1], Ms Gorjana Radisic[1,2], Ms Lenore de la Perelle[1,2], Dr Kate Laver[1,2]

[1]Flinders University, Adelaide, Australia, [2]Cognitive Decline Partnership Centre, University of Sydney, Sydney, Australia, [3]University of Sydney, Sydney, Australia, [4]Griffith Business School, Gold Coast, Australia

Background: The quality of dementia care in Australia is largely dependent on the clinician involved and the extent to which they apply best available evidence in their practice. Programs focused on promoting independence for people with dementia are effective and favored by advocacy groups but not routinely implemented.

Objective: To assess the efficacy of Quality Improvement Collaboratives (QICs) to improve adherence to key recommendations from the Clinical Practice Guidelines for Dementia in Australia.

Method: Clinicians from across Australia were invited to join the three QICs to build their capacity in leading quality improvement projects within dementia care. Clinicians participated in a training program and were supported to enact a quality improvement plan unique to their service context using plan-do-study-act cycles. Monthly consultation summaries were judged for guideline adherence according to standardised criteria, and intervention effectiveness was examined using segmented regression analysis. Implementation outcomes were assessed with inbuilt process evaluation.

Results: Thirty-seven clinicians participated in the project including physicians, nurses, occupational therapists, social workers, physiotherapists, health services professionals, and dieticians. Pre-intervention data from 939 consultations with people with dementia and/or informal carers demonstrated full guideline adherence in 24% of cases, while partial adherence was common (72% of cases). Preliminary post-intervention data suggests a positive impact of the intervention on guideline adherence. Process evaluation identified key barriers to guideline adherence including restrictive policies (for example, where funding is provided only to service the person with dementia and not their carer) and a lack of consultation with clients with dementia before making decisions.

DR TONY COOK

Wicking Dementia Research and Education Centre

Dementia Education for Undergraduate Students

Dr Anthony Cook[1], Associate Professor Alison Canty[1], Professor Fran McInerney[1], Professor James Vickers[1]

[1]Wicking Dementia Research and Education Centre, University Of Tasmania, Hobart, Australia

The Wicking Dementia Research and Education Centre at the University of Tasmania has established a world first Bachelor of Dementia Care (BDemCare) in response to urgent national and international calls to build capacity for dementia care. This fully online, evidence-based program opens opportunities for education to those previously unable to access it, and attracts significant numbers of non-traditional students. The program is front loaded with foundation level skill-building units, and then diverges into 2 majors in understanding dementia and models of care. Commencing in 2012, the course has grown to over 1500 students actively studying at any point in the year. To date, 817 students across Australia have graduated with a Diploma (531), Associate Degree (135) or Bachelor of Dementia Care (151). Surveys of BDemCare students (1236 students, 871 [70%] responses) reveal that 98% of students reside in Australia, 93% are female, and 83% are over 41 years of age. 83% of students work either full-time (47%) or part-time (53%), with 67% having a direct care role for a person living with dementia. Qualitative and quantitative student feedback indicates the BDemCare program provides a supportive online learning environment that provides relevant dementia education, aligned with the NHMRC Dementia Priorities, and which is directly impacting on the care practices of current students and graduates. This program has won awards at both State and National levels for innovative educational design and delivery that enhances learning. The success of this program has led to a suite of postgraduate dementia education programs being developed.

DR HELEN COURTNEY-PRATT

Wicking Dementia Research and Education Centre

Barriers and Enablers to the provision of leisure to people with dementia: An Exploratory Study

Mrs Sharon Stoddart[1], Dr Helen Courtney-Pratt, Dr Sharon Andrews

[1]Thompson Health Care, Terrey Hills, Australia, [2]University of Tasmania, Hobart, Australia

Engaging in leisure pursuits provides a constellation of benefits for the person living with dementia, including improved quality of life (QoL). However, there is a lack of leisure provision for people with dementia who live in residential aged care facilities (RACFs). There has been little research conducted previously in this area that examines the reasons for this phenomenon, from the perspective of personal care attendants (PCAs) with the responsibility for leisure provision.

This research study explored barriers and enablers to the provision of leisure activities to people living with dementia in RACFs.

Using a qualitative exploratory descriptive methodology to frame the research, data was collected from participants in four focus groups.

Findings show that a low staff to resident ratio, high workload and the propensity of staff to prioritise clinical care were barriers to leisure provision.

Secondly, resident characteristics that impact on the provision of leisure in the form of reduced functional capabilities, behavioural and psychological symptoms of dementia (BPSDs), and declined mobility also reduced residents' opportunities for leisure.

Thirdly, leisure provision was influenced by the physical environment in the RACF and the social environment among staff and residents, alongside the support of the manager.

Fourthly, staff knowledge and skills also had an impact on leisure provision for residents with dementia.

Finally, it was found that volunteering was found to improve leisure provision in RACFs.

As leisure has been strongly linked to QoL, there is a need to address barriers, and support staff to provide leisure activities for residents with dementia.

MRS SARAH CRESP

Monash University

The Experiences of Substitute Decision Makers Supporting People with Advanced Dementia: A qualitative systematic review

Mrs Sarah Cresp[1], Associate Professor Susan Lee[1], Associate Professor Cheryle Moss[1]

[1]School of Nursing and Midwifery, Monash University, Frankston, Australia

Background: Substitute decision makers (SDMs) play an important part in making health-care decisions for people with dementia at the end of life (EOL). SDMs report support, physical, and psychological concerns from their role. This systematic review sought to describe the experiences and effects of this role.

Methodology: An apriority protocol using the Joanna Briggs approach was peer reviewed and published. A thorough search of published and unpublished studies from 2007-2017, in English language was undertaken. Three authors engaged in critical appraisal and data extraction. Meta-aggregation of 20 themes into 8 categories, resulted in 5 synthesized findings.

Results:

1 The cultivation of trust in healthcare Professionals positively influences substitute decision-making;
2 Guilt, mistrust and confusion surfaced when faced with medical, care, and social complexities;
3 Translating quality of life to their context whilst navigating EOL decisions was problematic;
4 Negotiating families' practical needs presented a challenge to successfully fulfil their role; and
5 Uncertainty and reactivity resulted from poor understanding of dementia, communication concerns, and ambivalence around advance care plans and EOL care.

Implications: The experience of being a SDM for person with dementia at EOL is complex. No research was found on the education and support needs of SDMs. This significant research area addresses the fifth research priority by the National Health and Medical Research Council, National Institute for Dementia Research. A consumer focus and involvement is pivotal in translating this research into the development of tools and strategies that may be used to meet SDMs' education and support needs.

MS LENORE DE LA PERRELLE

Flinders University

Valuing Expert Experience: involving people with dementia and care partners in Agents of Change research

de la Perrelle, L.[1,2], Cations, M[1,2], Crotty, M[1,2], Kurrle, S[2,3] Fitzgerald, A[2,4], Cameron, I[2,3], Whitehead, C[1,2], Thompson, J[2], Kaambwa, B[1], Radisic, G[1,2], Laver, K[1,2]

[1] Flinders University, Adelaide, Australia, [2] NHMRC Cognitive Decline Partnership Centre, Sydney, Australia, [3] University of Sydney, Sydney, Australia, [4] Griffith University, Brisbane, Australia

Background: The Agents of Change translational research project has been designed to involve people living with dementia, care partners and members of the public at all levels in the research. This involvement is expected to benefit the design of the intervention, the conduct of the research and the success of the implementation of clinical guidelines. The costs of the involvement of the public in research is often seen as a barrier, but not quantified.

Objectives: This process evaluation will quantify the value that involvement of people with lived experience of dementia and care partners adds to a translational research project.

Methods: Semi-structured interviews with 30 research participant clinicians will provide information about the value of consumer feedback to clinician quality improvement plans. Semi-structured interviews and focus groups with 3 expert advisors who live with dementia and 4 care partners will be conducted to ascertain what they contributed to the research and how they viewed their participation. Themes elicited within the interviews, examples of contributions and influences on participants will be synthesised. Cost-benefit analysis will be conducted to examine the costs of involvement relative to the benefits identified. The benefits are monetised through a willingness to pay discrete choice experiment.

Results: Clinicians spoke of the unique opportunity to have members of the public providing feedback on their projects as they implement changes to practice. Members of the public were interested to hear how their contributions made tangible differences to the project. Experience: involving people with dementia and care partners in Agents of Change research.

MS LENORE DE LA PERRELLE

Flinders University

Cost effectiveness of Quality Improvement Collaboratives in translational health research: a systematic review

de la Perrelle, L.[1,2], Cations, M[1,2], Crotty, M[1,2], Kurrle, S[2,3] Fitzgerald, A[2,4], Cameron, I[2,3], Whitehead, C[1,2], Thompson, J[2], Kaambwa, B[1], Radisic, G[1,2], Laver, K[1,2]

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Background: Quality Improvement Collaboratives have been used as a strategy for clinicians to share learning and collaborate on healthcare quality improvement. They have the potential to spread innovations, increase the speed of knowledge translation and create learning networks. However, they are resource intensive and little is known on their cost effectiveness.

The aim of this systematic review was to determine the cost-effectiveness of quality improvement collaboratives as a strategy to implement clinical guidelines in healthcare.

Methods: MEDLINE, CINAHL, PsycINFO, Econolit, ProQuest (Health & Medicine, Social Sciences) and grey literature were searched for studies reporting an economic evaluation of a quality improvement collaborative in a healthcare setting. Economic evaluations were included if they calculated cost-minimisation, cost-effectiveness, cost-utility or cost-benefit approach.

Results: 3740 titles and abstracts were screened and 128 full text articles were reviewed. Included studies were conducted in 6 countries and commonly in the areas of surgery, nursing and medical improvements. Only a small number of studies presented data regarding cost-effectiveness and results were mixed. Few examples of cost effectiveness were found to meet the CHEERS reporting standard indicating the need for assessment of cost effectiveness for QICs if they are to be used effectively in healthcare improvement.

DR NADEEKA DISSANAYAKA

University of Queensland

Residential Aged Care Staff, Same Same Only Different: Insight into staff attitudes towards entering RAC

Miss Nicole Walker[1, 2], Dr Theresa Scott[2], Professor Nancy Pachana[2], Dr Nadeeka Dissanayaka[1, 2, 3]

[1]UQCCR, Faculty of Medicine, University Of Queensland, Herston, Brisbane, Australia, [2]School of Psychology, University of Queensland, St Lucia, Brisbane , Australia, [3]Royal Brisbane & Women's Hospital, Herston, Brisbane, Australia

Objectives: This research investigates and evaluates attitudes of people working in residential aged care (RAC) towards entering RAC in the future themselves. It aims to investigate whether education about dementia, older people and RAC is Associated with the extent to which people report positive or negative attitudes towards entering RAC in the future themselves. Finally if mediating factors such as losses of independence, trust and perceptions of RAC workers were Associated with attitudes towards entering RAC.

Results: Analyses revealed that loss of independence was the only mediating variable that predicted variance in levels of resistance to enter RAC in future, therefore the variables trust and perceptions of RAC staff were eliminated. Further it was found that both occupational status and educational level had no direct Association with levels of resistance. Finally, confidence and knowledge were compared in educational levels (total years of education) and there were no significant differences between those with or without university education. The analysis revealed that independence was significantly associated with resistance towards entering RAC. That is, despite education levels or position held, levels of mild and extreme refusal were significant through the variable of independence. The perceived losses of independence once you enter RAC revealed heightened resistance.

Discussion: Largely, the results suggest that despite total years of education and knowledge of people with dementia and RAC, this in itself is not adequate to diminish negative evaluations of living in RAC. This key information in formulating future models of care.

DR KATHLEEN DOHERTY

Wicking Dementia Research and Education Centre

The Understanding Dementia MOOC improves carers' and nurses' knowledge of dementia

Dr Kathleen Doherty[1], Dr. Maree Farrow[1], Mr Aidan Bindoff[1], Professor James Vickers[1], Professor Fran McInerney[1]

[1]Wicking Dementia Research and Education Centre, Hobart, Australia

The Understanding Dementia Massive Open Online course (UDMOOC) was developed by the Wicking Centre in response to the need for improved understanding and awareness of dementia broadly across the community. The UDMOOC has been undertaken by a varied cross section of participants, with a significant proportion employed in the delivery of care to people living with dementia.

We collated data on a cohort of 1770 Australian UDMOOC participants whose work sector was identified as either community or residential aged care (RAC). From survey responses we examined their motivation for commencing the UDMOOC, interaction with course elements, and knowledge of dementia before and after course completion using the Dementia Knowledge Assessment Scale.

All groups overwhelmingly indicated a desire to improve their knowledge of dementia and deliver better care for people living with dementia as motivating factors. Course engagement patterns were similar however, the probability of completing the course was higher for nurses than carers and was positively associated with commencing knowledge score for carers. Commencing scores of both nurses (37.8 +/-7.5) and carers (33.7 +/-8.3) in the RAC sector were higher than nurses (35.3 +/- 8.3) and carers (31.7 +/-9.0) in the community sector. For all groups, knowledge of dementia significantly increased on completion of the course (community: nurses +9.9, carers

+9.7 and RAC: nurses +5.8, carers +7.0).

This study demonstrates that the UDMOOC engages nurses and carers in both the community and RAC sectors and leads to an improved knowledge base on which to deliver better care.

ASSOCIATE PROFESSOR BRIONY DOW

National Ageing Research Institute

What do home care workers need to know to effectively support people living with dementia?

Associate Professor Briony Dow[1], Dr Meg Polacsek[1], Mr Brendan Hallam[1], Professor Colleen Doyle[1], Emeritus Professor David Ames[2], Dr Margaret Winbolt[3], Dr Steven Savvas[1], Dr Sue Malta[2], Professor Philip Clarke[2], Dr Anita Panayiotou[1], Professor Claudia Cooper[4], Professor Gill Livingston[4], Professor Constantine Lyketsos[5], Dr Frances Batchelor[1], Mr Jason Burton[6], Associate Professor Lee-Fay Low[7], Associate Professor Samuel Scherer[8], Dr Samantha Loi[9], Dr Luke Gahan[1], Ms Ellen Gaffy[3], Mrs Anne Fairhall[10], Dr Anita M Y Goh[1]

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Many older people want to remain in their own homes as they age, including when they have received a diagnosis of dementia. As their symptoms progress, formal support is often provided by home care workers. The quality of home care they provide directly influences the person's life quality and ability to remain independent. However, providing home care is uniquely challenging and many home-care workers have limited dementia specialist training and knowledge. The NNIDR-funded study Promoting Independence Through quality Care at Home (PITCH) project aims to fill this gap by co-designing and testing a new evidence-based training program that enables home care workers to provide care that promotes independence, improves quality of life, and recognises the lived experience of dementia. The project involves co-designing and evaluating a training program for home care workers, and evaluating it through a randomised controlled trial. In the co-design phase, 10 home care workers, 5 home care service managers and 5 case managers participated in qualitative interviews, and 38 participated in co-design workshops to share their experiences. Themes from the data relate to dementia knowledge, the importance of collaborating with family carers, effective communication and rapport, and the importance of maintaining safety in the home. Improved processes were needed to enable appropriate support, particularly concerning the stage or progression of dementia. The need for improved training, work conditions and overall recognition were highlighted. The implications of these findings will be discussed, reflecting home care Professionals' views on how to create a skilled, knowledgeable and empathic workforce.

DR SANETTA DU TOIT

University of Sydney

Care settings as micro-communities- Time to focus on a collective approach

Dr Sanetta Du Toit[1]

[1]University of Sydney, Lidcombe, Australia

The right to access and engage in what a person considers to be meaningful is termed occupational justice. Despite culture change and resident-directed care initiatives, residents (especially those living with advanced dementia) in care settings are still prone to experience disengagement and isolation. It appears as if best efforts amount to a state of occupational 'disownment' – engagement dependent on the initiative of others. Staff education and various approaches to address 'challenging behaviours' contribute to an attitude where staff view situations to find a quick 'fix', so that they can carry on with care tasks. These dementia care approaches have impacted on the definition and interpretation of meaningful engagement and need closer consideration. This presentation will critically consider meaningful engagement Associated with advanced dementia care. As the wellbeing of older people with dementia is closely connected to the quality of their doing and belonging, care facilities needs to be considered as micro-communities – i.e. a place where independence and interdependence is part of a continuum. Factors for facilitating a community, where all living and working in the specific social habitat, are contributors to everyone's wellbeing, will be highlighted. This presentation will specifically explore the use assessment tools, recently included in feasibility studies to promote co-occupation and shared doing for collective settings. Proposed key considerations include environmental adaptations; creating occupational spaces; and upskilling staff to promote citizenship, agency and self-determination for residents.

DR LIZ EVANS

3DN, University of New South Wales

Can research guide integrated care for people with intellectual disability who develop dementia?

Dr Liz Evans[1], Ms Rebecca Daly[1], Professor Julian Trollor[1]

[1]Department of Developmental Disability Neuropsychiatry, UNSW, Sydney, Australia

Background: People with intellectual disability (ID) are living longer than previously. People with ID experience substantially increased dementia risk, especially those with Down syndrome. As many people with ID already receive disability supports, those who develop dementia face a unique challenge of accessing dementia supports and integrating these with disability supports. Family caregivers also face challenges: they may no longer be able to meet their relative's needs, and new dementia specific supports may be required. This review aims to examine local and international literature on care models for people with ID and dementia, to identify strategies to promote integrated care.

Methods: As part of an environmental scan, an integrative literature review was conducted. Medline, PsycINFO, and

Embase were searched using a range of MeSH headings and keyword Boolean operators. Both quantitative and qualitative research was reviewed. Articles were selected if they included a focus on existing access to care, or improved provision of care, for people with ID living with dementia.

Results: Themes highlighted included complexity of diagnosis contributing to delays accessing care; incongruence of design in aged care and disability care; reduced access to planned healthcare, including end-of-life care planning; and the potential benefits of staff training, case managers and multidisciplinary approaches.

Conclusions: Research suggests that dementia care pathways in Australia are difficult to navigate for people with ID. Emerging international research points to potential improvements to service provision for people with ID and dementia, which could inform Australian healthcare policy and practice and guide future research

DR ELAINE FIELDING

Queensland University of Technology

Building dementia care research capacity: Using a rapid literature review to inform a mentoring program

Dr Elaine Fielding[1], Dr Catherine Travers[1], Dr Diane Collins[1], Professor Elizabeth Beattie[1]

[1]Dementia Centre for Research Collaboration, Queensland University Of Technology, Kelvin Grove, Australia

Aim: The aim was to identify the key characteristics of successful dyadic research mentoring programs for nurses and allied health researchers to inform the Dementia Centre for Research Collaboration's (DCRC) Flagship program to build dementia research capacity in this group.

Methods: A rapid review of the literature was undertaken, with four databases (CINAHL, ERIC, MEDLINE, PsycINFO) systematically searched for English language articles published between 2008 and 2018. Additional articles were identified through hand searching retrieved articles but grey literature was excluded. Articles were included for review if the paper (a) described a formal dyadic mentoring program (i.e. involving a mentor and a mentee) for (b) nurse or allied health researchers. Key elements of the programs were summarised and synthesised.

Results: Fifteen papers were included in the review. Factors identified as being important for a successful mentoring program including (a) appropriate mentor-mentee matching, (b) preparation of both participants for program involvement, (c) establishing clear goals and participant expectations, and (d) having more than one mentor per mentee.

Discussion: Few published studies of mentoring programs for nurse and allied health researchers were identified, as research mentoring programs for these disciplines appear to be relatively new. Reported results from these studies, however, concur with the findings of mentoring programs from other disciplines (such as medicine) that mentoring results in positive outcomes and the identified key program elements are critical for success.

Conclusions: These findings will inform the development of the DCRC's mentorship program for emerging researchers in dementia care which commenced this year.

DR AMANDA FOX

Queensland University of Technology

Functional decline and predictors of adverse events for people with and without dementia during hospitalisation

Dr Amanda Fox[1], Dr Margaret MacAndrew[1], Ms Katy Wyles[1], Professor Elizabeth Beattie[2]

[1]Queensland University of Technology, Brisbane, Australia, [2]Dementia Centre for Research Collaboration, Brisbane, Australia

People with dementia experience greater physical functional decline, require more constant observation and are at higher risk of complications whilst in hospital. To explore these factors, this research has examined functional decline and the predictors of adverse events for people with and without dementia during hospitalisation. A retrospective chart audit of patients with (n=120) and without (n=120) a diagnosis of dementia, admitted to a regional hospital in 2017 was conducted. Level of physical function on admission and discharge, primary diagnosis, frequency/duration of constant patient observation, allied health treatment/s and adverse events (fall, medication error, wound, and hospital acquired infection/incontinence) were recorded. There were significant differences in physical function between patients with and without dementia on admission and discharge. Patients with dementia were more dependent with mobility, hygiene and feeding, and were more likely to be confused and incontinent. Regardless of dementia status there was no significant variation in physical function of each group from admission to discharge. Patients with dementia were significantly more likely to require constant patient observation (OR=25.286) and/or experience an adverse event (OR=6.000). The most common adverse event experienced was wound. In addition to having dementia, being male and having orthopaedic surgery contributed to the likelihood of experiencing an adverse event. Hospitalisation for people living with dementia is more likely to involve negative outcomes and understanding these needs will assist in developing models of care that promote optimal health outcomes.

ASSOCIATE PROFESSOR BELINDA GOODENOUGH

Dementia Training Australia

Joining the Pipelines: Readiness for Knowledge Translation (R4KT) protocol

Associate Professor Belinda Goodenough[1,7,8], Dr Travis Sztainert[2], Professor Aimee Spector[3], Dr Rachel Davis[4], Ms Kim Burns[5,8], Dr Margaret MacAndrew[5,9], Ms Lidan Zheng[5,8], Ms Jennifer Thompson[6,10]

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The Australian dementia research investment has increased. Outputs from recent boosts to capacity building are adding to existing local inventories of completed projects. An emergent challenge surrounds maximising benefits from this cumulative research effort on an appropriate scale. One priority direction of impact is national workforce training. With a goal of joining the pipelines between generators and implementers of evidence, a knowledge translation work program has been established between Dementia Training Australia (DTA) and the NHMRC National Institute for Dementia Research (NNIDR). The first deliverable is a protocol to assist in curating evidence, and triage into products and activities suited to workforce training. The Readiness for Knowledge Translation (R4KT) protocol has been developed. As a checklist driven tool, it assists in the review of research outputs in three main domains: quality, relevance, and usability. Scores on these domains produce a readiness indicator (not ready, has potential, ready for translation). R4KT items are informed by other checklists and international advisory on indices for end-of-grant implementation readiness. R4KT also includes a stakeholder-specific 'quick screen' to enable fast-track of knowledge products which may meet the strategic objectives of DTA in the area of salutogenic principles of care. The R4KT protocol is now in prototype form and being piloted on projects from the Dementia Centre for Research Collaboration and the Cognitive Decline Partnership Centre. It is anticipated that R4KT will be made available to help researchers self-assess and flag outputs to DTA for consideration as potentially ready for dissemination and implementation in workforce training.

DR MEREDITH GRESHAM

HammondCare

Special Dementia Care Programmes: 10 years' experience

Dr Meredith Gresham[1], Dr Thyuen Truong[1], Dr Natalie Plant[1], Mr John Nadjarian[1], Dr Catriona Lorang[1], Ms Angie Bennett[1], A/ Professor Colm Cunningham[1]

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A small proportion of people living with dementia will develop very severe and persistent behavioural and psychological symptoms of dementia (BPSD) that cause significant distress for themselves, their families, health and aged care staff. As well, severe BPSD provides challenges for systems of health and aged care to provide appropriate long-term accommodation and care. In November 2018 The Australian Government announced the development of 35, 8-12 place Special Dementia Care Programs (SDCP), across Australia. SDCPs are designed to offer intensive care and support programs within aged care homes, through provision of enhanced staffing ratios, greater staff knowledge and skill levels, more intensive intervention and linkages with geriatric and aged care psychiatry services. Support to transition to mainstream aged care will be provided when strategies to manage behaviours are established.

HammondCare established a NSW Health-Aged Care partnership SDCP in November 2007 following a RANZCP Faculty of Psychiatry of Old Age report on the accommodation and management of this group. Comprising an 8-place, 9-bed Special Care Unit, known as 'Linden' and a supported transition-out program, this SDCP has accommodated 77 residents over the first 10-years of operation. This presentation will provide a description of SDCP service elements, a profile of residents' demographic, behavioural and care requirement characteristics and changes over time, derived from a retrospective file audit, and discuss emerging data that may identify which people with severe BPSD may benefit most from this type of service and support development of new services.

DR MEREDITH GRESHAM

HammondCare

Best practice pain management in residential aged care: A participatory action research study

Dr Meredith Gresham[1], Dr Raj Anand[1], Associate Professor Colm Cunningham[1]

[1]Hammondcare, Sydney, Australia

As people living with dementia become less able to effectively verbally communicate their pain or pain related needs (Pautex et al. 2006), there is an increased risk of the pain going undetected and under treated. Preliminary research into pain management for people with dementia in residential aged care (Intervene Phase 1) revealed limited and inconsistent use of formal pain assessment tools and issues of communication between staff as barriers to evidence-based pain management. The Intervene Phase 2 project which ran from 2016 to 2018 was devised to address these key barriers. Dementia Centre researchers co-developed strategies with Multi-Disciplinary Teams (MDTs) at four residential aged care sites to target staff behaviours and foster a pain vigilant culture. Underpinned by theoretical frameworks of participatory action research and the COM-B (Capabilty, Opportunity, Motivation – Behaviour) model, the project recognised the staff as the experts at their local sites and first response caregivers for the residents; and allowed the MDTs to solve local issues that are of concern to them. Findings demonstrate an increase in staff involvement, documentation of pain episodes and the use of formal pain assessment tools as a result of the interventions introduced by MDTs. A synthesis of the findings has informed the development of the 'MDT pain management model', a resource which other residential aged care services can refer to when considering improving their pain management practices.

DR SUNNY JANG

Wicking Dementia Research and Education Centre

Discussion of university-community collaboration for engaging CALD communities in dementia care education and research

Dr Sun Hee (Sunny) Jang[1], Dr Hoang Nguyen[1], Dr Kathleen Doherty[1], Dr Helen Courtney-Pratt[1], Ms Fiona Rees[2]

[1]University of Tasmania, Hobart, Australia, [2]Migrant Resource Centre, Hobart, Australia

Dementia is a growing public health concern world-wide. The prevalence of dementia is increasing due to the ageing of the population. In Australia, the impact of dementia is predicted to be significantly high and highly complex. Australia is a rich multicultural society where one in three Australians aged 65 or over was born outside Australia, and many of them do not speak English as their first language. A considerable body of research reported that

culturally and linguistically diverse (CALD) communities often do not accept dementia as a medical condition and some CALD communities are disadvantaged due to stigma. As a result, CALD communities may not access or receive services and care that is available to them.

According to the Aged Care Act 1997, older people with CALD backgrounds are considered as "people with special needs". The Australian Government have prompted "building capacity for the emerging aged care needs of CALD communities" (Ageing and Aged Care, 2015) as one of the key research areas the Department of Health. In contemporary care practice, there is gathering momentum for listening to the authentic voice of people with dementia, with growing recognition that people with dementia can, and want to, speak for themselves. This is exemplified by the phrase "Nothing about us, without us". However, there is a lack of the participation of CALD people with dementia in the discussions around this condition. University-community collaboration is a potential and powerful way to improve the current situation and to provide opportunities for their engagement, hence better care for people from CALD backgrounds living with dementia and their care givers.

The purpose of this roundtable discussion, through engagement with a wider community, is to identify opportunities, challenges and strategies for university-community collaboration for engaging CALD communities in dementia care education and research.

The discussion topics included in the roundtable will be:

- approaches and priorities to support people from CALD backgrounds living with dementia, and their care givers
- past and current collaborative projects for people from CALD backgrounds living with dementia and their care givers
- identified challenges and issues emerging from suchcross-sector collaboration
- effective strategies for successful university-community collaboration
- potential benefits and opportunities for university-community collaboration for dementia care education and research

This round table will provide an opportunity for people involved in working with or for CALD communities to discuss their shared interest in improving care practices for people from CALD backgrounds living with dementia.

Ageing and Aged Care. (August, 2015). Building capacity for the emerging aged care needs of culturally and linguistically diverse communities. Retrieved from **https://agedcare.health.gov.au/overview/advice-to-the-aged-care-industry/building-capacity-for-the-emerging-aged-care-needs-of-culturally-and-linguistically-diverse-communities**

DR LISA KALISCH ELLETT

University of South Australia

Use of health and support services by people living with dementia in the community

Dr Lisa Kalisch Ellett[1], Associate Professor Nicole Pratt[1], Dr Tuan Nguyen[1], Professor Elizabeth Roughead[1]

[1]University of South Australia, Adelaide, Australia

Background: Providing appropriate health care and supports to people with dementia living in the community and their carers can delay the time to aged care admission or ill health

Aims: To characterise access to and use of healthcare and support services by people with dementia in the community.

Methods: We conducted a retrospective analysis of the Australian Government Department of Veterans' Affairs administrative claims data for people with dementia who were living in the community on 30-June-2017. We identified demographics, comorbidities, healthcare and support service use over the one year period 1-July-2016 to 30-June-2017.

Results: 10,171 community dwelling people with dementia were included. They had a median age of 89 years, 60% were female and 63% lived in a major city. They had a median of 96 visits to six different types of healthcare providers in the one-year period. 98% visited the GP and 99% had medicines dispensed at a pharmacy. Although 82% saw a specialist, only 19% saw a geriatrician. Only 31% received a dose administration aid and 19% received a home medicines review. Less than half had claims for occupational therapist services (48%), community nursing (48%), physiotherapists (41%) or dentist visits (33%). Only 58% received home care supports.

Conclusions: Many people living with dementia in the community do not access all of the healthcare or support services available to them. Ensuring that people with dementia and their carers are supported to live in the community setting for as long as possible is important

DR CINDY KOK

Hammondcare

Evaluation of resident engagement pre and post relocation from a traditional nursing home to cottages

Dr Cindy Kok[1], Ms Meredith Gresham[1], Ms Sabrina Chao[1], Dr Tom Morris[1], Professor Chris Poulos[1], Professor Colm Cunningham[1]

[1]Hammondcare, Greenwich, Australia

Introduction: Community standards and changes to regulatory requirements for the built environment has increased the number of old, frail and cognitive impaired residents being relocated to new buildings. Relocation is frequently associated with negative outcomes including increased confusion, falls and risk of death.

Aim: To describe a range of variables affecting aged care residents with dementia and to monitor behaviours of concern during a relocation from a traditional facility to new purpose built dementia cottages.

Methods: This study is a pre-post observational study of residents transferring from the HammondCare Nursing Home Caulfield to dementia specific cottages. The unique cottage design is home-like and the environment is clustered around a village. Residents scheduled for relocation are eligible if they are permanent residents, have been at the nursing home for longer than three months and are not receiving active end-of-life care.

Observational & Engagement study: The observer will watch each resident at different times of the day and score the resident as either positively, negatively or not engaged. Data is summarised to reflect the percentage of observations the resident was engaged, negatively engaged or not engaged.

Additionally, the observer will mark the location and behaviour of each resident, staff member and visitor on an architectural map of the facility. Staff are recorded as doing tasks that are interactive with the residents, doing something not interactive or off task.

Conclusion: The outputs of this work will inform how practice concerning relocation of this vulnerable group of people may be improved.

PROFESSOR SUSAN KURRLE

Cognitive Decline Partnership Centre

What is good quality care for people with dementia?

Professor Susan Kurrle[1], Ms Jennifer Thompson[1], Ms Sally Grosvenor[1]

[1]Cognitive Decline Partnership Centre, University Of Sydney, Hornsby, Australia

Understanding what good quality care looks like is a focus of the current Royal Commission into Aged Care Safety and Quality[1], and essential to the quality of life for people living with dementia[2]. This presentation will outline how Cognitive Decline Partnership Centre research outcomes are driving practice change in community, residential and hospital settings through translation of research that improve care for people living with dementia.

The "Clinical Practice Guidelines and Principles of Care for People with Dementia'[3] have brought significant change in understanding and application of good quality care. Containing 109 recommendations, these Guidelines are influencing clinical practice, directing government funding initiatives, supporting staff training programs, and informing health and aged care services.

"Supported Decision-Making in Aged Care: A Policy Development Guideline for Aged Care Providers in Australia"[4] is a tool to assist aged care providers in ensuring residents are involved in decisions that impact their lives. Referenced in the new Aged Care Quality Standards, the guide includes a self-assessment audit tool and principles for policy development. In-house training workshops using this resource are being run for aged care staff across most States and territories in Australia.

The Care of Confused Hospitalised Older Persons (CHOPs) program developed the "Key Principles for Care of Confused Hospitalised Older Persons"[5]. The program has been implemented and is being maintained across at least 12 hospitals across multiple States, and the CHOPS seven principles of care have underpinned interstate and international hospital dementia and delirium initiatives.

1 Commonwealth of Australia. 2019. **https://agedcare.royalcommission.gov.au/Pages/default.aspx**

2 Bird et al. 2016. Do interventions with staff in long-term residential facilities improve quality of care or quality for life people with dementia? A systematic review of the evidence. International Psychogeriatrics. 28:12 p1937-1963

3 http://sydney.edu.au/medicine/cdpc/documents/resources/Dementia-Guideline-Recommendations-WEB-version.pdf

4 http://sydney.edu.au/medicine/cdpc/documents/resources/SDM_PolicyGuidelines_FA_V2_Digital.pdf

5 https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0006/249171/CHOPS-key-principles1-2-web.pdf

DR KATE LAVER

Flinders University

Implementing an evidence-based program for Australian people with dementia and their families within existing services

Dr Kate Laver[1,2], Professor Lindy Clemson[2,3], Professor Yun-Hee Jeon[3], Associate Professor Tracy Comans[2,4], Dr Justin Scanlan[3], Ms Miia Rahja[1,2], Ms Jennifer Culph[2,3], Associate Professor Lee-Fay Low[3], Ms Sally Day[2,3], Dr Monica Cations[1], Professor Maria Crotty[1,2], Professor Susan Kurrle[2,3], Associate Professor Catherine Piersol[5], Professor Laura Gitlin[6]

[1]Flinders University, Adelaide , Australia, [2]NHMRC Partnership Centre for Dealing with Cognitive and Related Functional Decline in Older People, Sydney, Australia, [3]University of Sydney, Sydney, Australia, [4]The University of Queensland, Brisbane, Australia, [5]Thomas Jefferson University, Philadelphia, USA, [6]Drexel University, Philadelphia, USA

Aims: The aim of this research was to implement the "COPE" program within existing services in New South Wales and South Australia and evaluate implementation strategies and service and client outcomes.

Methods: In this mixed methods study, the intervention (a structured program provided by occupational therapists and nurses) was implemented in government, non-government and private settings. Implementation strategies included: education (workshops and coaching), process restructure (with an expectation for clinicians to provide data on completed cases), and quality management (reminders, fidelity checking). Qualitative data from interviews with clinicians and managers and quantitative data measuring client outcomes were used to understand the process of adoption and replicability of the program in improving outcomes for program recipients. Families who received the program were interviewed to determine the impact of, and their experience with, the program.

Results: Thirty eight occupational therapists and 17 nurses from 13 organisations were trained and provided with support to implement. A total of 78 dyads have completed

the program (as of February 2019). Preliminary results indicate it was possible to implement the program within existing services and clients who received the program provided positive feedback. Preliminary analysis of data (n=53) showed that 62% of carers reported that their ability to manage day to day caregiving had improved somewhat or improved a lot following intervention despite functional decline.

Conclusions: Implementing evidence-based dementia care programs within existing services is possible but work is needed to upskill clinicians, provide them with tools and resources and provide tailored implementation support.

DR EMMA LEA

Wicking Dementia Research and Education Centre

Link between aged care home staff dementia knowledge and experiences caring for people with dementia

Dr Emma Lea[1], Ms Kim Page[1], Ms Liz Neville[1], Professor Andrew Robinson[1], Dr Kathleen Doherty[1]

[1]Wicking Dementia Research and Education Centre, University of Tasmania, Hobart, Australia

Working with people living with dementia in residential aged care can be challenging, which is exacerbated by low levels of dementia knowledge. This study investigated the relationship between aged care home staff knowledge of dementia and strain in caring for people with dementia. A cross-sectional survey was conducted in 2017 in three southern Australian aged care homes. Ninety-six staff (53% of staff on shift over a 24-hour period) participated, including nurses, care workers and hospitality staff (i.e. those involved directly and indirectly in care). The questionnaire contained the Dementia Knowledge Assessment Scale and Strain in Dementia Care Scale. Bivariate analyses examined the relationships between scales, subscales and individual item scores. Dementia knowledge was found to be moderate (32.6/50) and strain in dementia care low (4.03/16). A positive relationship was found between dementia knowledge and strain in dementia care - i.e. the higher the knowledge, the higher the strain - particularly with regards to feeling that residents were not receiving appropriate care. The overall relationship between knowledge and strain was weak in staff in direct compared to non-direct care roles. The findings suggest aged care home staff have gaps in their dementia knowledge, but more comprehensive knowledge is also associated with higher strain in the context of perceived lapses in care quality. Further investigation is required on the impact of role on this relationship. However, it may be that employment of a whole-of-organisation approach to increasing dementia knowledge among as many staff as possible is important to minimise strain on individuals.

DR MARGARET MACANDREW

Queensland University of Technology

The development and preliminary testing of the Safe Walking Assessment and Planning (SWAP) tool

Dr Margaret MacAndrew[1]

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Despite the known life threatening outcomes associated with dementia-related wandering (exhaustion, malnutrition/dehydration, getting lost, injury), in clinical practice there are currently no validated tools to assess the risks related to wandering and few evidence-based care planning resources available. The *Safe Walking Assessment and Planning* (SWAP) tool, a newly developed tool, has the potential to a) identify risks Associated with the type and intensity of walking, b) provide care planning advice for each identified risk and c) collect vital personal information about the person with dementia to assist with a search if needed. The SWAP tool items were generated from a review of current research evidence and two consultation rounds with an expert panel (N=11; n=3 family carers, n=3 nurses, n=5 dementia researchers). The original 35 items reviewed in Round 1 were reduced to 13 in Round 2 with consensus the items were relevant and acceptable across all care settings, accurately measured risk Associated with wandering, and provided appropriate care planning recommendations. Preliminary testing of the resultant SWAP tool with potential end users (N=5; n=3 nurses; n=2 family carers) demonstrated consensus that the tool is easy to use, applicable to all care settings, and that the care advice provided is useful. Nurse users expressed concern that adding the SWAP tool to their already extensive suite of assessments would create additional burden. The practical application of the tool to guide individual care planning was seen as a positive attribute. Psychometric testing of the modified SWAP tool is now in progress.

PROFESSOR FRAN MCINERNEY

Wicking Dementia Research and Education Centre

The Dementia Literacy Assessment Model - a measure of consumer dementia knowledge and care access

Professor Fran McInerney[1], Dr Claire Eccleston[1], Mr Aidan Bindoff[1], Mr Ron Mason[1], Dr Hoang Nguyen[1], Mrs Laura Tierney[1], Professor Andrew Robinson[1], Professor James Vickers[1], Dr Kathleen Doherty[1]

[1]Wicking Dementia Research & Education Centre, University of Tasmania, Hobart, Australia

Health literacy is defined as "the skills, knowledge, motivation and capacity of a person to access, understand, appraise and apply information to make effective decisions about health and health care and take appropriate action" (Australian Commission on Safety and Quality in Health Care (ACSQHC), 2014). In dementia, this includes the ability to recognise and understand causes, sources and utility of relevant information, knowledge of and access to professional help, and the capacity to take appropriate decisions and actions, either as a person living

with dementia, or else with or for that person. Poor health literacy has been proposed as a major barrier to help-seeking behaviour, timely diagnosis, risk reduction, and effective coping strategies (Noble et al., 2015). These are of particular relevance to the major public health issue that is dementia.

We report here on the development of a tool to measure consumer access to dementia care and support, the Consumer Access Survey – Dementia (CAS-Dem) which, together with our Dementia Knowledge Assessment Scale ((DKAS), Annear et al., 2015) forms the Dementia Literacy Assessment Model (DLAM). Items were generated from analysis of more than 150,000 consenting participant forum texts from our 2014-2016 Understanding Dementia Massive Open Online Course (UDMOOC) and consideration of existing health literacy instruments. The first iteration was trialled with July 2018 UDMOOC participants and subsequently revised and administered to the February 2019 UDMOOC cohort. Participants expressed particular needs around seeking a dementia diagnosis, obtaining community support, and navigating the aged care system.

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DR TUAN ANH NGUYEN

University of South Australia

A systematic review of pharmacist interventions in dementia management

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Background: Use of medications in people with dementia (PWD) or cognitive impairment (CI) is challenging. As medication experts, pharmacists have an important role in improving care of this vulnerable population.

Objective: Systematically review evidence for the effectiveness of pharmacist-led interventions on quality use of medicines, quality of life, and health outcomes of PWD or CI.

Methods: A systematic review was conducted using MEDLINE, EMBASE, PsycINFO, Allied and Complementary Medicine, and CINAHL databases from conception to 20 March 2017. Full articles published in English were included. Data were synthesised using a narrative approach.

Results: Nine studies were eligible for inclusion. All studies were from high-income countries and assessed pharmacist-led medication management services. There was great variability in the content and focus of services described and outcomes reported. Pharmacists were found to provide a number of cognitive services including medication reconciliation, medication review, medication adherence services and proactive adverse reaction monitoring. These services were generally effective with regards to improving quality use of medicines and health outcomes for PWD and their caregivers, and for saving costs to the healthcare system. Pharmacist-led medication and dementia consultation services may also improve caregiver understanding of dementia and the different aspects of pharmacotherapy, thus improving medication adherence.

Conclusion: Emerging evidence suggests that pharmacist-led medication management services for PWD may improve outcomes. Future research should confirm these findings using more robust study designs and explore additional roles that pharmacists could undertake in the pursuit of supporting PWD or CI.

DR TUAN ANH NGUYEN

University of South Australia

Toward Vietnam's national dementia plan – the first step of action

Dr Tuan Anh Nguyen[1], Dr Thu Ha Dang[1], Professor Thang Pham[2], Associate/Professor Tuan Le Pham[3], Professor Ladson Hinton[4], Professor Maria Crotty[5], Professor Susan Kurrle[6], Professor Libby Roughead[1]

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Problem Dementia is an emerging public health problem in Vietnam requiring a whole-of-government, multi-sectoral and multi-stakeholder public policy response through the development of a national dementia plan. Lack of dementia awareness among national dementia stakeholders, however, is an important gap that needs addressing. **Approach** In September 2018, the Ministry of Health of Vietnam together with Vietnam National Geriatric Hospital, University of South Australia, University of California Davis, and Australian NHMRC Cognitive Decline Partnership Centre organised the first Vietnam National Dementia Conference to foster national dialogue on addressing the problem of dementia in Vietnam. We also provided two training workshops on dementia and geriatric competencies for family medicine for Vietnamese health professionals. **Local setting** In 2015, 660000 Vietnamese people were estimated to live with dementia, incurring a total dementia cost of US$ 960 million. The number of people living with dementia in Vietnam is predicted to increase to 1.2 million in 2030 and 2.4 million in 2050.

Relevant changes Over 270 representatives of Vietnam national dementia stakeholders and international dementia experts participated in the Conference. The participants agreed on dementia as a public health priority and the need for the development of Vietnam's national dementia plan. The subsequent training workshops were well received by 120 lead health Professionals across the country with evidence of immediate pre-post training changes in dementia knowledge. **Lessons learnt** International support and engagement of a consortium of key national dementia stakeholders is critical in advocating for the development of Vietnam's national dementia plan.

PROFESSOR LYNNE PARKINSON

Central Queensland University

Caring for carers of people with dementia project: reducing social isolation and increasing social networks

Central Queensland University Lynne Parkinson[1], Dr Annie Banbury[2,4], Mrs Anne Livingstone[3], Professor Denise Wood[4], Dr Steven Gordon[5], Dr Biplob Ray[6]

[1]Central Queensland University, Gladstone, Australia, [2]Prevention First, Kingscliff, Australia, [3]Global Community Resourcing , Brisbane, Australia, [4]Central Queensland University, Rockhampton, Australia, [5]Central Queensland University, Cairns, Australia, [6]Central Queensland University, Melbourne, Australia

Background: In rural Australia, knowledge and utilisation of support by informal carers is not optimal. Multiple factors affect the experience of carers during caregiving, and the success of transitioning through the post-care period. During the caregiving period, socioemotional support from family and friends plays an important role in sustaining caregiving activities. Post-care, strong social networks facilitate adjustment to role change and dealing with grief. The primary objective of this project is to examine the response of isolated rural carers for people with dementia to a 6-week videoconferencing peer support and information program.

Methods: A repeated measures, randomized wait list trial was evaluated with on-line surveys at baseline, Week 8, Week 15, and Week 26. Twenty 20 groups of 6 carers were recruited, from May 2018 to June 2019. Social networks are assessed using a social network analysis tool for Egocentric mapping. Social isolation is measured using the short form UCLA Loneliness Scale (ULS-6), which is appropriate for use among older adults. Effect of the videoconferencing program is assessed across these measures.

Result: Baseline Preliminary results (n=15) found that this was a socially isolated group of people (ULS6 Median 20.00 [IQR 15.00, 22.00] with support networks concentrated on close family.

DR LYN PHILLIPSON

University of Wollongong

What happened to Respite? Shining the light on policy reforms and their impact on carers

Dr Lyn Phillipson[1], Mrs Val Fell

[1]University of Wollongong, University of Wollongong, Wollongong, Australia

Providing a range of respite options for people with dementia and their carers has traditionally been considered a core aspect of a well-functioning aged and disability care systems. In an ideal context, supporting informal carers and people with dementia to age in place involves providing access to a broad range of support including flexible respite services in a variety of settings. Policy and program reforms in Australia are significantly transforming the aged and disability care service sectors, towards a more individualised, consumer directed and market based approach to service delivery. In the context of this fundamental re-design of these systems, what has happened to respite for carers?

In this paper, we will present the results from a content analysis of new national programs to shine a light on how planned and emergency respite have been included in new and continuing national programs including: the Home Care Support Program, Home Care Packages, Commonwealth Care Respite Centres; the Carers Gateway and Integrated Care Plan and the National Disability Insurance Scheme. We will also reflect on the results from over a decade of collaboration on local respite research and advocacy in the Illawarra (NSW) highlighting the insights this has provided to address the challenges facing people with dementia and their carers who identify the need for respite.

This paper provides a timely analysis of the interface between new and continuing national aged, carer and disability programs and their capacity to support access to flexible respite. Results highlight the need for a more integrated approach to respite policy development and service provision to support people with dementia and their carers. It also highlights the value of academic and community partnership in research to promote community impact and benefit.

DR CRAIG SINCLAIR

University of New South Wales

Health professional judgements regarding decision-making involvement among people living with dementia

Dr Craig Sinclair[1]

[1]University of New South Wales, Sydney, Australia

Background: A key aspect of living well with dementia is maintaining involvement in decision-making, including receiving support when required. This factorial survey study investigated Professional judgements about the involvement of a person with dementia in a healthcare or lifestyle decision, through the use of hypothetical vignettes, to better understand the factors influencing these participant judgements.

Methods: Australian health Professionals and aged care workers who involved in dementia care were invited to participate in an online survey. Participants were asked to make separate judgements about the ability of a hypothetical person with dementia to make the decision independently, or be 'meaningfully involved' in the decision. Vignette characteristics were pseudo-randomised, and included decision type, person's age, person's gender, severity of the person's cognitive impairment, type of support person, availability of support person and decision urgency. Demographic variables collected from participants included age, gender, Professional discipline, work setting, knowledge regarding dementia and attitudes towards dementia. Multi-level logistic regression modelled key factors contributing to the participant's judgement.

Results: 140 participants completed the survey. Participants judged that the person was able to make the decision independently in 54% of cases and could be 'meaningfully involved' in 87% of cases, with significant variation between participants (intraclass correlation = 0.50). Regression analyses indicated that decision type, severity of cognitive impairment, availability of a support person, Professional discipline and work setting were Associated with Professional judgements.

Discussion: These findings have implications for future interventions aimed at enabling Professionals to take person-centred approaches to dementia care.

MS JENNIFER THOMPSON

Cognitive Decline Partnership Centre - University of Sydney

Cognitive Decline Partnership Centre: partnerships impacting care for people with dementia

Ms Jennifer Thompson[1,2], Ms Lyntara Quirke[3], A/Professor Gaynor Parfitt[4], Ms Megan Corlis[5], Ms Wendy Hudson[6], Ms Sally Grosvenor[1,2], Dr Shannon McDermott[1,2], Ms Alexandra Kitching[1,2], Dr Meredith Gresham[7], Professor Susan Kurrle[1,2]

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The Cognitive Decline Partnership Centre (CDPC) at University of Sydney is an Australian Government and industry funded national research centre with a vision, to positively impact care for people with dementia through researchers engaging in partnership with consumers, industry and government. The CDPC works alongside the NNIDR, and this presentation will demonstrate the CDPC's successful co-creation model through four voices representing; management, aged-care industry partners, consumers, and researchers. Speakers will share individual and group experiences and lessons from their participation across the thirty-two CDPC projects.

The CDPC's collaborative processes have facilitated identification of unmet needs, and research priorities for improving care for people with cognitive and related functional decline in Australia. The Centre worked broadly across eight contexts of care for people with dementia: service model options; pathways and navigation; planning for later life; attitude and culture; clinical guidelines development; functional decline; medication management; and workforce development and education.

Research was funded under a contributory partnership model, with research teams expected to include consumers ie. people with dementia and/or their carers, and industry representatives, across all stages of the research cycle from protocol development to final reporting. Project teams were also expected to include implementation into policy or practice within their scope of work and as a result, research outcomes, outputs, and interventions were collaboratively developed by the researchers, consumers, industry, policy leaders, and health Professionals. This approach is enabling implementation of research-informed systems change, policy change, and attitude change, to impact care for people with dementia in Australia.

MRS LAURA TIERNEY

Wicking Dementia Research and Education Centre

Activity opportunities and participation among older adults living with dementia in residential aged care facilities

Mrs Laura Tierney[1], Dr Elaine Fielding[1], Professor Elizabeth Beattie[1]

[1]Queensland University of Technology, Kelvin Grove, Australia

Introduction: People living with dementia in residential aged care facilities (RACFs) have reported that participation in activities is important for their experience of a good quality of life (QoL) with idleness contributing to frustration and poor QoL. There is limited understanding of differences in resident activity participation in relation to varying levels of impairments or health status or across different types of RACFs.

Method: This national cross-sectional study explored QoL of RACF residents with dementia. Data was collected on facility and resident characteristics including their activity opportunities and frequency of participation as measured by the Activity and Affect Indicators of Quality of Life instrument. Hierarchical multiple linear regression models predicted what factors were Associated with resident activity.

Results: Across Australia, 396 residents from 53 RACFs participated in the study. Residents had the opportunity to participate in an average of eight of the 15 specified activities with a mean frequency of participation score of ten out of 30. In the final activity opportunity model, more severe cognitive impairment and depression, poorer nutritional status, more frequent incontinence and aggressive agitated behaviour and not exhibiting non-aggressive verbal behaviour were Associated with fewer opportunities. In the final participation model, cognitive impairment, pain and depression had negative effects on activity while non-aggressive verbal behaviour had a positive effect. No facility or resident demographic characteristics were significant variables in either model.

Conclusion: These findings contribute to understanding activity opportunities and participation among people living with dementia in RACFs with implications for care in this context.

DR KAREN WATSON

University of Technology Sydney

Nurse perception of influencing factors that support and build dementia research capacity in aged care

Dr Karen Watson[1], Professor Deborah Hatcher[2], Dr Anthony Good[3]

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Purpose: Nurses caring for people with dementia are often best positioned to advise on research feasibility in dementia care settings, regardless, their voices are often absent from the research process. This study explores nurse attitudes towards research, particularly the influencing factors that promote and sustain nurse participation in research in the residential aged care facility (RACF) setting.

Methods: Semi-structured interviews were conducted at six aged care facility sites in Sydney with dementia care nursing staff (n=10) before and after participation in a randomised controlled trial on their ward. The interview questions were constructed from limitations in the literature; they explored the nurse perception of the importance of research involving people with dementia and factors that influence nurse participation in research conducted in the RACF setting.

Results: Nurses reported dementia research conducted in RACF settings to be important (90%). The barriers to nurse participation included insufficient time (50%) lack of belief in the intervention effect (30%), deficits in research knowledge (40%) or support (30%). Research perceived as practical (40%) that could be implemented unobtrusively in the dementia care setting (60%), provided tailored education (70%) with effective communication between researcher and nurse (50%) was reported as favourable for nurse participation.

Conclusion: Nurses recognise dementia research to be vital to improving care for people with dementia although challenging to conduct in the RACF setting. Strategies that support nurse research time away from clinical duties, improve access to research education and foster communication between academic and nurse can improve nurse participation in dementia research.

DR CHRISTINE WHILE

La Trobe University

Supporting the inclusion of people with dementia through person-centred research principles to achieve research impact

Dr Christine While[1], Dr Margaret Winbolt[1], Emeritus Professor Rhonda Nay[1]

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The use of person-centred approaches supports research impact when the key stakeholders are people living with dementia. Conventional research methods are not user friendly for people experiencing cognitive changes that impact on language, memory and self-evaluation (Hyden, Swarbrick, Johnson, & Keady, 2017).

This presentation will describe the pathway to research impact in a recently completed PhD study. The research aim was to establish how the construct and meaning of home for the person with dementia is affected by the presence of the community service provider. Strategies to support the inclusion of people living with dementia were vital to increase community service providers' awareness of the consumer experience and promote uptake of research findings.

An early consideration in planning this study was a suitable method to answer the research question whilst having the flexibility to enact person-centred principles in the research setting. This included an inclusionary consent process, simplified participant information, adaptations to the data collection method and the building of a research relationship.

Person-centredness in thinking, research design and behaviour by the researcher and research team will add to a positive research experience for the participant and add to the body of knowledge of the first-person perspective of living with dementia.

Hyden, L.-C., Swarbrick, C., Johnson, A., & Keady, J. (2017). Messages and futures in social research methods in dementia studies. In J. Keady, L.-C. Hyden, C. Swarbrick & A. Johnson (Eds.), *Social research methods in dementia studies: Inclusion and innovation*. ProQuest Ebook Central: Taylor and Francis. Retrieved from **https://ebookcentral.proquest.com/lib/latrobe/detail.action?docID=5092141**

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INTRODUCTION

In September 2019, the NHMRC National Institute for Dementia Research announced the fifth annual Australian Dementia Forum (ADF2020), to be held in Adelaide. The theme for the 2020 Forum, *Dementia Research: Innovation, Discovery and Translation* encouraged researchers to celebrate the discoveries and innovation achieved through the Boosting Dementia Research Initiative and the wider dementia research community.

ADF2020 also aimed to focus on the task of translating research outcomes into practice and improving the life of those living with dementia, their families and carers.

239 abstracts were submitted for consideration, with 106 accepted for poster presentations, 69 accepted for rapid presentations and 62 accepted for oral presentations. In addition, four Public Travel Awards were made available to members of the public, comprising of people living with dementia, their family members and carers, to present their insights and experiences of public involvement in research.

Due to COVID-19, NNIDR and the ADF2020 Program Committee made the decision to postpone the Forum to a later date. In June 2020, it was announced that Dementia Australia and the Australian Dementia Network were partnering together to deliver the postponed ADF2020 in the 2021 calendar year, which would continue to be sponsored by the National Health and Medical Research Council.

NNIDR is pleased to make available to accepted abstracts from the postponed ADF2020.

PRESENTATION ABSTRACTS

Prevention

Is there a link between dementia risk and social and built environments' characteristics?

Dr NASSER BAGHERI1, Dr Hossein Tabatabaei-Jafari2, Dr Suzzane Mavoa3, Associate Professor Luke Knibbs4, Associate Professor Neil Coffee[5], Professor Kaarin Anstey6

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We have a poor understanding of whether dementia clusters geographically, how this occurs, and how dementia risk may relate to built environment factors. To shed light on these important questions, first, this study aimed to compute a dementia risk score for individuals using general practices data. Second, assess spatial variation of dementia risk across the communities to identify significant clusters (hotspots) in spatial pattern of dementia risk and explore their association with built environment characteristics. Methods: Active patients (n=46,723) aged 35 and over from 16 GP practices in West Adelaide were assessed for dementia risk using Australian National University Alzheimer's Disease Risk Index. Geo-spatial analysis was conducted to identify spatial variation of dementia risk. A multilevel linear regression was conducted to explore the association between built environmental factors (including; social fragmentation, economic disadvantage, green spaces, air pollutions, and walkability score) and dementia risk. Results: The predicted dementia risk score ranged from -3 to 49 points in the sample population. 78% of participants had low dementia risk score (< 14 points), 13% had moderate risk (14 to 28) and 9% had high risk (>28 points). The findings revealed that a great deal of geographical variations in dementia risk. The results also showed that high level of air pollution and low access to open green spaces are associated with increased risk of dementia. Conclusion: Our study findings may aid policy makers to target prevention strategies in areas with high dementia risk to reduce or delay the onset of dementia.

Investigating neural markers of delirium vulnerability using the EEG power spectrum

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Delirium is a major risk factor for dementia and accelerates cognitive decline. Delirium is an acute and fluctuating impairment in arousal and cognition affecting approximately 25% of older adults undergoing cardiac procedures. Delirium is preventable in approximately 30-40% of cases, and therefore interventions for delirium may reduce dementia risk. These interventions however are less effective once delirium has occurred, and a method of identifying patients at high risk for delirium is needed. Electroencephalogram (EEG) patterns of delirium are well studied, but little is known about markers for delirium vulnerability. We aimed to assess if pre-procedural resting EEG power associated with post-procedural delirium in 44 older adults undergoing cardiac procedures aged 65 to 91 years old (M=78, SD=7). Delirium was assessed daily until discharge following participants' procedures. Average power was computed by integrating the power spectral density estimate with the integral approximated by the rectangle method. Relative power was then calculated in four frequency bands: delta (1-3Hz), theta (4-7Hz), alpha (8-12Hz), and beta (13-30Hz). Delirium was present in 38.6% of participants (17/44). Mann-Whitney U tests revealed reduced power across all frequency bands in all delirium subtypes compared to the no delirium group, however these were all statistically non-significant. A larger sample might indicate that vulnerability to delirium may be indexed in the EEG power spectrum weeks before delirium occurs, that is reflecting the emerging or vulnerability to delirium rather than the

established syndrome. Delirium is theorised as a disorder of brain (dis)integration, therefore functional connectivity may be more suited to reveal a vulnerability marker.

Variables for cultural and linguistic diversity in dementia epidemiology: recommendations from a scoping review

Associate Professor Bianca Brijnath1, Ms Julieta Sabates1, Dr Samantha Croy2, Dr Amit Lampit3, Associate Professor Lee-Fay Low4, Mr Daniel Coase5, Dr Fleur de Crespigny6, Mr Robert Day7, Professor Annette Dobson8, Dr Cerise Elliott9, Ms Stephanie Ellis2, Ms Cathy Etherington10, Ms Mary Ann Geronimo5, Ms Danijela Hlis11, Professor Paul Maruff12, Dr Annette Moxey13, Dr Nicola Straiton14, Associate Professor Jeromey Temple3

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Culturally and linguistically diverse (CALD) Australians make up a third of the population over the age of 65 but are under-represented in Australian epidemiological studies of dementia. Research that excludes CALD populations, or that does not adequately collect data relating to CALD, is not able to account for pathological heterogeneity in dementia between groups. The NHMRC National Institute for Dementia Research's CALD Research Action Plan highlights the need for guidelines for the collection, analysis and reporting of CALD variables in dementia research. This presentation draws on preliminary results of a scoping review on the collection, analysis and reporting of CALD variables in dementia epidemiology, and identifies best practice exemplars. We searched Embase, PsycINFO, Medline, CENTRAL and CINAHL for research studies in dementia epidemiology dealing with cultural and ethnic minorities in high-income countries. These included clinical trials as well as cohort studies. The presentation will describe the variables used to capture cultural and linguistic diversity in high-income countries, the measures used, and how these are treated, triangulated or corrected for. This study contributes to methodological questions about how to analyse data on cultural and linguistic diversity in a robust way, in relation to dementia epidemiology. The findings of this study will inform recommendations for a consistent, minimum set of CALD variables to be collected, analysed and reported on in Australian dementia research.

Twelve-month progress of online intervention to prevent cognitive decline: Maintain Your Brain

Professor Henry Brodaty1, Dr Megan Heffernan1, Professor Gavin Andrews2, Professor Kaarin Anstey3, Professor Louisa Jorm4, Professor Nicola Lautenschlager5, Professor Anthony Maeder6, Professor John McNeil7, Professor Perminder Sachdev1, Professor Maria Fiatarone Singh8, Professor Michael Valenzuela9

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In the absence of disease modifying interventions for Alzheimer's disease (AD) and other dementias there is an increased interest in dementia prevention. An issue for population-based lifestyle preventative approaches is scalability. An internet-based multicomponent randomised trial, Maintain Your Brain (MYB), is currently underway. During recruitment 96,418 invitations were sent via email or mail and 14,064 (14%) provided consent. Amongst these, 6,236 (44%) were enrolled resulting in an overall recruitment rate of 6%, or 50% of those eligible at screening. The final sample was 64% female with a mean age of 64.9yrs (SD = 5.8, range 55-77 yrs) and mean years of education of 12.9yrs (SD = 3.0, range 2-22 yrs). Recruitment rates in MYB were comparable to other clinical trials targeting older people and who included online recruitment strategies. This is promising for the willingness of participants to engage with trials that use online rather than traditional in-person methods. Although the baseline withdrawal number (3%) remained stable after randomisation (4%), a further 25% of participants did not attempt any activities. These numbers were carried through to the annual assessments with 4% withdrawn, 31% completing no follow-up activities, 14% partial completers and 55%

who completed all. Online lifestyle interventions have capacity to reach broad segments of the population and support activities shown to be effective in reducing risk of cognitive decline and ultimately delay onset of dementia. The challenge with this new approach is encouraging continued engagement with the program over time.

Alzheimer's disease-related gene expression is reduced following six months of high-intensity exercise

Dr Belinda Brown1, Ms Lidija Milicic2, Dr Tenielle Porter2, Dr Stephanie Rainey-Smith2, Ms Madeline Peretti2, Dr Michael Vacher3, A/Prof Hamid Sohrabi4, Professor Ralph Martins2, A/Prof Jeremiah Peiffer1, Professor Simon Laws2

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Extensive research supports the use of exercise to protect against Alzheimer's disease (AD). Nevertheless, there is limited evidence from human studies regarding the mechanisms underlying the positive effects of exercise on the brain. Gene expression determines the extent to which a gene is 'turned on or off' and can be used to understand mechanistic pathways. Animal research has demonstrated that exercise influences the expression of genes related to various AD biological pathways; however, the impact of exercise on AD-related gene expression has not yet been studied in humans. Methods: Cognitively normal men and women (60-80y) were randomised to either six-months of work-matched high-intensity exercise (n=33), moderate-intensity exercise (n=34) or an inactive control group (n=32). Blood samples were collected pre- and post-intervention and expression levels from a panel of genes implicated in Alzheimer's disease were measured.

Results: Preliminary analyses demonstrated a decrease in AD-related gene expression following six months of exercise, compared with the control group. More specifically, gene expression associated with cholesterol metabolism, amyloid precursor protein processing and synaptic plasticity was favourably altered in the high-intensity exercise intervention, compared with the moderate-intensity intervention and control groups. Discussion: Investigation of AD-related gene expression has the potential to play an important role in understanding the biological pathways by which exercise reduces AD risk and contributes to enhanced cognitive health. The current work indicates a dose-dependent effect of exercise intensity on the expression of genes associated with AD, revealing mechanistic pathways that require further investigation.

Retromer regulates the lysosomal clearance of tau

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Many late-onset neurological disorders (including Alzheimer's disease) have shared etiologies such as lysosomal system dysfunction and the accumulation of neurotoxic amyloids in the brain. The endosomal-coat complex retromer is crucial for receptor trafficking and the maintenance of normal lysosomal function. There is regional overlap between retromer depletion and tau aggregation in the Alzheimer's brain. However, whether retromer dysfunction plays a direct role in mediating tau aggregation remains unclear. Here, using a tractable cell model of tau aggregation, we show that the autophagy-lysosome axis is critical for the clearance of small seed-competent tau aggregates from the cytoplasm. We found that depletion of the core retromer component VPS35 causes a block in the resolution of autolysosomes that is mediated by a defect in lysosomal proteolysis. This defect contributes to a dramatic accumulation of cytoplasmic tau aggregates. Our work demonstrates how retromer dysfunction promotes lysosomal system failure to enhance the aggregation and spread of tau in the brain.

Physical activity guidelines for older Australians with mild cognitive impairment or subjective cognitive decline

Dr Terence Chong1,2,3,4, Dr Eleanor Curran2,4, A/Prof Kathryn Ellis2,5, Ms Jenny Southam2, Dr Emily You2, A/Prof Kay Cox6, Prof Keith Hill7, Prof Dimity Pond8, Prof Briony Dow9, Prof Kaarin Anstey10,11, Dr Diane Hosking12,13, A/Prof Elizabeth Cyarto14, Prof Nicola Lautenschlager2,4,15

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Physical inactivity is the modifiable risk factor for dementia with the largest population attributable risk in Australia and many developed nations. The process of developing the first national Physical Activity (PA) Guidelines for Older Australians with Mild Cognitive Impairment (MCI) or Subjective Cognitive Decline (SCD) (http://www.dementiaresearch.org.au/images/dcrc/output-files/1567-pa_guidelines_for_mci_or_scd_full_report_final.pdf) is described, as well as possible next steps in research translation. These guidelines aim to encourage older adults with SCD/MCI to engage in PA to enhance cognitive, mental and physical health. A guideline adaptation process was undertaken using the ADPATE Guideline Adaptation Resource Toolkit. Existing PA guidelines for older adults were systematically searched and evaluated using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) Instrument. The search identified 22 guidelines, none of which specifically considered older adults with SCD/MCI. The Canadian Physical Activity Guidelines for Older Adults were selected as the most appropriate for adaptation to the population with SCD/MCI. A narrative review was undertaken to support the guideline adaptation process and yielded 24 high-quality randomised controlled trials and 17 observational studies. The findings of these trials and studies were used to support the four guideline recommendations that address aerobic PA, progressive resistance training, balance exercises and consultation with healthcare professionals to tailor PA to the individual. These recommendations provide specific guidance for older adults with SCD/MCI, their families, health professionals, community organisations and government to obtain benefits from undertaking PA. Future research directions, particularly translational research for risk reduction in diverse populations will be described.

A Snapshot of High Potential Impact Research on Dementia in Australia

Prof Moira Clay1, A/Professor Nicki Hodyl1

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With the announcement of the five-year Boosting Dementia Research Initiative (BDRI) in 2014, the Australian Government invested an additional $200M in dementia research and established the NHMRC National Institute for Dementia Research (NNIDR) to target, coordinate and translate the strategic expansion of dementia research in Australia. This investment has produced significant advances from increased understanding of disease mechanisms to diagnosis, drug discovery and delivery, clinical treatment, quality care, risk reduction and prevention. The sector has grown in capacity and capability to be a high achieving and highly respected body of researchers operating with new scale and focus. The Strategic Roadmap for Dementia Research and Translation 2019 outlines five priority areas for research to meet the urgent challenge that dementia presents to Australia's health, economy and society. A study, commissioned by NNIDR in 2019, was conducted to identify outcomes of the BDRI to date and areas of high potential for future investment. This presentation will provide a snapshot of progress in each priority area, the potential for future impact for people living with dementia, their families and carers and gaps in research. The study shows that the impact of research on dementia in Australia is growing but the future needs across the five research priority areas vary considerably. There are many lessons to be learned, including the challenges of facilitating genuine consumer involvement and ensuring access for under-represented groups or those new to the sector. There is a vital need for an ongoing coordinating mechanism and "honest

broker" to ensure that the effectiveness of this sector continues to grow for the benefit of the Australian community.

Improving Australia's Dementia Statistics

Prof Annette Dobson1, Prof Leon Flicker2, Assoc. Prof Tracy Comans1, Dr Michael Waller1, Prof Kaarin Anstey3, Prof Osvaldo Almeida2, Dr Kim-Huong Nguyen1, Dr Graciela Muniz-Terrera4

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This project, funded through the Boosting Dementia Research Initiative, is a partnership between researchers and Australia's statistical agencies. The goal is to develop methods to produce accurate national estimates of incidence and prevalence of dementia suitable for monitoring trends over time and differences between sub-populations. To ensure sustainability, the focus is on routinely collected data acquired for administrative purposes. There are three parts: 1.Record linkage is being conducted by the Australian Institute of Health and Welfare (AIHW) combining administrative data from hospital and emergency department admissions, the National Mortality Database, the Pharmaceutical Benefit Scheme and aged care sector to identify people with a dementia record in any of these sources. Initially not all jurisdictions are included, but the system will be adaptable as different data sources become available. Coverage and diagnostic validity will be assessed by comparison with smaller cohort studies, including those in the Australian Dementia Network (ADNeT), that have determined the presence and types of dementia using established clinical criteria. 2. Death certification for dementia is being assessed using multiple cause coded records for all deaths in Australia, jointly with the Australian Bureau of Statistics (ABS). 3. Methods for improved coverage of dementia in national data collections, in the short or longer term - such as the census, various national health surveys, and survey of disability, ageing and carers - are being explored with the ABS. The presentation will provide an update on progress and preliminary results.

Objective measurement of sleep in mild cognitive impairment: A systematic review and meta-analysis

Dr Angela D'Rozario1,2, Dr Julia Chapman1,2, Associate Professor Craig Phillips1,2, Mr Jake Palmer1, Dr Camilla Hoyos1,2, Dr Loren Mowszowski1, Dr Shantel Duffy1,2, Associate Professor Nathaniel Marshall1,2, Professor Ruth Benca3, Dr Bryce Mander3, Professor Ronald Grunstein1,2,4, Professor Sharon Naismith1

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Older people with mild cognitive impairment (MCI) are at risk of developing dementia, particularly Alzheimer's disease. While some research suggests that alterations in sleep architecture may mediate cognitive decline, the nature and magnitude of changes to sleep macro-architecture (sleep stages and timings) and sleep micro-architecture (brain electrical activity measured using electroencephalography (EEG)) in MCI is not yet clear. This study aimed to systematically review and meta-analyse case-control studies objectively measuring sleep in MCI. A systematic search was conducted and a total of 10 studies met inclusion criteria. All reported sleep macro-architecture and four reported sleep micro-architecture outcomes. A combined total of 430 participants (209 with and 221 without MCI) underwent objective sleep assessments in the included articles. Compared to healthy controls, those with MCI have pronounced changes in sleep macro-architecture with more time spent awake after falling asleep, less sleep time, lower sleep efficiency and longer time to fall asleep and to reach rapid eye movement sleep (REM) sleep. People with MCI also had less REM sleep, more light sleep, and lower nocturnal blood oxygen levels. Pooling of sleep EEG measures was not possible due to limited studies, however fewer sleep spindles in non-REM sleep and greater EEG slowing in REM sleep were reported. These results provide evidence of abnormal sleep in people with MCI, above and beyond that seen in healthy ageing. Pathological changes to sleep may herald worse cognitive trajectories in older age. Modifying sleep could potentially be a promising target for slowing cognitive decline and dementia prevention.

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Fitness and aortic stiffness explain the age-associated decline in cognition in cognitively healthy older people.

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The Lifestyle Intervention in Independent Living Aged Care (LIILAC) investigated the potential for cognitive change in a cohort of cognitively healthy older adults, living in independent accommodation within Australian aged care facilities. This trial, involving 102 participants, examined the effect on mental functioning following the introduction of a Mediterranean style of diet and/or increased aerobic exercise, in the form of regular walking. This presentation will focus on the relationships between exercise, fitness and cognition. Our recently published baseline structural equation modelling found that (in conjunction with BMI and sex) both greater ambulatory fitness and lower aortic stiffness were associated with better performance, specifically in the area of spatial working memory (SWM). In combination, fitness and aortic stiffness explained 33% of the total variation in SWM in this cohort, with age no longer directly predicting any of the variation. Follow-up analysis also found that more moderate exercise indirectly predicted better SWM via its effect of fitness, however this effect was limited to those of low to moderate fitness. No such relationship was found between fitness and aortic stiffness. To our knowledge these are new and novel findings. This research has the potential to provide an evidence base for simple lifestyle interventions to improve brain health and cognitive outcomes for older individuals living independently.

LDL cholesterol may have protective properties for brain health in older age

Miss Julia Kuszewski1, Miss Jay Jay Thaung Zaw1, Dr Rachel Wong1,2, Prof Peter Howe1,2,3

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Elevated low-density lipoprotein (LDL) cholesterol is a major contributor to cardiovascular diseases (CVD), which are associated with accelerated cognitive decline. However, recent studies suggest LDL cholesterol to be protective against cognitive decline in the very elderly (>85 years). We investigated associations between serum LDL cholesterol, cerebrovascular function and cognition in adults aged 50-80 years, testing for differences between mid-life (50-64 years) and older age (65-80 years). Methods: Our cross-sectional analysis used baseline assessments from 236 older adults (78% female, age: 65±0.5 years, BMI: 28.2±0.3 kg/m2, LDL: 3.7±0.1 mmol/L) participating in two intervention trials investigating effects of vasoactive nutrients on cognition, cerebrovascular function and cardiometabolic biomarkers. None were taking statin medication. Assessments included a battery of 10 neuropsychological tests, transcranial Doppler ultrasound to measure cerebral blood flow velocity (BFV) and cerebrovascular resistance index (CVRi), clinic blood pressure and a fasted venous blood sample to measure serum cholesterol. Results: LDL cholesterol correlated with Framingham CVD risk in mid-life (R=0.360, P<0.001), but not in older adults (R=-0.124, P=0.174). In adults aged >65 years (n=122), higher LDL cholesterol correlated with higher mean BFV (R=0.255, P=0.009), lower CVRi (R=-0.266, P=0.006) and higher overall cognitive performance (R=0.228, P=0.011). The latter two were inversely correlated (R=-0.154, P=0.024, age adjusted). Conclusion: LDL cholesterol appears to have a positive association with cerebrovascular and cognitive functions in advanced age; hence, pharmacologically reducing LDL cholesterol to <2mmol/L as currently recommended might not be beneficial for this age group. Further research is warranted to establish optimal LDL cholesterol levels in the elderly.

Dismantling and optimising computerised cognitive training in older adults: A systematic review and multivariate meta-analysis

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Given robust evidence for efficacy, various computerised cognitive training (CCT) programs have been adopted in clinical research and practice aiming at slowing cognitive decline. Yet what specific components of CCT are most potent and how they interact to maximise benefits is largely unknown, slowing translation to clinical practice and rational study design. Methods: We systematically reviewed all published randomised controlled trials of CCT in healthy older adults to November 2019. Detection and investigations of heterogeneity were based on random-and mixed-effects models with robust variance estimation to account for dependent effect sizes. Associations between global cognitive effect sizes (Hedges' g) and pre-registered design factors and behaviour change techniques were delineated using multiple meta-regressions and component network meta-analysis. Results: We included 91 RCTs encompassing 120 comparisons (1223 effect sizes, n= 7,249). The overall model detected moderate heterogeneity (τ^2=0.086, 95% prediction interval g= -0.31 to 0.78), which was largely explained by the design factors and their interactions. Clinically meaningful cognitive benefits (g>0.2) emerged after 10 hours of training and peaked at 25 hours, optimally divided into 45-60-minute sessions 2-3 times per week. Global and domain-specific benefits were most pronounced in trials of multidomain CCT, followed by action video games. Unsupervised, single-domain (e.g., working memory) and frequent or short-term training generally led to negligible effect sizes. Discussion: This talk will translate the RCT evidence for CCT into robust intervention design and delivery guidelines at the population level. These will allow clinical trialists and practitioners to focus on long-term interventions and optimising CCT at the individual level.

Disrupted endolysosomal acidification as a driving pathological stress in early onset familial Alzheimer's disease

Assoc. Prof Michael Lardelli1, Dr Morgan Newman1, Dr Stephen Pederson1, Ms Nhi Hin1, Ms Karissa Barthelson1, Mr Yang Dong1, Mr Lachlan Baer1, Assoc. Prof Syahida Ahmad2

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To prevent or delay Alzheimer's disease (AD), we must understand the initial molecular changes/stresses that ultimately lead to cognitive changes and neurodegeneration. Rare mutations, mostly in the gene PSEN1, cause carriers to develop AD in middle age (early onset familial AD, EOfAD). However, we cannot study the brains of living people in molecular detail to determine what is happening before they develop AD. To do this we must use animal models. There is considerable disagreement about the validity of current animal models of AD. The designs and evaluation of current transgenic models are based on the idea that the mutations causing AD do so by altering production of the Amyloidbeta peptide. However, an explanation more consistent with the mutation data is that all the mutations reduce endolysosomal acidification, with important consequences for iron homeostasis and cellular energy production. Our approach to understanding the effects of EOfAD mutations is to replicate, as closely as possible, the genetic states of human EOfAD mutation carriers – i.e. we examine single EOfAD-like mutations in single copies of single endogenous genes. We do this using the zebrafish to exploit its advantages in advanced "'omics" analyses. Our analyses of young adult zebrafish brains support that EOfAD-like mutations disrupt endolysosomal acidification, iron homeostasis, and energy production. Indeed, disrupted energy production is observed across a variety of EOfAD mutations in different genes and so represents an "EOfAD signature" disturbance. Our work suggests that EOfAD and Sanfilippo syndrome childhood dementia may share a common pathological mechanism.

Ngarraanga Giinganay ('thinking peacefully') to reduce dementia risk: Culturally-grounded mindfulness-based stress-reduction for older Aboriginal Australians

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Aboriginal Australian 'survivors' are reaching older age in increasing numbers. However, dementia rates are high, with dementia prevention and translation into practice limited in this population. Lifecourse stress and depression are risk factors for dementia, and of substantial concern in Aboriginal communities. This study aimed to co-design an innovative, culturally-grounded stress-reduction program, and evaluate its acceptability and feasibility with an Aboriginal community.

Method: An expert Working Group was convened to guide program development, with Aboriginal and non-Indigenous clinicians/consultants. The program was named in Gumbaynggirr language: Ngarraanga Giinganay. A yarning (focus) group was conducted with older Aboriginal people (n=9), which led to further program modifications. Finally, a single-group pilot study was conducted over eight sessions (n=7, age 62-81 years; baseline Addenbrooke's Cognitive Examination Revised score range=47-94), co-facilitated by a clinician and local Elder, with quantitative (cognitive, psychological, health) and qualitative outcomes. Results: Working Group and focus group feedback shaped program development, ensuring content aligned with cultural understandings and practices of the Gumbaynggirr community, and with therapeutic principles of mindfulness. Pilot study results demonstrated feasibility, acceptability and preliminary effectiveness. Improvements were seen for mindful awareness, depression, anxiety, and blood pressure (Cohen's d 0.87-1.48). Qualitative results highlighted aspects for program refinement and further evaluation. Ngarraanga Giinganay also provided opportunities for knowledge translation through 'teachings' about dementia and managing stress. Conclusion: This study provides insight into partnering with underrepresented populations for dementia research; and highlights the effectiveness of the co-design approach. Ngarraanga Giinganay has considerable potential for supporting wellbeing and reducing dementia risk.

Combined cognitive and physical training in older adults: A systematic review and meta-analysis

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Combined physical exercise (PE) and cognitive training (CT) is a promising approach to promote cognitive and physical health in old age. Yet intervention design varies across trials, and the most efficient combination strategies remain unclear. Methods: We searched MEDLINE, EMBASE and PsycINFO for randomized controlled trials combining PE and CT in older adults, compared to PE, CT, active or passive control. Effect estimates were calculated as change from baseline (Hedge's g) and analyses were conducted using multilevel random-effects models. Results: Forty-three trials encompassing 2,925 older participants were identified. A small and significant effect was found for cognition (g = 0.17, 95% CI 0.11 to 0.24). Combined interventions gave rise to cognitive improvements over and above active and passive control and PE alone, and were equally beneficial as CT. Larger cognitive effect sizes were found for simultaneous (e.g., exergaming) compared to sequential (i.e., separate sessions) combinations. For physical outcomes, a small and significant effect was found (g = 0.27 95% CI 0.15 to 0.39), which was comparable across control conditions and combination strategies. Discussion: The available evidence supports the efficacy of combined PE and CT to improve cognitive and physical health in older adults. Simultaneous combinations are more beneficial for cognitive outcomes than sequential combinations, while also achieving similar physical effects. Cognitive effects exceed PE and control conditions but not those of CT, suggesting that CT drives the effects on cognition. This presentation will discuss the implications from this systematic review for preventive efforts and clinical practice in the field.

The influence of brain reserve, cognitive reserve, and education on functional decline in older adults

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Reserve theory explains why some individuals show slower than expected cognitive and functional decline in the context of age- or disease-related brain changes. Brain reserve provides greater structural resources (e.g. brain volume), and cognitive reserve provides compensation for physiological changes (e.g. the use of supplementary neural resources). Years of education is currently the most common proxy for cognitive reserve. Another approach, residual-based cognitive reserve, has many advantages over education, but the two have never been compared in the context of brain reserve and neuropathology. We investigated the degree to which brain reserve, residual-based cognitive reserve, and education could predict change in independent functioning over five years, and whether these relations depended on whether participants' cerebrospinal fluid was positive or negative for Alzheimer's disease (AD) biomarkers at baseline. Participants were 1201 volunteers for the Alzheimer 's disease Neuroimaging Initiative. We defined brain reserve as the variance in memory performance explained by structural brain volumes. We defined residual-based cognitive reserve as the difference between observed memory performance and that predicted by brain structure and demographics. We found that greater brain reserve predicted slower functional decline independent of baseline AD pathology status. However, residual-based cognitive reserve only predicted slower decline when AD biomarker pathology was positive; in contrast, education did not predict decline. This suggests that brain reserve may protect against functional decline before significant AD pathology accumulates, cognitive reserve may require a certain level of pathology before it is 'activated', and education – at least in this sample – may not offer any incremental validity.

Neighbourhood socioeconomic advantage and cognitive performance in an Australian community sample

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Objective: To examine whether cognitive function differs between levels of neighborhood socioeconomic advantage. Methods: We studied participants from the Healthy Brain Project, a cohort of community-dwelling Australians aged 40-70 years. Socioeconomic advantage was computed by matching participants' residential address to the Australian Bureau of Statistics' Index of Relative Socio-Economic Advantage and Disadvantage. We used ANOVA to compare advantaged participants (score ≥70th percentile) to the remainder of the sample across self-reported dementia risk factors and performance on the Cogstate Brief Battery (CBB). A modified CAIDE score was calculated by combining history of hypertension, hypercholesterolemia, diabetes, obesity, and current cigarette smoking (one point for each risk factor). Results: Of the 2303 participants (mean age, 56±7 years, 26% male), 1348 (59%) were advantaged and 613 resided in rural or regional areas (27%). Persons who were advantaged displayed higher educational attainment and a lower modified CAIDE score. On the CBB, persons with high advantage displayed faster processing speed (d=0.12, p=0.004) and attention scores (d=0.09, p=0.03), and superior memory performance (d=0.11, p=0.015): these differences were not statistically significant following adjustments for age, sex, and education (p>0.05). Education level interacted with advantage (p=0.05): high advantage was associated with better memory performance in those with (d=1.01, p=0.04) but not without (d=0.16, p=0.22) at least 12 years of education, adjusting for age and sex. Conclusion: The prevalence of dementia risk factors was lower in persons with higher neighbourhood advantage. Neighbourhood and personal advantage (inferred from education) may interact, such that the most advantaged have the best memory performance.

Mediterranean diet and exercise intervention to reduce cognitive decline and dementia risks: the MedWalk trial

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The 2017 Lancet Commission on Dementia Prevention, Intervention and Care report prioritises the need to target known modifiable risk factors, with exercise and Mediterranean diet (MedDiet) highlighted, as interventions with high potential for success in delaying dementia. Our pilot data demonstrate improved cognition in a sub-group of older participants adhering to a combination of MedDiet and walking, for 6 months. MedWalk will investigate the efficacy of a combined MedDiet and walking intervention, on cognitive decline over 2 years, in an older population living independently without cognitive impairment. This study will utilise proven, effective behaviour change strategies, Motivational Interviewing and Cognitive Behavioural Therapy (MI-CBT), to embed modifications to dietary choice and physical activity. The study will be a cluster-randomised controlled trial with MedWalk intervention in the first year and further 1-year follow-up, to investigate the effects of the MedWalk intervention relative to control, on the trajectory of cognitive decline over two years. Secondary outcomes include mood, quality of life, arterial stiffness, inflammation, glucoregulation, oxidative stress and gut microbiome status. MedWalk will involve 364 participants across 28 independent living facilities in Victoria and South Australia. These sites will be designated as either control or MedWalk intervention sites. The overall goal of this project is to evaluate whether a simple lifestyle intervention, that promotes healthy cognitive ageing, is suitable for wide-scale implementation for older independently living Australians. The long-term vision is to promote the widespread adoption of this healthy lifestyle intervention to reduce the incidence of dementia in Australia.

Koori Active and Healthy Ageing: Promoting vitality and reducing dementia risk with older Aboriginal Australians

Dr Kylie Radford1,2,3, Ms Madeleine Nichols1, Ms Alison Timbery1, Ms Pam Wettasinghe2, Dr Wendy Allan1, Mrs Gail Daylight1, Dr Louise Lavrencic1,2,3, Prof Gail Garvey4, A/Prof Kim Delbaere1,2,3

1NeuRA, 2University of New South Wales, 3UNSW Ageing Futures Institute, 4Menzies School of Health Research

This project aimed to develop innovative, effective, culturally-appropriate healthy brain ageing approaches in collaboration with older Aboriginal people and urban/regional community partners. Method: A co-design process involved 34 semi-structured interviews and 2 yarning groups with older Aboriginal people to understand health priorities, preferences for healthy ageing programs and acceptability of technology use. This led to a pilot randomised control trial (RCT) over 16 weeks to evaluate the feasibility of a novel program (versus health education) in Aboriginal people aged 45+ years, with dual-task walking as primary outcome measure. Results: Qualitative analyses highlighted health concerns including memory loss, mobility, depression, and access to healthcare services. Using self-directed technology for healthy ageing was widely supported, however, the importance of maintaining social connections was emphasised. StandingTall, an unsupervised balance exercise program delivered using mobile technology, was selected as a suitable means to exercise. Following further consultation, StandingTall was redeveloped to provide a culturally-inclusive interface, and incorporate cognitive-motor (dual-task) and social group activities. Eighteen participants were enrolled in the RCT (8 intervention, 10 control). Users rated StandingTall as easy and enjoyable to use. There was no significant effect of intervention on dual-task walking ($F(1,16)=0.14$, $p=0.71$). However, adherence was highly variable and likely affected outcomes (median range: 0–130.7 minutes/week). Conclusion: Technology-based programs have potential to improve access to dementia risk reduction, enable low-cost individualised programs and transferability across diverse community settings. Understanding the factors related to adherence is critical and a larger trial is needed to evaluate StandingTall in this population.

Causal effects of smoking and drinking behavior on Parkinson's disease risk: A Mendelian Randomization study

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Parkinson's disease (PD) is the second leading cause of dementia, only after Alzheimer's disease. Epidemiological studies have revealed correlations between PD risk and lifestyle factors such as smoking and drinking alcohol. However, it is not clear if this is a causal relationship or whether it is confounded by pleiotropy (e.g. the same genes that predispose someone to PD also predispose the person to smoke). In this study, we use summary data from genome-wide association studies and perform Mendelian randomisation, a statistical approach that enables to test causality between an environmental exposure and a health outcome. Using several approaches, our results suggest that both alcohol consumption, measured as 'drinks per week' (DPW) and smoking status, determined 'current versus previous smoker' are associated with a lower risk of developing PD. The main driver for the DPW effect was a single genetic variant (rs1229984) near the alcohol dehydrogenase 1B (ADH1B) gene. Although protective for PD, smoking and drinking increase the risk of other undesirable health outcomes. More research is required in order to understand the mechanisms underlying these causal effects, and to enable the design of interventions that emulate the positive effects for those at-risk of PD, but without the negative effects of smoking and drinking.

Addressing the high rates of dementia found in Aboriginal and Torres Strait Islander peoples

Dr Sarah Russell1, Mrs Rachel Quigley1, Dr Edward Strivens1, Mrs Betty Sagigi2, Dr Gavin Miller1,2

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Background: In Australia, Indigenous people aged 45 and over have three to five times higher risk of dementia than the wider community. Research shows that up to a third of dementia cases may be delayed by modifying lifestyle risk factors. Specific risk and protective factors contributing to the increased dementia risk in Indigenous communities require clarification as the first step towards developing culturally appropriate interventions. The aim of this paper is to outline a study protocol investigating whether potential protective factors identified in the wider population as supporting cognitive function in later life confer protection to Indigenous populations. Method: This project will use a Participatory Action Research approach to enable communities to identify and prioritise dementia risk reduction strategies/potential risk and protective factors. Using a Continuous Quality Improvement Framework, primary health care centres will address modifiable dementia risk factors identified to change practice and systems through the development of culturally appropriate interventions. Results: Resulting interventions will identify and address barriers and enablers unique to Aboriginal and Torres Strait Islander communities. Conclusion: The outcome will be a culturally appropriate framework that incorporates evidence-based best-practice guidelines for delivering community specific interventions for risk reduction and prevention of dementia

Using virtual reality for apathy in aged care

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Apathy is one of the most common symptoms for older people living in residential care. Experiencing apathy is associated with a faster rate of cognitive decline and increased mortality risk. Reminiscence therapy is a common intervention used in aged care for symptoms including apathy. Recollection of memories provides a therapeutic experience, assisting with maintaining a sense of self and identity. Virtual reality (VR) using head-mounted displays (HMDs) has demonstrated effectiveness in treating psychiatric conditions including Post-Traumatic Stress Disorder and for pain management, however, there is limited research on using VR for therapy with older adults in aged care. This feasibility study examined if VR using HMDs could be used to deliver reminiscence therapy for the treatment of apathy. Willingness to participate, response rates to measures, time taken to created tailored content, and technical problems were examined. Side effects from using VR were also measured. 17 participants were recruited from an aged care facility. We found improvements in semantic verbal fluency in those with higher levels of apathy after an individualised reminiscence session. Although 35% of participants

reported temporary side effects, all participants reported enjoyment from the VR experience. This study provides evidence that VR can be used to deliver individualised content to residents in aged care, with a need to monitor side effects. Immediate positive effects found on cognitive function associated with apathy indicates that VR may provide an effective tool in therapy for older adults, with further research required to compare with traditional methods of reminiscence.

Long-term resveratrol supplementation improves cognition, cerebrovascular function and overall well-being in elderly postmenopausal women

Ms Jay Jay Thaung Zaw1, E/Prof Peter Howe1,2,3, Dr Rachel Wong1,2

1University of Newcastle, 2University of Southern Queensland, 3University of South Australia

With increasing life expectancy, post-menopausal women are more vulnerable to circulatory and cognitive impairments resulting in poorer quality-of-life. In a pilot study, we showed cognitive and cerebrovascular improvements in postmenopausal women following 14 weeks supplementation with a low dose of resveratrol, a phytoestrogen. We have now confirmed these benefits in 125 women aged 64±1 years, 15±1 years postmenopausal and not taking hormone therapy who were randomized in a 2×12-month crossover trial to take 75mg trans-resveratrol or matching placebo twice daily. A battery of cognitive tasks was administered to assess 7 cognitive domains. Transcranial Doppler ultrasound measured the magnitude of vasodilator responsiveness (CVR) during hypercapnia and neurological stimuli, i.e. neurovascular coupling (NVC). Well-being measures including pain and menopausal symptoms were also examined. Compared to placebo, resveratrol significantly improved overall cognitive performance (d=0.269, P=0.002), CVR to hypercapnia (d=0.361 P=0.027) and overall NVC (d=0.259, P=0.032). In addition, overall well-being was improved by resveratrol (d=0.200, P=0.005), including reductions in pain (d=0.422, P=0.002) and menopausal symptoms (d=0.223, P=0.024). This confirms our pilot results showing multiple benefits of resveratrol, thereby highlighting a potential non-pharmacological approach to prolong independent living in elderly postmenopausal women.

Metabolic syndrome risk factors influence cerebrovascular function and cognition in older adults: a cross-sectional study

Ms Jay Jay Thaung Zaw1, Ms Julia Kuszewski1, E/Prof Peter Howe1,2,3, Dr Rachel Wong1,2

1University of Newcastle, 2University of Southern Queensland, 3University of South Australia

Metabolic syndrome risk factors (MRFs) are associated with cerebrovascular disease, which can accelerate cognitive decline. We investigated the influence of individual and multiple MRFs on cerebrovascular and cognitive function in community dwelling older adults. Methods: Baseline data was obtained from two randomized controlled trials assessing the effects of vasoactive nutrients on cognition, cerebrovascular and cardiometabolic function in 296 older adults (77%female, age: 66±0.4years, BMI:28.2±0.3kg/m2). MRFs included high waist circumference, high blood pressure, high triglyceride, low HDL-cholesterol and high glucose levels. Blood flow velocity in the middle cerebral artery(BFV) and cerebrovascular resistance index(CVRi) were measured by transcranial Doppler ultrasound. Cognitive performance was assessed by 12 neuropsychological tests. Results: In this population, overall cognitive performance correlated with BFV(R=0.154, P=0.007) and inversely with CVRi(R=-0.148, P=0.015). Of the 296 participants, 70 had no MRF, 62 had one MRF, 84 had two MRF and 80 had three or more MRF. After adjusting for age, the number of MRF correlated with CVRi(R=0.333, P<0.001) and inversely with overall cognitive performance(R=-0.146, P=0.012). Post-hoc analyses revealed that compared to no MRF, the presence of only one MRF, which was predominantly high waist circumference(60%), was sufficient to increase CVRi(+31%), lower BFV(-17%) and decrease cognitive performance(-0.3SD). High waist circumference was associated with higher CVRi (P<0.001) and poorer cognition (P=0.011) (age, education and depressive symptoms adjusted). Conclusion: MRFs, primarily high waist circumference, are quantitatively associated with poorer cerebrovascular and cognitive function in older adults. Early lifestyle modifications and interventions to prevent or manage MRF are crucial to maintain optimal cerebrovascular and cognitive functions in older adults.

Does a nasal injury increase bacterial infection of your brain?

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There has been a recent growing body of research investigating the correlation between bacteria and chronic diseases of the central nervous system (CNS), such as neurodegenerative disorders, in particular Alzheimer's disease. Our previous work has shown that the bacterium Burkholderia pseudomallei, following intranasal inoculation, can enter the olfactory nerve and the intranasal branch of the trigeminal nerve, reaching the spinal cord within 24 hours of inoculation. To date, what has remained largely uncharacterised is the consequence of injury to the nasal olfactory epithelium for the invasion of the CNS by bacteria. In the current study, we investigated this by using an established olfactory epithelial injury model, where mice were administered methimazole via intraperitoneal injection, inducing patchy epithelial degradation. Then mice, both with and without epithelial degradation, were intranasally inoculated with B. pseudomallei for seven days. We have now discovered that epithelial injury greatly increases the invasion of B. pseudomallei within the olfactory epithelium. This led to bacterial invasion of the olfactory nerve fascicles within the lamina propria underlying the olfactory epithelium, continuing to the nerve fibre layer and then the glomerular layer of the olfactory bulb (CNS). Our work here shows, for the first time, that prior injury to the nasal epithelium increases the risk of olfactory nerve and olfactory bulb invasion by bacteria. Thus, these findings open the possibility that other bacterial species may also use this route to invade the CNS, contributing to the growing correlation between bacteria and chronic diseases of the CNS, such as Alzheimer's disease.

Evaluating Get SMART to reduce risk for dementia in primary care

Prof Viviana Wuthrich1

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Risk reduction for cognitive decline and dementia is a national priority. Without a cure for dementia, and an ageing population, risk reduction is an important step to reduce the societal and economic costs associated with dementia. Modifiable risk factors have been identified and estimates suggest that reduction of these risks could lead to dramatic decreases in the prevalence of dementia. This presentation will outline a novel method for increasing access to routine dementia risk reduction. In a clinical trial we will evaluate a new systematic semi-automated GP tool (Get SMART) integrated with primary care software to generate a dementia risk matrix to calculate personalised risk profiles for adults aged 60 years of age. Completion of the risk matrix will occur in primary care and will identify the severity of individual risks, recommend evidence-based mitigation strategies, and review behaviour change using a patient-centered personalised medicine approach. Patients will be educated about their risk profile, and a collaborative mitigation plan will be developed to assist patients to prioritise risks and implement interventions that match their personal choice. This model will be tested in a large primary health care network, and evaluated for effectiveness and feasibility in a randomized controlled trial. Moderators of treatment success will be determined, as well as changes in cognitive measures sensitive to early decline. This new study will help to better identify individuals at risk and engage patients in preventative medicine approaches that offer the potential to result in wide scale risk reduction for cognitive decline.

Assessment and Diagnosis

Is difficulty taking medications associated with Alzheimer's disease and related dementias (ADRD)?

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Medication management requires complex cognitive functioning. Therefore, difficulty taking medications might signify unrecognised ADRD. Caregivers and healthcare providers could potentially discern such signs to aid the early recognition of ADRD. Currently however, it is not known whether an association exists between medication management difficulties and an ADRD diagnosis. Methods: Respondents (n=1,461) to the Health and Retirement Study (HRS) survey with an ADRD diagnosis observed from 1993-2012 (cases) were matched to 3,771 controls with no ADRD diagnosis. We examined the association between ADRD diagnosis and self-reported difficulty taking medications in the preceding years (1-2 and 3-4 years prior to case definition). Conditional logistic regressions adjusted for age, sex, race, socioeconomic status, and comorbidities. Discussion: Compared to matched controls, cases exhibited higher prevalence of difficulty taking medications 1-2 years prior to diagnosis (cases: 11.0%, controls: 2.3%), and 3-4 years prior to diagnosis (cases: 5.8%, controls: 2.3%). Adjusted analyses showed that compared to individuals without difficulty taking medications, those with difficulty had more than four times higher odds of an ADRD diagnosis in the next 1-2 years [OR=4.56 (CI: 3.30-6.31)], and more than two times higher odds of an ADRD diagnosis in the next 3-4 years [OR=2.41 (CI: 1.61-3.59)]. Conclusion: Odds of ADRD were more than four times greater for those who reported difficulty taking medication up to 2 years before diagnosis compared to those who did not report difficulty. The presence of medication management difficulties may prompt further cognitive screening in older adults, potentially aiding the earlier recognition of ADRD.

What's in a diagnosis? Identifying characteristics of dementia diagnosis from clinical document review in Australia

Prof Jane Banaszak-Holl1, Dr Xiaoping Lin1, Ms Swarna Vishwanath1, Ms Delphine Allan1, Dr Stephanie Ward1,2,3, Professor Henry Brodaty2, Dr Elsdon Storey1, Professor John McNeil1, Professor Raj C. Shah4, Professor Anne Murray5, Professor Susannah Ahern1

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Improving dementia diagnosis, a recognised priority in Australia, requires greater understanding of variation in timing, setting and assessment tools currently being used. This study identifies characteristics of dementia diagnosis through a clinical document review of Australian participants in the ASPirin Reducing Events in the Elderly (ASPREE) study. ASPREE was a trial of low-dose aspirin for extending dementia- and disability-free survival amongst healthy older people. Participants triggered for dementia if cognitive test results were poorer than expected, the individual self-reported dementia or memory problems, or reported taking dementia medications. Presence of dementia was then adjudicated by an expert committee using a neuropsychological battery and medical record review applying DSM-IV criteria. This study reviews clinical documents of 964 participants who triggered for dementia. Coding rules were developed based on review of 100 randomly selected cases and validated with 20 additional cases. Document review is ongoing and this presentation discusses the challenges in coding dementia diagnosis from a variety of clinical documents, including pathology and neuroimaging results, letters and clinical notes from health professionals (e.g., general practitioners, geriatricians), and reports from hospitals and aged care assessment teams. Challenges include identifying whether diagnoses has occurred in specialist or GP settings, the extent of multidisciplinary input, and how clinical tests around time of diagnosis supported diagnosis. This study highlights the importance of obtaining comprehensive information on dementia diagnosis from different clinical documents and has implications for data

accuracy for dementia incident and standardised diagnostic processes in Australia.

Biomarkers in Younger Onset Neurocognitive Disorders (BeYOND): Beyond the current paradigm

Ms Carolyn Chadunow1, Dr Dhamidhu Eratne1, Dr Wendy Kelso1, Professor Mark Walterfang1,2,3, Dr Andrew Evans5, Dr Sarah Farrand1, Associate Professor Rosie Watson4,5, Professor Dennis Velakoulis1,2, Dr Samantha Loi1,2

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Younger Onset neurocognitive Disorders (YOD) is a term encompassing a broad range of conditions occurring in those aged under 65, presenting with a variety of psychiatric, behavioural, neurological, and cognitive symptoms. Diagnoses range from the various dementias through to psychiatric illness and movement disorders. Due to the overlap of clinical symptoms among disorders, many people are faced with considerable diagnostic delay, with multiple serial assessments required, and considerable psychosocial impact on young families due to diagnostic uncertainty. The BeYOND study is investigating the clinical utility of biomarkers and other novel tests in diagnosing YOD. The study aims to a) investigate the aetiology, progression and risk factors of YOD; b) investigate the utility of CSF and blood biomarkers, and novel neuroimaging in YOD; and c) investigate the psychosocial factors in YOD including impact on families. Of particular interest is the utility of biomarkers and imaging in distinguishing between psychiatric and neurodegenerative illnesses, with the purpose of reducing time from first presentation to diagnosis. Neuropsychiatry at the Royal Melbourne Hospital is currently undertaking this research by establishing a prospective longitudinal cohort of both confirmed and suspected YOD patients who come through the service. Through the gathering of a broad range of data collected from routine clinical investigations, psychosocial and caregiver information, and additional specialised tests, the researchers are furthering the understanding of YOD, its risk factors, diagnosis, progression, and the psychosocial impact of YOD. This presentation provides a brief overview of the research protocol and progress to date.

Brain-derived neurotrophic factor in the blood as a biomarker of cognitive health in older adults

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1Wicking Dementia Research and Education Centre, UTAS

The risk of developing dementia is influenced by genetics and environmental factors. The gene encoding brain-derived neurotrophic factor (BDNF) may play an important role in cognition, with changes in BDNF expression associated with normal and pathological ageing. A single nucleotide polymorphism exists in the BDNF gene causing an amino-acid substitution of valine to methionine (Met), with evidence suggesting that this polymorphism may influence cognitive decline and dementia risk. Discovery: This study measured BDNF protein levels in serum samples of healthy older adults aged between 50 and 80 years (n=174). The study aimed to determine whether serum BDNF levels are related to BDNF genotype (Met versus non-Met carriers), ageing, cognitive reserve and cognitive change over time. Linear fixed effect models were fitted using the R statistical computing environment. This study demonstrated that serum BDNF levels decrease with age ($p<0.05$) and are higher in Met carriers compared to non-carriers ($p=0.05$). Furthermore, correcting for age and genotype, people with higher cognitive reserve had lower serum BDNF levels ($p<0.05$). Further analyses are being performed to determine whether BDNF levels are related to cognitive change over time. Innovation and Translation: Measuring BDNF protein levels in the blood may serve as a biomarker of cognitive health and dementia risk. We are measuring a number of proteins in the blood to determine the best biomarkers of brain health and cognitive decline. Our goal is to develop a battery of blood-based biomarkers that can give a pre-symptomatic indication of brain health and risk of cognitive decline and dementia.

Chlamydia pneumoniae can infects the central nervous system and cause Alzheimer's disease like pathology

Dr Seyed Ali Delbaz1, Dr Anu Chacko1, Ms Heidi Walkden1, Dr Charles Armitage2, Dr Ronak Reshamwala1, Dr Logan Trim3, Ms Edith Miller1, Dr James St John1,4, Dr Ken Beagley3, Dr Jenny Ekberg1,4

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The cause of Alzheimer's disease (AD) remains unknown. While predisposing genetic mutations have been identified, AD is considered multifactorial. One factor that has been largely neglected in the field is infectious agents. It is now well-established that bacteria can enter, survive and become dormant in the central nervous system (CNS). The long-term presence of bacteria may lead to neuroinflammation and in combination with genetic predisposition may contribute to the onset of AD. Amyloid beta (Aβ), a key AD hallmark, is now known to be an antibacterial peptide secreted by neural cells in response to pathogens. Certain bacteria have been linked to late-onset AD and have been isolated from plaques in brains of AD patients. We here investigated whether one such bacterium, Chlamydia pneumoniae (Cpn), can infect the CNS via the olfactory and trigeminal nerves which extend between the nasal epithelium and the brain and whether infection resulted in accumulation of Aβ. We found that Cpn was present in the olfactory epithelium, nerve and bulb at 24 h and seven days post intranasal inoculation in mice. We found that Cpn inclusion bodies in the olfactory bulb co-localised with Aβ immunoreactivity, suggesting that cells in the olfactory bulb respond to infection by upregulation and/or secretion of Aβ. Finally, we showed that Cpn can infect the glial cells of these nerves, as well as CNS glia in vitro. Overall, these results show that C. pneumoniae can invade the CNS via the peripheral nerves, survive within glial cells and contribute to AD-like pathology.

Let's CHAT (Community Health Approaches To) Dementia: update on project progress

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The Let's CHAT Dementia research project is a national study working in collaboration with 12 Aboriginal Community-controlled Health Services (ACCHSs) across four states to develop a culturally appropriate and contextually adaptable model of care for dementia and cognitive impairment in the Indigenous primary care context. This presentation gives an update on the progress of this stepped-wedge design study, now in the third step of the implementation phase. Overall baseline audit results identified low detection rates of cognitive impairment and dementia. Using a continuous quality improvement (CQI) framework, feedback on audit results is presented to health service staff as part of best-practice care workshops. In collaboration with ACCHS staff, strategies are developed to introduce system and practice changes with the aim of increasing detection rates of cognitive impairment and dementia. To date, initiatives undertaken have been to: incorporate/change cognitive components in the Aboriginal Health Check (MBS item 715); facilitate clear healthcare pathways for cognitive impairment and dementia screening and assessment, including visiting specialist services; upskill staff so that they can identify appropriate cognitive assessments to be used with individual patients, and then carry out any relevant assessments. Challenges encountered to date include: competing clinical demands, frequent staff turnover, and in some cases low engagement from leadership. Enablers include: a strong Indigenous research staff contingent, the co-design approach and high ACCHS staff interest. Subsequent audits will indicate if detection rates are improving as a result of

the study. In the meantime, implementation activities will continue for a further 18 months.

Quantification of brain cholinergic function using [18F]FEOBV PET imaging in patients with dementia

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Cholinergic degeneration of basal forebrain (BF) is an earliest pathological feature of Alzheimer's disease (AD). A robust biomarker of BF cholinergic function has yet been developed. In this study, we used an innovative radiotracer Fluorine-18 fluoroethoxybenzovesamicol ([18F]FEOBV) for direct imaging of cholinergic function, which will allow development of effective biomarkers for BF cholinergic function. This is the first study that performed FEOBV PET imaging on humans in Australia. Participants recruited from the memory clinic at the Prince Charles Hospital underwent the baseline PET imaging using florbetaben (FBB; for amyloid) and FEOBV radiotracers. The FEOBV scanning was performed at 90 and 180 minutes post bolus injection. High resolution 3D structural MRI scans were acquired for analysis. Follow-up cognitive assessment will be performed including post cholinesterase inhibitor therapy. Amyloid-β (Aβ) depositions were automatically quantified in FBB PET data using CapAIBL, with Aβ-positivity defined as >20 centiloid. The dynamic FEOBV PET data were used to estimate tissue time-activity curves (TACs) and distribution volume ratios (DVR) are calculated based on TACs using a 2-parameter simplified reference tissue model. The current cohort consisted of 15 participants (Female/Male=10/5) aged 60-82 years. High Aβ burden (Aβ+) was observed in 5 participants at baseline. The DVR calculated from the dynamic FEOBV data show similar distribution patterns to that of cholinergic terminals with highest binding in the striatum in good agreement with the literature. Future work will associate the [18F]FEOBV retention in the cortex and hippocampus (targets of BF neurons) with follow-up cognitive scores.

Blood based DNA methylation biomarkers of Dementia

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Dementia currently has no definitive biomarker for diagnosis. DNA methylation (DNAm) is implicated in dementia, and has potential to act as an early biomarker of the disease. The aims of this study are to determine whether a unique DNAm signature exists in the peripheral blood of individuals with dementia, and whether a discernible DNAm signature is present prior to diagnosis. The ASPREE study recruited 19,114 generally healthy individuals, predominantly over 70y/o, from the community. Cognitive tests were administered at baseline and at follow-up visits (approx. 3yrs). Incident dementia was adjudicated according to DSM-IV criteria. Epigenome-wide DNAm profiles (of 761,967 methylation sites) were generated using 49 blood samples at follow-up and 160 at baseline. Initial analysis compared DNAm between 25 dementia cases and 24 controls (follow-up). Further analysis compared the DNAm of individuals at baseline, when all participants were without dementia diagnosis, where 73 would go on to receive a dementia diagnosis, and 87 remained cognitively healthy. We identified 3955 differentially methylated regions (DMRs) ($p<0.01$) between cases and controls (adjusted for batch, age and sex), and 1060 DMRs between pre-diagnosis individuals (at baseline) and controls. Thirty-three DMRs overlapped between

follow-up and baseline analyses, including genes implicated in neurodegenerative diseases such as Alzheimer's and macular degeneration, as well as genes associated with neurotransmission and neurotoxicity. DNAm signatures measured in blood have the potential to be early biomarkers of dementia. Future studies using larger sample sizes are needed to verify findings, and explore the functional significance of these DNAm marks in dementia pathophysiology.

Kynurenine pathway metabolites in Alzheimer's disease patients and relationship to amyloid-β, tau and phosphorylated-tau.

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Chronic activation of the kynurenine pathway (KP) is implicated in Alzheimer's disease (AD) where over-activity of the enzyme kynurenine 3-monooxygenase (KMO) causes accumulation of quinolinic acid (QUIN) which induces neurotoxicity by excitotoxic stimulation of the NMDA receptor. Although the links between the KP and AD are well established, most studies investigating the KP in AD patients focus on plasma and it is unclear if concentrations in the periphery are reflective of concentrations in the brain and how these may be related to classical AD hallmarks Aβ, p-tau and tau. We characterized the KP in matched CSF and plasma samples from 20 AD patients and 18 age-matched healthy controls (HC) by UHPLC and GC/MS. In AD patient CSF, KYNA was significantly increased 1.7-fold ($p = 0.005$) compared to controls. Plasma concentrations of kynurenine (KYN; $p<0.0001$), 3-hydroxykynurnine (3 HK; $p=0.044$) anthranilic acid (AA; $p<0.0001$), picolinic acid (PIC; $p=0.0005$), K/T ($p<0.0001$) and 3-HK/KYN ($p = 0.0001$) significantly correlated with their respective CSF levels. Furthermore, in AD plasma, decreases in immunomodulatory KYN ($p = 0.0328$) and neuroprotective PIC ($p = 0.0094$) correlated with increases in p-tau and tau respectively. In AD CSF, increased 3-HK/KYN ($p = 0.009$), indicative of increased KMO activity, correlated with tau. The present study highlights correlations between KYN, 3-HK, AA, PIC, K/T and 3-HK/KYN in plasma and CSF. Furthermore, strong correlations between 3-HK and 3-HK/KYN and AD hallmarks tau and p-tau demonstrate the potential of KMO as a drug target for the treatment of AD and other conditions with significant tauopathy.

Regional associations of cortical thickness with gait variability

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Gait variability is a novel marker of dementia. However, little is known about the cortical regions important for the control of gait variability. We examined associations between regional cortical thickness and gait variability in a population-based sample of older people. Methods: Participants (n=351, mean age 71.9±7.1) were randomly selected from an electoral roll. Variability in step time, step length, step width and double support time (DST) were calculated as the standard deviation of each measure, obtained from the GAITRite walkway. FreeSurfer pipeline was used to processes MRI scans and obtain cortical thickness of 68 regions. Associations of regional mean cortical thickness and regional thickness ratio (regional thickness/overall mean thickness) with gait variability were examined using Bayesian regression models. Results: Smaller total brain cortical thickness was only associated with greater step width and step time variability. Smaller mean thickness in widespread regions important for sensory, cognitive and motor functions were associated with greater step width and step time variability. In contrast, smaller thickness in a few specific frontal and temporal regions were associated with DST and step length variability. The regional thickness ratio in frontal and temporal regions important for motor planning, execution and sensory function was associated with all gait measures. Conclusions: Examining individual cortical regions is important in understanding the relationship between grey matter and gait variability. Cortical thickness ratio highlights that smaller thickness in specific regions, compared to overall thickness important for the consistency of gait.

Gait characteristics are associated with decline in specific cognitive domains: A longitudinal population-based study

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Gait impairments have emerged as novel predictors of dementia. This study aimed to determine whether gait characteristics were associated with decline in specific cognitive domains and whether the presence of the ApoE4 genotype modified these associations. Methods: Participants (n=410; mean age 72.0±7.0 years) were randomly selected from the electoral roll. At baseline, gait speed was assessed using the GAITRite walkway. Gait variability in step time, step length, step width and double support time (DST) was calculated as the standard deviation of each measure across all steps. The difference between usual and fast pace was calculated in a subsample (n=177). At baseline and follow up, processing speed, memory, executive and visuospatial function were measured using neuropsychological tests. Multivariable mixed models were used to examine 1) associations between gait and each cognitive domains over time (gait×time) and 2) whether the presence of ApoE4 genotype modified these associations. Results: Higher DST variability was associated with greater decline in memory (p = 0.03). Slow gait speed predicted decline in processing speed (p=0.02), visuospatial function (p=0.03) and in memory only in APOE4 carriers (p=0.02). Conclusions: Gait is an early indicator of cognitive decline. Specific gait measures are useful in identifying decline specific cognitive domains.

BRIGHT-YOD: Using telepsychiatry and teleneuropsychology to provide assessment, diagnosis and care in Young Onset Dementia.

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The BRIGHT-YOD 'Utilising telehealth to bridge the gaps in Young Onset Dementia' is a world-first service innovation project run by Neuropsychiatry Unit, Royal Melbourne Hospital (RMH) and Better Care Victoria in collaboration with Ballarat, Goulburn Valley, Albury and Royal Park Cognitive Dementia and Memory Services (CDAMS), Dementia Australia, Huntington's Victoria and Consumer and Carer Representatives. The service provides diagnostic telepsychiatry and teleneuropsychology for people living in rural and remote areas to improve equity of access to multidisciplinary care. Young-onset dementia (YOD) affects 27,000 Australians. There are delays in diagnosis up to 5 years, due to the complexity of diagnosing dementia in a younger person. Consumers often need to travel to a major metropolitan city to access specialist care, causing physical and financial strain. Pilot implementation ran from April 2019-January 2020. To date, 61 unique consumers have undergone diagnostic assessment with 130 appointments offered. Greater than 35% of consumers and carers reported they would not have otherwise attended the RMH for the appointment, and the average distance for rural patients (ARIA 1 and above) was increased from 137km for the face to face versus 273km for the telehealth clinic. Over 67,000km and 19.8 tonnes of carbon emissions were saved. We have found telehealth to be a well-tolerated and flexible service medium for consumers with atypical dementias and neuropsychiatric conditions seeking diagnosis and follow-up care. This pilot aims to create a cultural change in the approach to clinical service provision, to allow consumers a choice in how they access their healthcare.

Using serum lipids to detect pathophysiological changes in frontotemporal dementia

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Analysis of lipids has greatly improved the understanding of pathophysiological changes in human diseases. Understanding lipid changes in neurodegenerative diseases is particularly important because of the fact that lipids make up >50% of brain tissues. Frontotemporal dementia (FTD) is a common cause of early onset dementia, characterized by brain atrophy, concomitant loss of lipids and dyslipidemia. However, little is known about the link between dyslipidemia and FTD pathophysiology. Here, we utilized an innovative approach – lipidomics based on mass spectrometry – to investigate three key aspects of FTD pathophysiology – mitochondrial dysfunction, inflammation, and oxidative stress. We analyzed the

lipids that are intrinsically linked to neurodegeneration in serum collected from FTD patients and controls. We found that cardiolipin, acylcarnitine, lysophosphatidylcholine, platelet-activating factor, o-acyl-ω-hydroxy fatty acid and acrolein were specifically altered in FTD with strong correlation between the lipids, signifying pathophysiological changes in FTD. The lipid changes were verified by measurement of the common disease markers (e.g. ATP, cytokine, calcium) using conventional assays. When put together, these results support the use of lipidomics technology to detect pathophysiological changes in FTD. It has also opened avenues for biomarker development and for monitoring disease progression in FTD.

Developing a blood-based biomarker test for brain health

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Early detection of dementia risk will require the development of biomarker tests that are non-invasive and readily available. To move the field forward will require us to discover, innovate and translate our research. Discover: Several brain proteins can be detected in blood, but their relationship to changes in the brain, such as synapse, axon and neuron loss, are not clear. Using animal models of disease, we have demonstrated that neurofilament light protein (NFL) is not significantly increased in the APP/PS1 mouse model of amyloidosis at 15 months when there is substantial amyloid pathology, but limited neuronal, axonal and synaptic degeneration ($p>0.05$ wildtype 61.6±8.8 pg/ml; transgenic 65.0±8.2pg/ml). However, there was a significant effect of ageing ($p<0.01$ 9months 37.8±3.1 pg/ml). Conversely, in a mouse model of motor neuron disease, characterized by rapid neuronal loss, there is a significant ($p<0.001$) 41-fold increase in plasma NFL at end stage disease which is reduced 49% in mice genetically manipulated to promote axon protection (SARM1knockout). We are now using inducible models of tau/TDP-43 mediated neurodegeneration to determine whether blood NFL changes in response to attenuated pathology, thus mimicking positive effects of neuroprotective drugs. Innovate: We are developing novel aptamer-based biosensors for detection of blood proteins at picogram levels for use in point-of-care devices. Translate: We are measuring serum NFL in a cohort of 200 people over the age of 50 and correlating to longitudinal measures of cognitive function. Together this work aims to develop blood biomarker tests to predict adverse changes in the brain.

Predicting Progression of Nonfluent Variant of Primary Progressive Aphasia

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Nonfluent-variant of primary progressive aphasia (nfvPPA) is a group of neurodegenerative conditions characterized by prominent effortful, halting speech and/or agrammatism. While the clinical diagnosis remains unchanged in most cases, new clinical features emerge in a proportion of cases, warranting an alternative diagnosis, mainly, corticobasal syndrome (CBS) or progressive supranuclear palsy (PSP). We aimed to identify relevant clinical and language signs at presentation suggestive of a revised diagnosis. Sixty-seven people initially diagnosed with nfvPPA were recruited at the FRONTIER dementia clinic in Sydney. 58% of them had at least one follow-up visit between 2007 and 2019. At follow-up 72% of people (n = 28) still met criteria for nfvPPA. Of the remainder, considerable heterogeneity was observed in the revised diagnosis. Notably, the most common was a change to a diagnosis of frontotemporal dementia with motor neurone disease (FTD-MND), which occurred in 13% of patients (n = 5). A further 13% of patients were either diagnosed with CBS (n = 2) or PSP (n = 3). The remaining case was reclassified as logopenic progressive aphasia (n = 1). Examination of initial clinical assessment indicated that syntactical errors were more common in those who did not change, whereas difficulties with sentence repetition tended to be more common in patients who changed diagnosis. Our results demonstrate that even in specialist clinics around 30% of people with nfvPPA who are reviewed have changed diagnosis. Unexpectedly, the most common change was to FTD-MND, which warrants further investigation. Future

analyses will examine clinicopathological associations in this cohort.

Deficits in learning are greater than memory dysfunction in preclinical Alzheimer's disease

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Prospective studies of Aβ+ cognitively normal (CN) older adults now show that memory performance remains stable across re-assessments, whereas performance improves substantially in matched Aβ- controls (practice effect). However, medial temporal lobe disruption in Aβ+ CNs may manifest more strongly as learning deficits than as progressive memory decline. Using a specifically designed learning test, we aimed to determine the extent to which deficits in learning over 6 days are associated with Aβ+ and hippocampal volume. Methods: Eighty CNs from AIBL underwent PET neuroimaging to determine Aβ status (42 Aβ- and 38 Aβ+), MRI to determine hippocampal and ventricular volume and repeated assessment of memory. Participants completed the Online Repeatable Cognitive Assessment-Language Learning Test (ORCA-LLT), which required they learn associations between 50 Chinese characters and their English language equivalents over 6 days. Results: Learning curves in the Aβ+ CNs were significantly worse than those in matched Aβ- CNs (d=2.16, p<.001), and greater than differences between these groups for memory decline since their enrolment in AIBL (d=0.52, p=.021), or memory impairment at their most recent visit. In Aβ+ CN adults, slower rates of learning were associated with smaller hippocampal, and larger ventricular volumes. Conclusions: In CNs, Aβ+ is associated more strongly with a deficit in learning than any aspect of memory dysfunction. Slower rates of learning in Aβ+ CNs were associated with smaller hippocampal volume. The primary cognitive consequence of Aβ+ may be a failure to benefit from experience when exposed to novel stimuli, even over very short periods.

Younger-onset dementia: delay to diagnosis

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There are approximately 27,000 people in Australia with younger-onset dementia (YOD). The causes can range from Alzheimer's dementia (AD), frontotemporal dementia (FTD) as well metabolic and genetic disorders. It is crucial to obtain a definitive diagnosis as soon as possible in order for appropriate treatment and future planning to occur. It can take 4-5 years to get a diagnosis (Draper et al. 2016). We report on our experience of diagnostic delay. Methods: This was a retrospective file review of 10 years of inpatients from Neuropsychiatry, Royal Melbourne Hospital, Australia. Neuropsychiatry is a tertiary/quaternary service which provides assessment of people with cognitive, psychiatric and neurological symptoms. Factors such as age of onset, number of services/specialists seen and ethnicity (Caucasian vs non-caucasian) were analysed using multivariate regression. Results: Of the 306 who had a YOD, the most commonly occurring dementia was AD (24.2%), followed by FTD (23%). There was an average of 3.7 years delay to diagnosis. Patients with Niemann-Pick type C (NPC) had the longest delay to diagnosis, 6.3 years delay. The variables of age of symptom onset and number of specialists/services seen were the significant predictors of delay to diagnosis $F(7,212)=3.975$, $p<0.001$, $R211.6$. Discussion and conclusions: This was an eclectic group of people with YOD. The results of regression suggests that there are other factors which contribute to the delay, which are not just demographic related. Rarer disorders, such as NPC which present at an early age, and present with symptoms that aren't cognitive, can contribute to diagnostic delay.

Assessing cognitive differences in individuals at high genetic risk of Alzheimer's disease using online testing

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The PISA study aims to characterise the natural history of Alzheimer's disease (AD) at its prodromal phase. Utilising genetic risk prediction we have identified middle-aged and older Australians at high risk of dementia. In addition to onsite phenotyping, online surveys and cognitive testing have been used to economically collect information from an Australia-wide sample. We have utilised our population based sample recruitment pool (N=15,351) of previous research participants who have been genome wide genotyped. Participants are invited to complete a comprehensive online survey, then complete online cognitive assessments, including Cambridge Brain Sciences (CBS), Cogstate, and an emotion recognition task. Thus far, nearly 3,000 participants have taken part in our core online survey and, of these, 1658 participants have completed the CBS assessment consisting of twelve subtests assessing memory, reasoning, attention, and planning. Recruitment for CBS and the other platforms is ongoing and participants are being invited to complete follow-up assessments after two years. At baseline we find significant association of both APOE genotype and polygenetic risk scores (PRS) for AD (omitting the APOE region) in a healthy middle-aged and elderly individuals with cognitive domains tested using the CBS platform. The utility of online cognitive testing for large scale testing in cohort and epidemiological studies will be discussed. The identification of cognitive changes associated with AD risk and prodromal disease gives important insights into mechanisms of AD development throughout the life span and is an opportunity to investigate prodromal markers to allow selection of individuals for early treatment strategies.

Brain-behaviour relationships in healthy mid-life Australians: Role of age, gender and genetic risk for dementia

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Our prospective cohort study, "Prospective Imaging Study of Ageing: Genes, Brain and Behaviour," (PISA) aims to characterise the natural history of Alzheimer's disease (AD) at its prodromal phase. PISA utilises genetic prediction to recruit and enrich a prospective cohort and follow them longitudinally. We have completed a comprehensive phenotypic, lifestyle, genetic and imaging characterization of mid-life Australians at high risk of dementia to discover biological markers of early neuropathology, identify modifiable risk factors, and establish the very earliest phenotypic and neuronal signs of disease conversion. Details of the PISA cohort and an update of data collection will be presented. Here we present the primary effects in complex baseline data, combining machine learning and multivariate analyses to uncover the moderating role of genetic risk for dementia on complex brain-behaviour relationships. Multivariate techniques identify the primary co-variations between different modalities– namely demographics and lifestyle factors (principally age, gender, years of education); cognitive function (both on-line and using detailed neuropsych assessment); genetics (APOE genotype and additional variation combined within polygenic risk scores); and brain (morphology plus structural and functional connectivity). These findings will form the bases for the predictions that will be tested at follow-up; for dementia high risk prediction algorithms and for fundamental understanding of brain-behaviour relationships in healthy mid-life Australians.

Harmonising neuropsychological assessments across Australian Memory Clinics: Insights into current practices and new ways forward

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A detailed neuropsychological assessment is usually necessary to establish a precise dementia diagnosis, particularly in cases with complex presentations or subtle cognitive deficits. The large variability in tests and normative data currently used in Australian Memory Clinics make test findings difficult to compare across services, potentially affecting diagnostic accuracy. Hence, the Australian Dementia Network - Memory Clinics initiative (ADNeT-MC) aimed to develop a harmonised protocol for a standardised neuropsychological assessment that enhances diagnostic accuracy and efficiency without precluding a hypothesis-driven approach. ADNeT-MC conducted a national survey of 150 Memory Clinics clinicians to identify the clinics' organisational structures and the most commonly used test instruments. We additionally identified outcome measures and test norms generally used in clinical trials. A clinically feasible overlap between research and clinical protocols was desirable to facilitate the translation of future research findings into practice. The survey showed that Australian clinicians used over 100 different test instruments at least 'sometimes'. From these, the top 3 test tools for each cognitive domain were identified. Notably, the organisational differences across Memory Clinics (e.g., metropolitan versus regional) did not result in differences in test use. Based on these results, ADNeT-MC developed an innovative electronic neuropsychology assessment form comprising 11 tests assessing 7 cognitive domains. An automated normative score calculator integrated into the form will save time in analysing results, minimise human error, and encourage harmonisation of test and norms use among Australian neuropsychologists. An evaluation study will be conducted to confirm the protocol's utility in clinical settings.

Changes in Subjective Cognitive Complaints Over Time are Associated with Cognitive Decline and Incident Dementia

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Subjective cognitive complaints (SCCs) are now an established risk factor for dementia, however, little is known about the trajectories of SCCs over time. This is an initial attempt to examine whether changes in SCCs reporting over time are associated with cognitive decline and/or risk of dementia. Method: Participants consisted of 1037 older adults without dementia (Mage = 78.65) from the Sydney Memory and Ageing Study who were followed-up biennially over 10 years. Global cognition was measured with comprehensive neuropsychological testing. Clinical diagnoses were made by expert consensus. SCCs were measured using the six-item Memory Complaint Questionnaire (MAC-Q). The associations between changes in SCCs and global cognition as well as between changes in SCCs and risk of dementia were examined. Results: After controlling for covariates, there was a significant negative association between changes in SCCs and global cognition, such that participants who reported more SCCs over time also showed a steeper rate of decline in global cognition. We also found an association between increasing SCCs and dementia risk, where participants who reported more SCCs over time were also at greater risk for developing dementia. Conclusion: This is one of the first studies to examine whether changes in SCCs over time are associated with cognitive decline or dementia. These results are clinically relevant as GPs will likely notice a patient who presents with increasing complaints over time and this individual could be at greater risk of cognitive decline and dementia.

Unsupervised web-based cognitive assessment in individuals at-risk of AD: Results from The Healthy Brain Project

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Web-based platforms are used increasingly to assess cognitive function in unsupervised settings. However, methods for ensuring the validity of cognitive data arising from unsupervised assessments are limited. We applied Human Computer Interaction (HCI) concepts of acceptability and usability to examine the validity of unsupervised cognitive testing in middle-aged adults enrolled in the Healthy Brain Project. Methods: 1594 middle-aged adults (mean age 56 years) completed unsupervised assessments using a self-administered version of the Cogstate Brief Battery via our online platform, healthybrainproject.org.au. HCI acceptability was defined by the nature and amount of missing data, and HCI usability as (a) errors made during test performance, and (b) time taken to read test instructions and complete the tests (learnability). We also explored whether cognitive performance varied across testing environments (e.g., home/work alone, home/work with others around, public space). Results: Overall, we observed high acceptability (98% complete data) and high usability (95% met criteria for low error rates and high learnability). Test validity was confirmed by observation of expected inverse relationships between performance and increasing test difficulty and age. After accounting for the effects of age, testing environment had no significant effect on cognitive performance or the proportion of individuals who satisfied our pre-specified acceptability and usability criteria. Conclusion: Data collected in this study retains similar psychometric characteristics to those collected from supervised testing of the same tests. HCI definitions of acceptability and usability show great promise for use as real time algorithms for the collection of valid indices of cognition in unsupervised settings.

Relationships between cerebellar atrophy and cognition in frontotemporal dementia with and without c9orf72 gene expansion

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The expansion of GGGGCC hexanucleotide repeat in the non-coding intronic region of the chromosome 9 open reading frame 72 gene (C9orf72) is the most common genetic cause of familial frontotemporal dementia (FTD). Cerebellar changes in FTD patients with C9orf72 gene expansion (C9-FTD), however, have been inconsistently identified. This study aimed to identify the patterns of cerebellar atrophy in C9-FTD patients compared with non-carrier FTD (NC-FTD) patients and healthy controls and determine the differential associations between cerebellar atrophy and cognition in these two groups. Methods: Sixty FTD patients (30 C9-FTD, 30 NC-FTD) and 30 matched healthy controls underwent brain MRI and cognitive assessments. The patient groups were matched for disease duration, general cognition, and disease severity. Results: Compared with controls, cerebellar atrophy was identified in both FTD groups. In NC-FTD, changes were found in bilateral lobules I-VI, Crus, VIIb, VIIIa, VIIIb, and vermis. In C9-FTD, focal changes were present bilaterally in the lobules VI and Crus. These changes were all located within the cerebellar regions found to be affected in NC-FTD. In NC-FTD, cerebellar atrophy was significantly associated with poorer performance on tasks of attention, working memory, language, episodic memory, executive function, and emotion processing. In C9-FTD, these associations were limited to attention, language, and executive function. Conclusions: This study is the first to shed light on the specific impact of C9orf72 gene expansion on cerebellar integrity in FTD. The findings reveal patterns of cerebellar atrophy in C9-FTD and non-carriers, and provide novel insights into their associations with cognition.

Using cluster analysis to identify Mild Cognitive Impairment phenotypes in Parkinson's disease

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The concept of mild cognitive impairment (MCI) has been adopted to identify at-risk patients with Parkinson's disease dementia (PDD). Recent literature, however, suggests that there are clinically heterogeneous frontal vs. posterior phenotypes within PD-MCI, which present with distinct executive/attention vs. memory/visuospatial impairments, respectively. Importantly, the posterior syndrome has shown to progress more rapidly toward PDD, suggesting a prodromal PDD syndrome. These PD-MCI phenotypes are not currently accounted for by the recommended guidelines for PD-MCI diagnosis. Thus, using a data-driven cluster approach, we aimed to identify these subtypes in order to define their cognitive characteristics. Method: A K-means cluster analysis was performed on 10 frontal-based and posterior-based variables derived from a dataset of 85 PD patients without dementia. The optimal cluster structure was chosen based on 21 quantitative validity criteria as well as its theoretical and clinical relevance. Patients were also assessed at a standardised diagnostic criteria PD-MCI diagnosis. Results: The resulting cluster structure revealed a progressive gradient of four distinct cognitive phenotypes: Cognitively-intact; Frontal-dominant impaired; Posterior-dominant impaired; and Globally-impaired. Demographic/affective profiling revealed significant differences in the age, gender split, global cognitive ability and motor symptoms of the phenotypes. Conclusions: The results showed strong frontal vs. posterior cognitive subgroups within PD-MCI. The validation of these distinct cognitive phenotypes encourages future research into their clinical trajectory to confirm whether the posterior subgroup truly present in the prodromal PDD phase. Targeting the subgroups for therapeutic innovations may therefore help streamline dementia research.

Can fluency tasks differentiate between parkinsonian disorders?

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Internally generated responses are centrally affected in parkinsonian disorders. Fluency tasks are widely used to assess voluntary generation of multiple responses. Thus, we investigate verbal and non-verbal fluency task performance across parkinsonian disorders in order to characterise differential patterns and to identify the crucial cognitive components. Participants with parkinsonian disorders (N = 58: 29 Parkinson's disease [PD], 22 corticobasal syndrome [CBS], 8 progressive supranuclear palsy [PSP]) and 89 age-matched controls completed baseline cognitive assessments and eight fluency tasks (two of each type: word, design, gesture, ideational). We analysed the total number of correct responses generated, error rates (repetitions and rule breaks) and the consistency of responding over time ("energization rate"). Individuals with CBS and PSP were significantly reduced in the number of correct responses generated across all fluency tasks, without incurring significant errors. By contrast, individuals with PD were only reduced on three fluency tasks; however, they also produced a high error rate on four fluency tasks. Those with PSP showed a pattern of responding that reflected reduced energization as they failed to maintain response generation over time. Overall, the findings reveal different patterns of fluency task performance across parkinsonian disorders. Specifically, the quantity of responses generated is differentially and primarily affected in CBS and PSP, whereas the quality of responses generated is primarily affected in PD. This has implications for both the differential diagnosis of parkinsonian disorders and the cognitive processes implicated in internally-guided response generation.

Idea selection for spoken language production in healthy ageing and dementia

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The ability to select an idea from many competing alternatives is critical for communication. Impairments in the ability to select ideas have been reported to underlie difficulties in spoken language production in persons with dementia, with recent evidence suggesting that idea selection is poorer in older compared to younger adults. Thus, we investigate whether verbal idea selection tasks are sensitive to selection demands in healthy older adults and persons with dementia. Participants included 154 neurologically healthy adults aged 18-89 years, and a case series of individuals with dementia. All completed a neuropsychological baseline, as well as three experimental idea selection tasks that required the oral generation of a single word or sentence in response to a sentence frame, single word or word pair stimulus. Selection demands varied within task, such that stimuli either activated a dominant response or multiple competing response alternatives. All three idea selection tasks were sensitive to selection demands in terms of response times (but not errors) in healthy individuals and response times and errors for individuals with dementia. In addition, older age was associated with greater effects of selection demands and exploratory analyses revealed that executive functions may contribute to idea selection. These findings have implications for theoretical models of spoken language production and for the clinical assessment of language and early diagnosis of dementia.

Exploring Older Adults' Experience and Emotions during Computerised Neuropsychological Assessment – Preliminary Results from CogSCAN Study

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Computerised neuropsychological assessment (CNA) could overcome barriers to assessment and diagnosis of neurocognitive disorders in older adults. Older adults may, however, be less familiar with technology; CNA may elicit greater anxiety, lower participation or worse performance. Presented is preliminary data on older-Australians' testing experience and emotional responses during CNAs from the CogSCAN Study. To date, 238 community-dwelling adults aged 60-95 years completed two CNA batteries (from CANTAB, CogState, CBS, NIH Toolbox) and rated their experience on four questions (enjoyment, interest, difficulty, anxiety), and emotions during testing on a Mood Adjective Checklist, with four subscales - high stress (worried), low stress (relaxed), high arousal (energised), low arousal (tired). Some found CNA difficult (11.3%) or felt anxious about their performance (10.5%); more enjoyed the tasks (29.4%) or found them interesting (27.7%). Similarly, some felt worried (24.9%) or tired (7.6%); more felt relaxed (49.9%) or energised (73.4%). A sub-sample (N=146) completed a pen-and-paper battery (PnP) counterbalanced with CNAs. PnP ratings were significantly higher than CNA for enjoyment, interest, relaxation, energy and tiredness. No differences were found on difficulty, anxiety or high stress. This cohort of older Australians had more favourable experience and emotions during PnP. Nonetheless, CNAs received more positive than negative ratings, and did not elicit greater negative emotions nor experience than PnP, suggesting CNAs may be an acceptable alternative to PnP assessment. Future work will investigate predictors of test experience, emotional response, and performance, on CNA and PnP, to guide decisions about the most appropriate cognitive testing format for individuals.

Reduced attention and cognitive control neuronal activity in amnestic mild cognitive impairment (aMCI)

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Aims: Mild cognitive impairment (MCI), conceptualised as the prodromal phase of dementia, causes a decline in cognition, affecting around 30% of Australians aged 70 years and older. People with MCI who have a memory deficit (amnestic MCI; aMCI) have an increased risk of Alzheimer's disease (AD); the most common cause of dementia. The aim of this study was to characterise the real-time neuronal activity in people with aMCI whilst they engage in a cognitive control task. Method: Forty-two people with aMCI and sixteen healthy age, gender, and education-matched controls (HCs) completed an auditory equiprobable Go/NoGo task whilst having their EEG activity recorded (N = 58). EOG-corrected and averaged event-related potentials (ERPs) for correct Go and NoGo trials for each group were submitted to four separate temporal principal components analyses (PCAs).

Results: Go N1-1, P3b, and SW, and NoGo N1-1, P2, and LP had significant ($p < .05$) topographic group interactions. Of these effects, individuals with aMCI generally had lower component amplitudes than HCs, with only the NoGo P2 showing a focal increase in people with aMCI. Conclusions: Results demonstrate that, compared to HCs, people with aMCI have reduced neuronal activation when encoding attentional information associated with auditory stimuli, disengaging from sensory processing associated with inhibitory control, and initiating motor response selection and evaluation. Findings further our understanding of the brain and cognitive function changes in early-stage AD that precede major cognitive decline, and help to characterise the neuronal activity and behaviour associated with increased dementia risk.

Digital Vocal Signature of Cognitive Reserve Exposure using LOGOS Memory Technology

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Cognitive Reserve refers to the human brain's ability to conserve function despite pathology, injury or insult by cerebral adaptation, in large part determined by lifelong exposure to voluntary and involuntary stimulatory environments. Cognitive Reserve Exposure can be measured using self-report instruments including our validated Lifetime of Experiences Questionnaire (LEQ), which is predictive of brain atrophy, cognitive decline, and incident dementia. However, to date, a simple and readily accessible biomarker of Cognitive Reserve Exposure has proven elusive. Methods: LOGOS is our novel, fully automated, phone-based digital episodic verbal memory test, administered in a large cohort of non-demented older individuals (Maintain Your Brain Trial, MYB, N=4233). Audio-based paralinguistic features were iteratively defined, extracted and reduced. Classification accuracy of binarized LEQ status using the k Nearest Neighbour machine learning algorithm was assessed by 10-fold cross validation. Results: In the large MYB cohort, LOGOS memory performance closely matched a gold standard clinical test (Rey Auditory Verbal Learning Test) across a panel of psychometric properties. Based on individuals with complete audio (N=4085), 283 features at the trial-, word- and frame-level were reduced to reveal a 13-feature subset predictive of LEQ status with 89.9% accuracy. Conclusions: LOGOS is the first validated and automated test of verbal list learning and free recall that can be deployed at scale. Using a large dataset, we for the first time reveal a digital vocal signature closely tied to Cognitive Reserve Exposure. Further research is required to better understand the nature of this putative digital biomarker.

Identifying mild cognitive impairment in older Aboriginal Australians: Clock Drawing Test and other screening tools

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The Clock Drawing Test (CDT) is commonly used in detection of cognitive disorder. Easily administered in clinical and non-clinical settings and well accepted by patients, this test is a good candidate for early detection of dementia with older Aboriginal Australians. This study aimed to compare three CDT scoring methods' reliability and validity in detecting mild cognitive impairment (MCI) and dementia; and investigate the relative and combined performance of the CDT with other cognitive screening tools [Kimberly Indigenous Cognitive Assessment (KICA); Mini Mental State Examination (MMSE); Roland Universal Dementia Assessment Scale (RUDAS)]. A subset of participants (n=153; aged 60-93) from the Koori Growing Old Well Study completed comprehensive medical assessment and were diagnosed as intact, MCI or dementia. CDT responses originally scored in Addenbrooke's Cognitive Examination-Revised (ACE-R) were rescored using Mendez and Sunderland methods. All CDT scoring methods differentiated dementia from MCI and intact participants ($p<.001$), but not intact from MCI (Mendez $p=.712$; Sunderland $p=.545$; ACE-R $p=.094$). The MMSE performed best in detecting any cognitive impairment (MCI/dementia; AUC=.851). In distinguishing MCI from intact participants, MMSE (AUC=0.777) was also superior to both the KICA (AUC=0.624; $p=.0252$) and CDT (AUC=0.586; $p=.0026$), but comparable to the RUDAS (AUC=0.680; $p=.2037$). Combining the CDT with other screening tools did not significantly improve diagnostic performance for cognitive impairment or MCI. CDT alone is not an adequate screening tool for MCI; however, has potential for detecting moderate-severe cognitive impairment in older Aboriginal Australians. Relative to other screening tools, the MMSE performed best for detecting cognitive impairment and MCI.

Metabolic phenotyping in a multi-centre clinical cohort of Alzheimer's disease

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Metabolic phenotyping uses state-of-the-art analytical chemistry technologies to produce unique chemical fingerprints of biofluids collected from both epidemiological and clinical population studies. The technique can be used to investigate specific pathways of interest and uncover molecular mechanisms in Alzheimer's disease. METHODS: Metabolic phenotyping was applied to urine (n=556). Data was extracted representing metabolites from pathways related to serotonergic signalling and markers of systemic inflammation. Follow-up analysis was completed in matched serum collected from the same study participants at the same study visit (where sample was available – n=354). RESULTS: Kruskal-Wallis tests revealed significant inter-group differences in urinary xanthurenic acid ($p = 0.0001$), kynurenic acid ($p = 0.0005$), serotonin ($p = 0.0016$), 5-hydroxyindoleacetic acid ($p = 0.0020$), tryptophan ($p = 0.0050$) and the kynurenine/tryptophan ratio ($p = 0.0021$) – a marker of systemic inflammation. In serum significant inter-group differences were observed for xanthurenic acid ($p = 0.0019$), kynurenine ($p = 0.0006$), serotonin ($p = 00016$) and tryptophan ($p = 0.0024$). For all metabolites an overall decreasing trend in concentrations was also observed dependant on clinical diagnosis - control > mild cognitive impairment (MCI) > Alzheimer's disease (AD). CONCLUSION: Neuroactive metabolites and molecular makers of systemic inflammation were investigated using metabolic phenotyping. Results showed metabolite changes in both the urine and serum of individuals diagnosed with AD. Future work may investigate the viability of modulating these pathways to promote downstream metabolite bioavailability and help alleviate systemic inflammation and serotonergic signalling disruption in AD.

Predicting brain age and its utility as a brain ageing biomarker: a systematic review

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The brain undergoes structural and functional changes as a normal part of ageing, and more severe changes often reflect underlying clinical disease. The considerable inter-individual heterogeneity within the population however, prevents a consensus on which brain phenotypes reflect normal ageing and pathology. To overcome this challenge, a biomarker of brain ageing - BrainAGE that combines neuroimaging data with machine learning has been developed. Deviations of brain age from chronological age could indicate accelerated/decelerated ageing. This systematic review aims to identify the different neuroimaging estimates of brain ageing, and their association with health factors and disease. A systematic search of Embase and MEDLINE via Ovid (1974 to present) was conducted following PRISMA guidelines. Included were 40 studies which estimated brain age using 10 different protocols, acquired from magnetic resonance imaging (MRI) or positron emission tomography (PET). Grey matter volume (GMV) was most commonly reported (16 articles). Studies associated brain ageing with a variety of mental health and neurodegenerative disorders, health and lifestyle factors, and sex hormone levels. Most consistent was accelerated brain ageing in individuals with Alzheimer's disease, schizophrenia and HIV. In summary, this systematic review identified a preference towards using GMV to estimate brain ageing, and accelerated ageing was observed in specific disease. BrainAGE is still a relatively new concept, and the majority of studies have relied on a relatively simple volumetric MRI measure. Thus investigation of more advanced neuroimaging features which might show greater sensitivity to differentiate normal ageing from disease is now required.

Subjective Memory Decline and Neuropsychological Performance over 12 years: the PATH Through Life Study

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Background: The association between subjective memory decline (SMD) and neuropsychological domains is not well understood. Method: Four waves (4-year intervals between waves) of data from 2,551 participants (aged 62.5±1.5 years) were used. SMD was defined as a response of 'no' to one question: Can you remember things as well as you used to? (w1 and w2), and categorized as 'consistent' (SMD both waves), 'fluctuating' (either) or 'neither'. A more comprehensive self-reported questionnaire, MAC-Q, was available at w4, and included questions about five specific and one general memory item (e.g. names, postcodes). Neuropsychological tests (w2 to w4) included immediate and delayed recall, digit span backwards, spot-the-word, symbol-digit-modalities (SMDT), Trails A and B and Purdue pegboard. We used linear mixed models to examine cross-sectional and prospective associations between the categories of SMD and neuropsychological performance, and linear regression models to investigate cross-sectional associations between SMD and neuropsychological performance at w4. Results: 'Neither', 'fluctuating' and 'consistent' SMD were present in 51%, 27% and 22% of participants. SMD categories were not associated with steeper neuropsychological decline but were associated with lower SDMT and Purdue pegboard scores at w2 (adjusted for age, sex, education, anxiety, depression, smoking, hypertension, diabetes and high cholesterol, all $P \leq 0.03$). Nineteen percent of participants had MAC-Q assessed SMD, which was cross-sectionally negatively associated with all neuropsychological tests (all $P<0.02$). Conclusion: The predictive value of SMD for future neuropsychological decline is not supported by this study. We may need a more appropriate approach, containing specific self-report items, to 'flag' SMD.

Intervention and Treatment

The role of automatic habit in physical activity behaviours of older Australians

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Physical inactivity is a key risk factor for dementia, yet only 17% of older Australians are sufficiently active. Increasing physical activity levels in this population is an urgent health priority. Automatic, context-dependent habits may play an important role in physical activity behaviour. This study aimed to investigate the relationship between physical activity behaviours and their automaticity in older Australians. Method: 110 community dwelling Australians aged over 65 years (M=72.3; 75 women), recruited from participant registries, local hospital noticeboards and community groups, completed an online questionnaire. Current physical activity levels were measured using the Incidental and Planned Exercise Questionnaire, and automaticity of those physical activity behaviours were measured using the Self-Report Habit Automaticity Index. Participants also reported demographic information, falls and medical history, and current mood symptoms. Results: Participants reported an average of 5.80 hours planned moderate/vigorous exercise (SD=4.08), 2.28 hours planned walking (SD=2.41), and 21.07 hours incidental physical activity (SD=15.7) per week. After controlling for history of falls, age, gender and presence of medical conditions, higher automaticity scores predicted higher levels of planned moderate/vigorous exercise (p=.018) and planned walking (p=.008), but not incidental activity (p=.055). Discussion: In a sample of active older Australians, participants who engaged in higher levels of planned moderate/vigorous exercise and planned walking activity reported their physical activity to be more automatic than those reporting lower levels of activity. Targeting automatic habits might be a promising new approach to help older Australians increase their physical activity and reduce their risk of developing dementia.

Using Organoids derived from MND/FTD Patient Induced Pluripotent Stem Cells (iPSC) to Model Disease

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The advancements of stem cell technology enable us to use skin samples from human patients to derive induced pluripotent stem cells (iPSC). Differentiating iPSC into relevant cell types to a disease of interest, in our case Motor Neuron Disease (MND)/Frontotemporal Dementia (FTD), enables us to investigate disease pathways with patient- and cell-specificity. Objectives: To create 3D organoid structures from patient iPSC to investigate mechanisms of disease in MND/FTD. Methods and Preliminary Results: We have access to the largest bank of MND/FTD patient iPSC lines in Australia spanning sporadic and familial cases and have begun creating CRISPR-Cas9 gene-edited control lines for the familial iPSC lines. To model MND, we neuralise, caudalize and ventralize the iPSC and create neurospheres that mirror development of the pMN domain of the spinal cord thereby containing the relevant cell types to MND including motor neurons, interneurons, myelinating oligodendrocytes and astrocytes. We have successfully cultured organoids from MND patients harbouring common genetic mutations in genes such as SOD1 and C9orf72 allowing us to now characterise pathology, cell morphology and functional capacity, individually and as a network of cells, within our organoids compared to otherwise healthy control organoids.

Supporting Spouses of Residents with Dementia: pilot and feasibility study of a psychosocial intervention

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Spousal carers of people with dementia may be at risk of negative psychosocial outcomes following placement of their partner into permanent residential care, but few formal supports currently exist to help

them cope. The Residential Care Transitions Module (RCTM) is a psychosocial intervention developed in the United States to support carers post-placement. This doctorate study aimed to adapt and pilot the RCTM for use with spousal carers within an Australian context, using a small-scale cluster randomised controlled trial [N=21]. Eleven spouses were allocated to the RCTM intervention of six telephone counselling sessions delivered over 12 weeks; ten received printed information only as the comparison group. Mean scores at baseline indicated moderate to high levels of stress, pre-death grief, depression and guilt, however two thirds of participants had not received any formal dementia education, counselling or attended any carer support groups. At four months post-baseline statistically significant decreases over time were found for measures of stress, depression and 'nursing home hassles' in both groups. Whilst no intervention effects were demonstrated for overall grief, promising results in relation to 'acceptance of loss' were reported in favour of the RCTM. Delivery of the RCTM was deemed feasible and acceptable to Australian spousal carers, especially with regard to validation of feelings of loss and grief, and coping strategies related to placement. Whilst recruitment was challenging, retention was high at 91%. This study adds to the evidence-base regarding the feasibility of delivering psychosocial interventions to spousal dementia carers post-placement and the management of pre-death grief. Conclusion: The creation of 3D organoid structures from patient iPSC allows us a more sophisticated platform to interrogate disease pathways compared to monolayer cultures of single cell types and we plan to make cerebral organoids which will also allow us to model FTD. Thus, these organoids have the potential to identify new and unexplored pathways of disease in MND/FTD.

Disinhibited behaviours in dementia: a conceptual framework of biopsychosocial factors and review of management approaches

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Disinhibited behaviours in dementia: a conceptual framework of biopsychosocial factors and review of management approaches.

Disinhibited behaviours, including sexual disinhibition, are less common than other behaviours and psychological symptoms associated with dementia, but when they do occur, they can cause significant distress for families, carers, other residents, as well as individuals who experience them. They raise safety, ethical and legal issues. Nevertheless, they remain largely overlooked in the literature. The limited literature demonstrates considerable heterogeneity in their presentation, their putative underlying mechanisms and management approaches considered most effective. We reviewed literature that investigated the neurobiological underpinnings for disinhibited behaviours. We also reviewed pharmacological and non-pharmacological management approaches published between 2012 and 2018. Biological factors integrated with psychological, social and environmental factors help to explain disinhibited behaviours. We provide a conceptual model that incorporates all associated factors and give case study examples to show how the model may assist in understanding these behaviours and determining the most appropriate treatment. We report evidence from ten intervention studies for pharmacological (medium effect size: mean Cohen's d = 0.53, medium) and nonpharmacological (large effect size: mean Cohen's d = 1.26) approaches for reducing disinhibition. The overall research quality was strong (mean score 12/16). However, issues around measuring and capturing disinhibited behaviours exist due to inconsistent definitions and inadequate understanding of the underlying factors associated with behaviours. Our conceptual model aims to address these and to provide future directions for research and clinical guidance.

National variation in anti-dementia and antipsychotic medication dispensing among people with dementia in Australia

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Anti-dementia and antipsychotic medication use are valuable clinical quality indicators (CQIs) for dementia care. We aim to examine Australia's performance on these CQIs and identify geographic variations in performance. Methods: A cross-sectional study of all aged care users in the financial year 2015-16 was conducted using the Registry of Senior Australians (ROSA). ROSA contains demographic and clinical characteristics (including dementia status and geographical location), and aged and health care utilisation history. Using medication dispensing

records, we examined the national variation in anti-dementia (galantamine, donepezil, rivastigmine, memantine) and antipsychotic medication use, adjusted for sex, age, country of birth, and co-morbidity. Results: There were 152,845 people with dementia in ROSA (64.5% women, mean age 81.6 years, 108,068 (70.7%) living in residential care). At least one anti-dementia medication dispensing was recorded for 28,521 (18.7%) people, while 28,168 (26.1%) of those living in residential care were dispensed an antipsychotic. Anti-dementia medication dispensing was more common among women and with increasing age. Antipsychotic dispensing was more common with increasing age and among those born in Australia; there were no differences by sex. Dispensing ranged from 16% in Tasmania to 38% in the ACT for anti-dementia medication, and from 19.6% in the Northern Territory to 28.1% in Victoria for antipsychotic medication. Conclusions: While Australian performance on the medication-related dementia CQIs are similar to international estimates, there is significant variation in the use of these medicines nationally. Person- and provider-level variation in performance can be used to identify areas for improvement.

Using isogenic stem cells to model disease mechanisms of Juvenile Batten disease

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Juvenile neuronal ceroid lipofuscinoses (JNCL, also known as Batten disease) is a lysosomal storage disorder associated with dementia, vision loss and epilepsy. There is a need for more physiologically relevant human cell-based models to better understand the cellular changes during the disease process and as platforms for drug screening. We used CRISPR/Cas9 and H9 human embryonic stem (ES) cells to reproduce the most common cause of JNCL, a homozygous ~1-kb deletion encompassing exons 7 and 8 of the CLN3 gene (CLN3Δex7/8/Δex7/8), with unmodified H9 ES cell line as an isogenic control cell line. We characterised the isogenic CLN3Δex7/8/Δex7/8 cell lines, as well as neurons and cerebral organoids derived from them. Confocal microscopy analysis of the CLN3Δex7/8/Δex7/8 ES cell line showed increased LAMP1 immunoreactivity relative to control cultures, indicating lysosomal enlargement and suggesting waste accumulation. Electron microscopy analysis of CLN3Δex7/8/Δex7/8 organoids at 5-months showed electron dense inclusions characteristics of lipofuscin and increased number of altered mitochondria, compared to controls. Immunohistochemistry of these organoids also revealed higher expression of astrocytes with longer and thicker processes, indicative of reactive astrocytes. These data provide insights on the development of JNCL phenotypes at the pre-symptomatic stage, and identified cellular phenotypes that may be suitable for drug screening.

Proteomic analysis of amyloid plaques in different subtypes of Alzheimer's disease

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Amyloid plaques contain many proteins in addition to beta amyloid. These proteins are important as they are potential biomarkers and/or therapeutic targets for Alzheimer's disease (AD), and they provide insight into mechanisms of disease. As a comprehensive analysis of amyloid plaque proteins has not yet been done, the aim of this study was to use an unbiased proteomic approach to identify all proteins enriched in amyloid plaques in different subtypes of AD. Amyloid plaques and surrounding non-plaque tissue were microdissected from human post-mortem brain samples from cases of sporadic early onset AD (age at death <65; n=5) or Down syndrome with AD (n=5). Quantitative mass spectrometry showed that 116 proteins were consistently enriched in plaques in both early onset AD and Down syndrome in addition to beta amyloid. The five most highly enriched proteins in plaques were the same in both AD subtypes; COL25A1 (136-fold enriched in plaques), SMOC1 (87-fold enriched), MDK (59-fold enriched), NTN1 (55-fold enriched), and HTRA1 (49-fold enriched). Pathway analysis showed that plaques were most significantly enriched in vesicle proteins (predominantly endosomal/lysosomal proteins), suggesting that the endosomal/lysosomal system may have an important role in amyloid plaque formation. We also identified 53 novel proteins enriched in plaques. Immunohistochemistry validated the enrichment of

selected novel plaque proteins such as all ERM family members (ezrin, radixin, moesin), which interact with the actin cytoskeleton and have important roles in endosome transport and maturation. These novel amyloid plaque proteins may be new potential therapeutic targets and/or biomarkers for AD.

Single cell gene expression analysis reveals disease-specific alterations in the olfactory mucosa in Alzheimer's disease

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The sense of smell is orchestrated by the olfactory mucosa in the upper nasal cavity. Cells of the olfactory mucosa are known to be altered in certain neurodegenerative conditions but have not been well characterized in Alzheimer's disease. This is surprising given that loss of olfaction is one of the earliest symptoms of the disease. Here we report the use of olfactory mucosa cells obtained from living biopsy donors as a research model for Alzheimer's disease. For the first time we have applied single-cell RNA sequencing of olfactory mucosa cells obtained from cognitively normal individuals and persons with Alzheimer's Disease to provide subtle delineation of cellular heterogeneity in olfactory mucosa cells, revealing the existence of potential markers and key factors contributing to the disease. The single-cell RNA sequencing approach elucidated the cellular makeup of individual olfactory mucosa cells. It uncovered a total of 1766 annotated genes, of which 136 were differentially expressed in persons with Alzheimer's disease. 62 % of the altered genes were up regulated while the expression of 38% of the genes were reduced in persons with Alzheimer's disease compared to cognitively normal individuals. Functional testing of beta-amyloid production, levels of tau protein, cytokine secretion and mitochondrial oxygen consumption rate revealed distinct alterations of the cells derived from persons with Alzheimer's disease. Taken together, our results support the utilization of olfactory mucosa cells as a research model, which holds promise for detailed understanding of disease mechanisms and discovery of biomarkers for Alzheimer's disease.

Yoga and Dementia: A Systematic Review

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The Australian guidelines for physical activity in older adults recommend yoga as a muscle-strengthening exercise to maintain or improve health. Prior reviews have determined yoga can enhance flexibility, balance, mood and cognition in older cohorts, but its feasibility and efficacy for individuals living with dementia has not been systematically evaluated. This systematic review assessed the efficacy of yoga-based interventions for physical, cognitive and mental health outcomes for individuals diagnosed with dementia. The quality of the included studies was assessed using a modified Cochrane risk of bias tool. Database searches identified 219 articles, of which 9 met inclusion criteria. Five of these publications recruited individuals diagnosed with mild–severe dementia. Six articles reported using Hatha-based yoga movements, two studies implemented Kirtan Kriya practice, and one study did not specify the type of yoga. Few programs (n = 4) ran for more than 12 weeks, and three studies involved a control group. Safety was assessed in five articles, and no adverse experiences were reported. All publications reported beneficial effects for various health outcomes, but a high risk of bias was identified in most articles (7 out of 9). The most robust findings included improved balance, attention, memory functioning, and mood. Despite the paucity of research in this field, these studies highlight that yoga is safe and may be beneficial for health and quality of life in individuals with various dementia stages. Future directions for more high-quality trials investigating the mechanisms of action and change will be presented.

Harmony in the Bush: A personalised dementia care model improves sleep in residents with advanced dementia in rural aged care facilities

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Sleep disturbances in dementia are common in aged care facilities and contributed to challenging behaviours in residents living with dementia, and poor quality of life and well-being. This study reports sleep-related findings derived from the Harmony in the Bush study; a quasi-experimental clinical trial that aimed to monitor and reduce episodes of delirium and associated problematic behaviours through a 12-week intervention designed to improve residents' sleep in five Australian rural facilities. Seventy-four residents with advanced dementia participated in the intervention, where sleep improvement strategies included daily afternoon rests with personalised music listening and a no enforced-wake up in the morning policy. Residents' sleep patterns were estimated using Actigraphy watches for five consecutive days, at baseline and four weeks after the intervention. A total of 65 interviews and 20 focus groups were conducted with staff, post-intervention and at one- and three-months follow up. At baseline, the residents had poor sleep, and were overactive during the day especially in the evenings. Preliminary analysis indicated statistically significant improvements in sleep through increased total sleep and sleep efficiency, and reduced wake after sleep onset; paired t-test $P < 0.05$. Thematic analysis revealed two themes underpinning improved sleep in residents; willingness to sleep and uninterrupted sleep. These findings demonstrate that it is possible to transform care and improve sleep in residential facilities through a holistic approach to care; the Harmony in the Bush model.

Alzheimer's disease alters astrocytic functions related to neuronal support and transcellular internalization of mitochondria

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Several essential neuronal functions are supported by astrocytes. Under physiological conditions in vivo in the optic nerve head, astrocytes have been shown to internalize and degrade neuronal mitochondria in a process called transmitophagy. The aim of this study was to determine whether transmitophagy occurs in cultured astrocytes, whether the process is affected in Alzheimer's disease (AD), and whether astrocytic functions and reactivity are altered in AD. Here we show that the internalization and degradation of neuronal mitochondria are significantly increased in vitro in astrocytes isolated from aged AD mouse brains. We demonstrate that the phenomenon of transmitophagy also occurs in human induced pluripotent stem cell-derived astrocytes. The transcellular movement and turnover of neuronal mitochondria in astrocytes were monitored with a lentiviral vector containing a tandem fluorophore protein reporter of acidified neuronal mitochondria. In vivo, the localization of neuronal mitochondria inside astrocytes was confirmed following intracerebral injection of the viral vector to the hippocampi of 6-month-old mice. Increased transmitophagy was not related to overall changes in autophagy since levels of autophagy-related proteins were unchanged in aged AD-model astrocytes. Furthermore, the levels of intracellular ATP and oxidative stress related genes in aged AD astrocytes were similar to age-matched controls. Taken together, our findings confirm that astrocytes possess the ability to degrade

mitochondria derived from neurons. For the first time, we demonstrate that transmitophagy, and the internalization of neuronal mitochondria are impaired in aged AD astrocytes. Thereby the presence of AD-related pathology alters key astrocytic functions related to neuronal support.

Principles for and potential models of dementia services in Australia

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The aim of this paper is to review potential models of health and aged care services for Australians with dementia. We define a model of service delivery as the systemic framework through which services are organised, accessed, funded, administered and delivered.

Principles underlying an ideal model were developed through discussion after review of other service principles. The following models of service delivery were reviewed for research evidence of effectiveness and discussed against these principles: service navigator, primary care chronic disease management, case management, self-managed care, shared care, stepped care, multidisciplinary team care and care pathways. Results are that none of the models appear to sufficiently meet the principles we specify with common weaknesses being a focus on either provision of medical treatment or care but not both, lack of integration across all of health and aged care and challenges of accessibility. We conclude that work is urgently needed to co-design develop and test a universal service model for Australia that build on our current system strengths. We propose that these combine the desirable elements of the primary care chronic disease management, case management, and specialist multidisciplinary care models.

Insights from a behaviour support service

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Behaviours that occur in the context of dementia can significantly impact the wellbeing of a person with dementia and those around them. Unfortunately, these behaviours are typically caused by factors external to the person, such as the presence of pain or an ineffective or inappropriate care approach. However, these causes are, at least in part, modifiable, and as such remain a primary avenue for reducing impacts of behaviour. This paper discusses insights and developments from the Dementia Support Australia (DSA) program, the leading national provider of best-practice support for behaviours in dementia: non-pharmacological strategies with an emphasis on de-prescribing inappropriate medications. Specifically, this paper will describe longitudinal characteristics and outcomes of a sample of over 5,000 people supported by DSA, including: the characteristics and prevalence of antecedents of behaviour; the clinical impact of behaviour support on the types and severity of behaviour experienced; the impact on carers and their quality of life; the possible role of time on reducing behaviour; and the possible downstream health savings associated with providing behaviour support. These findings will be reported in the wider context of learnings from the DSA program, and how these can benefit not only people supported by DSA but all people living with dementia.

Effects of BACE inhibition on behaviour and dendritic spine properties in mice

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Inhibition of BACE1 (beta-secretase) is a potential treatment for people with Alzheimer's disease. BACE inhibitors lower production of amyloid-beta peptide by decreasing cleavage of the amyloid precursor protein. However, in some recent clinical trials, BACE

inhibitor treatment increased adverse events and cognitive worsening in participants. This may be related to the effect of inhibitors on other neuronal BACE1 substrates including Seizure-related gene 6 (Sez6) family proteins, known to be required for the normal development of dendrites and excitatory synapses. RESULTS: Wild-type and Sez6 family knockout mice were treated with an in-diet BACE inhibitor (cas 1432511-80-2) for 4-8 weeks and assessed with the elevated open field, Morris water maze, context fear conditioning and light-dark box. Treated wild-type mice, but not Sez6 family knockout mice, displayed hyperactivity on the elevated open field (as indicated by greater distance travelled) indicating that blocking Sez6 family protein ectodomain shedding is a contributing factor. BACE inhibitor treatment did not, however, lead to significant changes in spatial or fear learning, reference memory, cognitive flexibility or anxiety in mice in either genotype. A subtle decrease in the density of mushroom-type spines was observed in the somatosensory cortex of treated mice of both genotypes, suggesting that BACE1 substrates other than Sez6 family members are involved in this effect. CONCLUSION: Mice treated with BACE inhibitor demonstrated increased locomotor output that was Sez6 family-dependent, suggesting that interfering with Sez6 protein functions contributes to the adverse effects seen with BACE inhibition.

Alzheimer's disease mutations and Alzheimer's disease related gene expression in human neural cell models

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Dementia collectively describes more than 100 neurodegenerative disorders all of which have lifelong consequences. Symptoms include loss of memory, rationality, social skills and physical functioning. The neurodegeneration common to all these disorders results in the progressive decline in routine functioning. By 2050, more than 131 million people worldwide will be living with dementia at an estimated cost to society of more than US$800 billion. As such, understanding the mechanisms driving this disease and its progression, along with new therapeutic approaches, are required. Mechanisms controlling disease onset as well as potential models of repair are provided by a variety of stem cell models. These models include neural stem cells, human mesenchymal stem cells (hMSCs) and increasingly, induced pluripotent stem cells (iPSCs), such as the immortalised ReNcells. Due to their relative ease of isolation and neural properties, hMSCs provide a viable therapeutic model for understanding both the disease and potential mechanisms of repair. These human stem cells, including patient derived-iPSCs also now provide an appealing source for potential treatment of neurodegenerative disorders. To assess AD potential and impact, we have examined normal human stem cell populations derived from the cerebral cortex and ventral mesencephalon, along with cell lines derived from neuro- and astroblastomas in comparison to hMSCs. All cells were genotyped for known causative mutations for early onset AD, including PSEN1 L286V, PSEN1, M146L, PSEN1 A246E and the APOE mutation. Genotypic analysis was correlated with gene expression of Alzheimer's related genes including Amyloid Precursor Protein, Microtubule-Associated Protein Tau and Presenilin 1.

Altered excitability and ferroptosis in Alzheimer's induced pluripotent stem cell derived neurons and cortical organoids

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Induced pluripotent stem cells can be used to identify disease mechanisms and test potential therapeutics in cells from familial Alzheimer's disease (FAD) or late-onset Alzheimer's disease (LOAD) patients. Cortical organoids are three-dimensional tissue structures, containing different cell types of the brain and representing the anatomical structures of the cortex. Importantly, organoids also exhibit hallmarks of AD, including amyloid plaques, neurofibrillary tangles, alterations in lipid membranes, elevated oxidative stress markers and increased cell death. Using induced pluripotent stem cell (iPSC) derived neurons and cortical organoids, the aim of this study was to investigate alterations in neuronal function and cell death and identify the effects of potential neuroprotective agents. Ferroptosis induction identified specific vulnerabilities of AD patient lines, whilst cells could be protected from cell death by inclusion of anti-oxidants in the media. Multiple hallmarks of AD, including oxidative stress and cell death, were reduced in response to anti-oxidant treatment in AD neurons. However the protective effects were lost in the more complex cellular environment of cortical organoids. AD organoids showed altered functionality compared to controls, including increased excitability and excitotoxicity that could not be ameliorated with anti-oxidants. Together

this data suggests that cortical organoids are a valuable pre-clinical tool for investigating potential treatments for AD and should be incorporated into drug evaluation programs.

"What can Genes and Lifestyle tell us about Dementia?" a community conversation

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Reducing dementia risk by the personalisation of lifestyle intervention, through genetic profiling, is a growing area of research. However, we know little about the public's level of interest for personalised interventions or whether this knowledge would encourage lasting intervention adherence. This raises the question: is it worth developing such a profile if there is a lack of public demand? To this end, there is increasing recognition of the role that the public should play at all stages of the research process. Methods: We held a "community conversation" to gain insight into the public understanding and opinions on our research programs. This publicly advertised event recruited 34 individuals both with and without a lived experience of dementia, to gain a range of diverse perspectives. Facilitated discussions were undertaken across four themes; dementia, genetics, tailored dementia prevention and adherence to lifestyle change. Results: Despite a high level of general knowledge about dementia, there was limited understanding over the role that genetics plays. Discussions highlighted participants' fears over genetically-driven dementia risk and a lack of familiarity with concepts of genetically-informed disease prevention. Nevertheless, most participants showed significant interest in the use of genetics to tailor interventions. The main factor identified for continued adherence to lifestyle-based interventions was the support of family and friends. Discussion: This community conversation confirms the high level of public interest in research, whilst insights will help inform future research directions. All participants expressed their appreciation at being asked to share their opinions, strengthening our commitment to community consultation.

Implementing a dementia reablement program in Australia: How can we ensure that everyone benefits?

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Rationale Evidence-based programs to improve function and capability in people with dementia are currently being implemented in Australia. What is not known is the economic and societal outcomes of program implementation. Objectives: To identify the costs and benefits of implementing a reablement program, Care of People with dementia in their Environments (COPE), within the Australian health context, and to describe the experiences of people with dementia and their caregivers participating in the program. Methods: A cost-benefit analysis was used to evaluate the program implementation and to identify who gains the most and who carries the costs. The analysis was completed for the duration of the program implementation (until 2019) with a projection for the program adoption in Australia until 2024. Semi-structured interviews with people with dementia and their caregivers who participated in the program were completed to gain an in depth understanding of personal experiences. Results: Participants described how the program gave them a chance to remain in their own homes and connected to their communities. Almost A$6.2 million societal gain can be achieved from program implementation. Costs and benefits are distributed unequally with people with dementia and their caregivers bearing most of the cost and the Australian health and social care system deriving the most benefit. Conclusion: Implementing the COPE program to derive maximum societal benefit may require providing subsidies or other incentives to assist people with dementia and their caregivers so they do not bear the entire cost of the program.

Boosting access to dementia therapy trials: The Australian Dementia Network (ADNeT) Trials Screening initiative

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The Australian Dementia Network (ADNeT) brings together the nation's leading researchers, clinicians, advocates and consumers to accelerate progress in dementia prevention, treatment and care. ADNeT's Trials Screening (ADNeT-TS) initiative seeks to speed up development of effective therapies to prevent or treat dementia by reducing the duration of clinical trials. It also aims to give more Australians access to the latest potential therapies via trial participation. ADNeT-TS leverages off a Melbourne AIBL program that put over 900 participants through screening with Aβ PET, MRI, and neuropsychology tests. Suitable participants were then referred onto local trial delivery sites, boosting recruitment and thereby shortening trial duration. Through ADNeT, similar programs are now being rolled out nationally. Ethics approval has been granted for screening sites in metropolitan Queensland, New South Wales, Western Australia, South Australia, Victoria, and Tasmania, with most expected to be operational by mid 2020. Initial funding is available to accommodate 1000 participant screens, and additional commercial support is anticipated to double this capacity and fund the program prospectively. Establishment of this screening and trial referral network is concurrent with the establishment of ADNeT Registry and ADNeT Clinics, both of which will also facilitate involvement in research and trials. Collectively, ADNeT initiatives have greatly boosted the profile and capabilities of Australia as a location for dementia prevention and treatment trials convincing international sponsors to bring additional major trials to Australia in 2020 that will put millions of dollars into research and care and increase opportunities for trial participation.

Blood Brain Barrier Penetrating siRNA Nanomedicine for Alzheimer's Disease Therapy

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Alzheimer's disease (AD) is the most common form of dementia without effective therapeutic solutions. The aberrant accumulation of aggregated amyloid-β (Aβ) peptide derives from amyloid precursor protein (APP) through sequential cleavage by BACE1 (β-site APP cleavage enzyme 1) and γ-secretase activity; this is a key pathogenic event in AD. Small interfering RNAs (siRNAs) show great promise for AD therapy because they can effectively down-regulate the expression of BACE1, leading to a significant inhibition of pathogenic pathways and the improvement of behavioural impairment in AD mouse models. However, a lack of effective and brain-specific delivery approaches of siRNA limits the efficacy of this therapy for AD treatment. Here, we developed a glycosylated "triple-interaction" stabilized polymeric siRNA nanomedicine (Gal-NP@siRNA) to target BACE1 in an APP/PS1 transgenic mouse model of AD. Gal-NP@siRNA exhibits superior blood stability and can efficiently penetrate the blood brain barrier (BBB) via glycemia-controlled Glut1 mediated transport, thereby ensuring siRNA effectively reaches the target brain cell types and plays a maximal therapeutic role. In APP/PS1 transgenic mice, intravenous injection of Gal-NP@siBACE1 decreased BACE1 expression and amyloid plaques, suppressed production of phosphorylated tau protein, and promoted myelin regeneration. Noticeably, Gal-NP@siBACE1 administration restored the deterioration of cognitive capacity in AD mice without significant side-effects (e.g. food intake, body weight change). This novel "Trojan horse" strategy to deliver siRNA through BBB with high targeting specificity and superior circulation stability, supports the utility of RNA interference (RNAi) therapy in other neurodegenerative diseases.

Does a vascular deficit accelerate pericyte death and cognitive decline in Alzheimer's disease?

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Alzheimer's disease (AD) is characterised pathologically by amyloid beta (Aβ) plaques and neurofibrillary tangles but vascular deficits have also been implicated. Chronic reductions in blood flow (hypoperfusion) have been observed in AD and may independently contribute to neurodegeneration. We hypothesised that cerebral hypoperfusion in young APP/PS1 mice (a model of amyloidosis) may exacerbate cognitive and pathological deficits. We performed common carotid artery occlusion (CCAO, a model of brain hypoperfusion) or sham surgeries in three-month-old APP/PS1 and wild-type (WT) mice, before assessing cognition over four weeks. One-week post-CCAO, APP/PS1 mice exhibited impaired novel object recognition compared to WT mice. By four weeks post-CCAO, neither APP/PS1 nor WT mice had intact novel object recognition, suggesting APP/PS1 mice experience more rapid memory decline post-CCAO than WT mice. In AD, the causes/consequences of hypoperfusion are unknown. Recent evidence has suggested pericytes, a multi-functional cell residing on capillaries, constrict blood vessels in AD, which may be a response to, or cause of hypoperfusion. To test how pericytes respond to hypoperfusion, we exposed cultured human brain pericytes to reduced oxygen (hypoxia). Surprisingly, hypoxia induced the proliferation of pericytes. Curiously, this proliferation was inhibited by the presence of soluble Aβ40. These results suggest pericytes may have an angiogenic response to hypoxia which is impaired in the presence of Aβ40. Combined, these innovative discoveries suggest hypoperfusion alters cognitive function in a mouse model of amyloidosis and that Aβ40 can impair hypoxia-induced pericyte proliferation, adding to a growing weight of evidence vascular deficits are contributing to AD.

Delineation and treatment of diabetes-associated dementia: a cerebrovascular approach

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Diabetes is reported to increase the risk of dementia by ~5-fold, yet the exact mechanisms are not completely understood. An emerging evidence is consistent that the integrity and function of cerebral capillary blood-brain barrier are central to the onset and progression of dementia. However, this notion is currently understudied in diabetes-associated dementia. Here, we used a murine model of diabetic insulin resistance to investigate the potential cerebrovascular pathways involved in diabetes-induced cognitive decline and sought potential therapeutic opportunity. We found that in diabetic mice, the integrity of blood-brain barrier was significantly compromised, leading to substantial activation of astrocytes and microglia. This has also resulted in marked alteration in brain metal and lipid dyshomeostasis, inducing neurodegeneration and neurocognitive decline. Notably, we also found that a treatment with potent anti-inflammatory agents including a lipid-lowering drug, probucol completely prevented the disruption of blood-brain barrier and cognitive deficits in diabetic mice. The findings of this study may shed light on potential mechanisms of diabetes-induced dementia, and provide promising potential for therapeutic interventions by using anti-inflammatory agents.

Exercise and home-hazard reduction program reduces falls in people with dementia and better physical function

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More than 60% of community-dwelling older people with dementia fall annually. The evidence for falls prevention in this group is limited. Methods: Randomised controlled trial (ACTRN12614000603617) involving 309 community-dwelling older people with mild-to-moderate dementia. The intervention group (IG; n=153) received a home hazard reduction and home-based exercise program (12-months). The control group (n=156) received usual care. The primary outcome was fall rate over 12-months. Pre-planned subgroup analysis assessed whether the intervention had a differential effect in those with better/worse baseline physical function. Results: The fall rate was not significantly reduced in the IG (IRR 1.05 95%CI 0.73-1.51). In sensitivity analyses, capping falls at 12 for participants (n=4) reporting a large number of falls and additionally controlling for significant baseline differences (dementia diagnosis and Geriatric Depression Scale), there were non-significant reductions in the IG fall rate (IRR 0.88 95%CI 0.65-1.21; IRR 0.78 95%CI 0.57-1.07 respectively). The interaction terms for baseline physical function were significant, indicating a differential effect on fall rate based on better/worse baseline physical function. Fall rate was significantly reduced in the IG with better baseline physical function (IRR 0.45 95%CI 0.26-0.77 [falls not capped]; IRR 0.60 95%CI 0.37-0.98 [falls capped]). Conclusions: This intervention did not significantly reduce fall rate in a sample of community-dwelling older people with dementia but did significantly reduce fall rate in a subgroup with better physical function. Future research should explore strategies for implementing the positive findings and interventions to prevent falls in people with dementia and poorer physical function.

Living with dementia

Lessons from a pragmatic trial of virtual dementia friendly rural communities in Australia

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The Virtual Dementia Friendly Rural Communities (Verily Connect) Project trialled online strategies to augment support for informal carers of people living with dementia (PLWD) in 12 communities in rural Australia using a stepped wedge cluster randomised method. The strategies included a website (https://verilyconnect.org.au/) and mobile application (app) with information about dementia, locally available services and a chat function, and videoconferencing using Zoom. Volunteers were trained and a technology hub was available in all communities to provide face-to-face support for the technical needs of carers. Data from 113 carers, service providers, and volunteers were collected between September 2018 and April 2019. Carers completed surveys at baseline, prior to the first cluster implementation, and every 2 months until the end of the project. Semi-structured interviews were completed with carers and service providers. Focus groups were undertaken with volunteers. The majority of carers were female, aged 34-79 years, and almost half lived in same location or community with PLWD. There were challenges in recruiting and engaging carers. Carers reported low levels of social support (Medical Outcomes Study Social Support Survey mean 43.3 (27.7)) and a high impact of caring (mean Zarit Burden Index (ZBI) 62.8 (12)). Qualitative data indicated that online strategies can increase the flexibility and availability of support for informal carers. Additional analyses of final outcomes and process evaluation data will be presented. Rural carers require more support than is currently offered and innovations such as Verily Connect can increase ready access to help for carers spanning large geographical distances.

Supporting community-living older people with cognitive impairment to stay at home: a modelled cost analysis

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To model the financial implications of programs with evidence of benefit in supporting community-living older people with cognitive impairment. Methods: Two intervention programs: (a) a residential dyad program consisting of carer training and a memory training and activity program for people with dementia (GTSAH); and (b) a frailty intervention (FIT) in a sub-group with cognitive impairment are examined. Two Markov cohort models compared costs accrued in community-living cohorts who could transition to permanent residential care, as appropriate. Direct health and social welfare costs are captured, the majority are borne by government. The model has a time-horizon of 5-years; costs at 2018 $AUD prices. Costs were: GTSAH $3,755, FIT $1,835 and permanent residential aged care (RAC) $237/day. The number of Australians likely to be eligible for the programs was estimated with epidemiological approaches. Results: Modelling predicts the interventions could break even on costs in approximately five months for GTSAH and seven months for FIT, after which they are predicted to save funds. The primary driver of the savings was the cost of permanent RAC (discounted at 5% per annum), at $121,030 for GTSAH versus $231,193 standard care and $47,857 with FIT versus $111,399 standard care. If the Australian population eligible for the programs was within 10% of 31,800 (GTSAH) or 158,900 (FIT) people, associated savings at 12 months could be $AUD 322-394 million (GTSAH) or $AUD 521-637 million (FIT). Conclusions: Programs for cognitively-impaired community-dwelling older people can be financially beneficial; further evaluation and implementation would be a low risk investment.

Evaluation of StepUp for Dementia Research: Digital platform innovation for participant recruitment and public engagement

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StepUp for Dementia Research ('StepUp' hereafter) is a research participation and engagement service, a "one-stop shop" to connect individuals (both with and without dementia) with researchers delivering studies into prevention, diagnosis, treatment and care in dementia. This new online, telephone and postal service uses innovative matching technology to provide people with a way of registering interest in studies and allowing researchers to access matched volunteers. The platform has been modelled after the UK Join Dementia Research (JDR) and developed in partnership with their team. Since 2015, JDR has demonstrated its success in terms of increased research recruitment efficiency, access to research for the public and for researchers, public engagement, and attitudinal change in dementia and research participation. Funded by the Australian Government Department of Health, the early implementation of StepUp in 2019 has shown its success and attracted a great deal of interest and support from individuals, communities, organisations as well as dementia researchers across Australia. As of January 2020, there were 834 volunteers registered with StepUp, and 104 researchers have expressed their interest. Currently, nine studies are recruiting volunteers using StepUp: five studies recruiting people living with dementia, three studies recruiting carers and four studies looking for people with memory concerns. At the least, 641 volunteers have been matched to one or more studies. This presentation will report on the most up-to-date progress made through StepUp in improving public participation in dementia research and evaluation outcomes. Implications for future research, global collaboration, policy, and service delivery will be presented.

Dementia and rapid mortality among older Australians: Evidence from the ASPREE study

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Dementia is an umbrella term for a clinical syndrome with different pathological causes, clinical trajectories and survival times. Understanding who rapidly declines to death is important for planning services. This project uses data from the ASPREE (ASPirin in Reducing Events in the Elderly) study to examine mortality among Australian participants developing dementia of any cause subsequent to recruitment. Methods: ASPREE was a primary intervention trial of low-dose aspirin among healthy older people. The Australian cohort included 16,703 dementia-free participants aged 70 years and over at enrolment. Participants were triggered for dementia adjudication if cognitive test results were poorer than expected, self-reporting dementia diagnosis or memory problems, or dementia medications being detected. Incidental dementia was adjudicated using the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV) criteria, based on results of a neuropsychological battery and functional measures and with medical record substantiation. Results: As previously reported, 1052 participants (5.5%) died during a median of 4.7 years of follow-up and 964 participants had a dementia trigger, of whom, 575 (60%) were adjucated as having dementia. Preliminary analyses revealed that the mortality rate was higher among participants with a dementia trigger, regardless of dementia adjudication outcome, than those without (15% vs 5%), $X2 = 205$, $p < .001$. Cox Proportional Hazards Regression Analyses are being conducted to further explore mortality among participants. Implication: This study will provide important data on rapid death among people with cognitive impairment and have important implications on service planning.

Dementia Friendly Skies: A comparison of air travel experiences from three continents

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1CQUniversity, 2Dementia Centre for Research Collaboration, QUT, 3University of Plymouth, 4Roseville Alzheimer's & Dementia Community Action Team, 5University of Queensland, 6University of Minnesota, 7Queensland University of Technology, 8Alzheimer's Speaks

In 2015 an Australian survey investigated the air travel experiences of people living with dementia. To our knowledge, it was the first of its kind in the world. This survey has since been replicated in the United Kingdom (UK) and the United States of America (USA). This paper will summarise and compare outcomes to generate an international perspective of air travel for people living with dementia. All three surveys were distributed online, and promoted via news media, social media, and advocacy groups. Surveys were anonymous and open to both people living with dementia and their travel companions. Samples consisted of seven travellers with dementia and 41 travel companions in Australia, 11 travellers with dementia and eight companions in the UK, and 49 travellers with dementia and 176 companions in the USA. Given the differences in sample sizes and the exploratory nature of the research, comparisons have been made using descriptive statistics and through sharing valuable qualitative comments. Results indicated that people living with dementia continue to travel by air, with or without companions, most commonly for leisure or visiting family and friends. Most experienced challenges, including navigating and wayfinding at the airport, hearing announcements, accessing toilet facilities, and accessing assistance. However, despite these challenges, many benefits of travel were identified. Airports and airlines worldwide need to consider strategies for ensuring smooth journeys for travellers with dementia. This presentation will also discuss successful dementia friendly travel initiatives currently being implemented around the world and suggest areas in need of further development.

Removing barriers to ethics approval: innovation by a researcher and a person living with dementia

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1University of Wollongong

Removing barriers to ethics approval: innovation by a researcher and a person living with dementia

Navigating ethics approvals for research with people with dementia can be complicated, especially for less experienced researchers. This can be due to limitations in researcher knowledge and experience, as well as with the knowledge and culture of local ethics committees. In response to this problem, an experienced researcher and research participant with dementia co-designed a novel intervention as part of the 'Connections for Life with dementia' interdisciplinary research project. Capacity building around ethical conduct of research had been identified by new 'Connections' team members as a key need. In response, a workshop was co-designed and informed by a rapid literature review, reflections on personal experiences and in active consultation with the local ethics committee, who also took part in a Q&A panel as part of the workshop. An initial workshop was co-facilitated by the researcher and the person with dementia for the interdisciplinary 'Connections for Life with Dementia' research team. This led to a subsequent invitation to repeat the workshop for all HREC committee members. Evaluation of the workshop highlighted changes in knowledge, attitudes and practices for both researchers and ethics committee members. The experience highlights the benefits of an approach that not only draws on research evidence and lived experience, but also builds relational bridges between researchers, participants and local ethics committees. Whilst early days, an agreed protocol and an open dialogue has supported greater mutual understanding and so far, improved the experiences of submission and approvals for dementia-related research projects.

Children's dementia knowledge and attitudes increase long-term following an 8-week dementia education program

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1University of South Australia, 2University of New South Wales, 3Flinders University

Objectives: School-based dementia education and intergenerational experiences where children and older adults interact have mutual benefits and improve dementia knowledge and attitudes in children. Whether these improvements are retained in the long-term are unknown. Methods: Using a mixed-methods, quasi-experimental approach, we evaluated an 8-week dementia education program in two groups of primary school students: those who interacted with people with dementia and those who did not. Eighty-one year 4/5 children participated in the dementia education and fifty-two also interacted with older adults. Dementia knowledge and attitudes were measured using the Kids Insight into Dementia Survey (KIDS). Secondary aims explored the family-level impact of the program and estimated costs and benefits of designing and delivering the program. Results: Knowledge and attitudes improved immediately, and at 6-months, after intervention ($p<.001$). Additional interaction with older adults did not augment the effects of dementia education. Qualitative reports indicated positive changes in empathy and greater 'real world' community awareness as a direct result of the program. For each child's increase in dementia knowledge and attitudes, the per-child program cost was $600 AUD. Discussion: These findings provide the first evidence that school-based dementia education can improve knowledge of dementia and attitudes towards people with dementia in the long-term.

Public involvement in the planning, implementation, monitoring and evaluation of StepUp for Dementia Research

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1University of Sydney

StepUp for Dementia Research is an innovative Australian research participation and engagement service which has people with lived experience of dementia at its heart. It connects researchers with individuals who wish to volunteer as participants in dementia research studies. StepUp was launched in NSW and WA in 2019, ahead of nationwide scaling. The success of this service depends on its ability to attract people, particularly people living with dementia and/or their carers, to register their interest in being matched to a research study. Partnership with people with relevant lived experience is critical to ensure that the service aligns with the needs and points of view of the people who will potentially engage with it. Lived experience experts have been involved in StepUp from the outset. They partnered with University of Sydney staff and researchers in the Governance Group formed in 2018. The Group had responsibility for establishment and implementation of governance and consent protocols. A Public Involvement Panel (PIP) was also formed with volunteer lived experience experts. Members were consulted on the development of StepUp's identity, including its naming, branding and web content, and advised on the messaging and ways to engage the wider community. They provided their own stories for the website, promoted the project to the media and participated in user acceptance testing of software. Through their networks, PIP members continue to actively promote StepUp. Ongoing involvement will be essential to ensure that StepUp is a genuine breakthrough in dementia research powered by those it serves.

Vulnerability to financial exploitation in younger-onset dementia: exploring cognitive and socioemotional factors

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In older adults, vulnerability to financial exploitation reflects increased susceptibilities to deception ('credulity') or manipulation for financial gain ('gullibility'), and is associated with age-related decline in cognitive and socioemotional abilities. While poor financial decision making and increased susceptibility to scams are commonly reported in dementia, levels of credulity and gullibility, and their associations with cognitive and socioemotional functions, have not been explored. Methods:

The current study contrasted credulity and gullibility in two of the most common younger-onset dementia syndromes: Alzheimer's disease (AD) and behavioural-variant frontotemporal dementia (bvFTD). Credulity and gullibility were rated by informants using the Social Vulnerability Scale (SVS) for 23 AD patients, 29 bvFTD patients and 32 age-matched healthy controls. Cognitive and socioemotional functions were assessed using neuropsychological measures of attention, memory, executive function and emotion recognition. Results: Relative to controls, both patient groups showed elevated scores on the credulity subscale. In contrast, gullibility scores were significantly higher in bvFTD patients only. Credulity was significantly associated with cognitive impairment in both patient groups, whereas gullibility was associated with deficits in emotion recognition in bvFTD. Conclusions: Credulity was elevated across both AD and bvFTD patients and was associated with level of cognitive impairment. Notably, bvFTD patients showed greater gullibility, which were related to deficits in socioemotional functions. These findings provide novel insights into the different factors that contribute to financial exploitation in people with dementia, highlight the importance of assessing credulity and gullibility, and open avenues for targeted interventions.

Care

Why we need to care about the care: a longitudinal study in residential dementia care

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The symbiotic relationship between aged care staff and residents with dementia is key to quality of life. The current research focused on narrowing down the most useful targets for intervention in quality of care (QOC) in order to improve quality of life (QOL) for people with dementia in residential care. Method: Over 6-months, we followed 247 older adults with dementia from 12 not-for-profit residential care facilities, their families/care partners (n=225), managers (n=12) and staff (n=232). Facilities ranged in size from 10 to 137 beds and were located across remote, rural and metropolitan areas of NSW/ACT. Measures: Staff surveys, family member and resident interviews, resident file audits, live resident and staff observations and organisational audits. Results: The QOC provided to residents had an immediate impact on their pain, depression, QOL scale scores, Body Mass Index, ease/engagement with staff, and food/fluid intake. This influence was still evident six months later, with baseline QOC leading to improved engagement with staff, QOL scores, and fluid intake. Restraint use featured heavily as a predictor of poor outcomes for residents. QOC did not significantly impact agitated behaviours, cognitive/physical frailty, nor observed physical/verbal expression of well-being by residents. Conclusions: What staff do and the way they do it has a very real and lasting impact on the overall quality of life of residents. The most useful targets for improving the quality of life of residents are: eradicating physical restraint and supporting and upskilling care staff so that they treat and interact empathetically and humanely with residents.

The Capacity Building in Care Research Initiative: Fostering dementia care research capacity: 12 Month Update

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In 2019, the Dementia Centre for Research Collaboration (DCRC) launched an innovative two-year program to grow dementia care research capacity in Australia. The program, the Capacity Building in Care Research (CBCR) initiative enrolled 13 early and mid-career researchers from nursing and allied health disciplines across Australia. Methods: The program includes mentoring and skills development, with each Fellow matched to a suitable Mentor (a senior Research Academic) based on their research interests and foci. Both Fellows and Mentors were inducted into the program and each Fellow has developed an Individual Development Plan. All dyads have met (virtually) on at least two occasions and connections have been made to facilitate the inclusion of Fellows on large research grants. Fortnightly education and training sessions are provided for Fellows via Zoom. Experts present on topics including dementia, methodology, implementation research, writing skills, and time management. The program is being evaluated for effectiveness, professional outcomes and cost. Results: Fellows were productive over the first 12 months and outcomes include: 18 peer-reviewed publications, 33 articles under review, 21 oral and 19 Poster presentations, and $2.8 million awarded in grants either as Chief or Co-Investigator. Both Fellows and Mentors reported high levels of satisfaction with the program. Discussion/ Conclusion: The CBCR program is the first Australian program to build the capacity of dementia care researchers, and both engagement and productivity over the first 12 months has been high. The model and learnings from this initiative may inform other programs aimed at developing research capacity.

Implementing non-pharmacological interventions addressing behavioural and psychological changes: A systematic review

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The majority of people living with dementia live at home in the community with care and support from their family. Changes in behaviours and psychological symptoms are common and can be distressing for both the person with dementia and their family. Non-pharmacological interventions addressing these changes in behaviour and psychological symptoms are recommended in the Australian clinical practice guidelines. However, implementing non-pharmacological interventions can be challenging and has been the subject of an increasing number of implementation studies. A systematic review of

implementation strategies designed to increase the use of such non-pharmacological interventions may inform these translation efforts and is the focus of this study. Methods: Systematic review of implementation studies. Studies were eligible for inclusion if they used quantitative methods, investigated the effect of implementation strategies designed to increase the use or adoption of evidence-based non-pharmacological interventions addressing some aspect of behaviour changes or psychological symptoms for people living with dementia in the community. We assessed risk of bias, categorised types of implementation interventions, and mapped study information to the RE-AIM framework. Narrative synthesis was used due to heterogeneity of studies. Results: Eleven studies were identified with the majority using pre-post methods. The most common implementation strategies were conducting educational meetings, providing educational materials, and developing partnerships between providers and academics. Six studies reported reductions in behaviour changes or psychological symptoms. Conclusion: Research investigating implementation of non-pharmacological interventions is in its infancy, but there are initial, promising results. Reporting and methods of future studies need to be strengthened.

Dementia is associated with poorer quality of care and outcomes after stroke: An Observational Study

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Objectives: To determine if pre-existing dementia is associated with poorer quality of care and outcomes after stroke in the acute hospital phase. Methods: This was a retrospective analysis of pooled data from the Australian Stroke Foundation national audit conducted in 2015 and 2017. Dementia status was obtained from the medical records. Processes of care to assess quality included: stroke unit care, time dependent therapy, nursing/allied health assessments and preparation for discharge. Outcomes included in-hospital complications, independence on discharge and destination. Logistic regression was used to examine associations between dementia status and processes of care. Multilevel random effects logistic regression, with level defined as hospital, was used to examine associations between dementia status and outcomes. Results: 7070/8279 audited patients had dementia status documented (dementia n=693). Patients with dementia were less likely to be treated in stroke units (58.3% versus 70.6%), receive thrombolysis if an ischemic stroke (5.8% versus 11.1%), have access within 48 hours to physiotherapy (56.4% versus 69.7%) or occupational therapy (46.8% versus 55.6%), see a dietitian if problems with nutrition (64.4% versus 75.9%), or have mood assessed (2.6% versus 12.3%). Patients with dementia were more likely to receive no rehabilitation (aOR 1.88 95%CI 1.25, 2.83) and be discharged to residential care (aOR 2.36 95%CI 1.50, 3.72). Conclusion: People with dementia received poorer quality of care and had worse outcomes after stroke. Our findings raise questions regarding equity and the need for better understanding of why the quality of care differs after stroke for people with dementia.

Barriers to quality care for young onset dementia continue in the National Disability Insurance Scheme

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People with young onset dementia (under 65 years at symptom onset; YOD) in Australia became eligible for the National Disability Insurance Scheme (NDIS) in 2016. Although the principles of the NDIS are aligned with evidence-based recommendations for service design, no research exists about the experiences of people with YOD in the NDIS so far. Methods: We conducted the first nationwide survey of people with YOD and their informal supporters since the NDIS rollout. Surveys were distributed via social media, specialist medical clinics, and Dementia Australia. Results: These preliminary data are from 46 people with YOD (45.7% female, mean age 60.4 years) and 104 informal supporters (75.0% female, mean age 55.4 years). Of those assessed for NDIS funding, 58.7% were deemed eligible while 9% were ineligible (32.3% awaiting a decision). Only 40% of respondents reported a positive experience with the NDIS. Most (65.7%) waited between 3 and 12 months to receive their approved NDIS plan, and 42.8% did not receive enough funding to cover the things that they felt they needed. The most critical issue identified was a lack of providers with whom to spend NDIS funding (reported by 74.2% of respondents). Nonetheless, most agreed that things were better for them (71.9%)

and for people with YOD generally (71.2%) since the NDIS roll out. Implications/Discussion: Despite perceived improvements from the aged care system, people with YOD still report barriers to best practice care in the disability system. Lack of infrastructure and awareness among disability providers are key areas for improvement.

The use of communication strategies to support person-cantered care in practice

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The application of person-centred care (PCC) in practice can be supported by the identification of specific strategies for staff to use. Recent research has suggested a link between PCC and language-based communication strategies (Savundranayagam & Moore-Nielsen, 2015). The use of communication skills training programs, such as the MESSAGE Communication Strategies in Dementia Program (Smith et al., 2011), have been linked with positive outcomes in the care of people with dementia (Chenery & Conway, 2016), however there remains an opportunity to articulate a specific link between the strategies taught and the application of PCC. The current study aimed to explore the link between MESSAGE strategies and PCC behaviours. The current study coded instances of both MESSAGE strategy use, and indicators of person-centred communication across 20 casual conversations between aged care staff and people with dementia. Coded transcripts were analysed for frequency of overlap and correlation between the two behaviour types. From the total 2422 utterances: 1737 coded as MESSAGE, 1996 coded as person-centred, and 1697 utterances had overlapping codes. The findings show that techniques from five of the MESSAGE strategies were associated with at least one of the person-centred communication indicators. These MESSAGE strategies are: Maximise Attention, Support their conversation, Assist with Visual Aids, Get their Message, and Encourage and Engage in conversation. These findings can inform future iterations of the training to highlight ways to support the application of PCC.

Understanding interactions between paramedics and community dwelling people living with dementia

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Paramedics are central to health care services in the community. People living with dementia intersect with paramedic services at a higher rate due to comorbid conditions, falls, delirium and other acute events that mean care cannot be provided at home. Little is known about this intersection of care. Anecdotally there is a perception that responding to, and integration of a dementia diagnosis into emergency care is challenging for a service where first responders are primed to provide succinct assessment and emergency care. Paramedics in one Australian state were recruited to an exploratory study in order to understand their experiences in relation to working with people living with dementia and their carers, and to understand whether further targeted education would support development of paramedic knowledge, skills and confidence in the area. Sixteen participants were recruited, and worked in a range of rural and urban areas, with experience that ranged from less than one to 36 years in the role. Analysis of interviews revealed three overarching themes. Theme one encapsulates the uncertainty that permeates paramedic services; theme two describes how the system and changing role of paramedics' impact on care decisions, and the final theme relates to knowledge where actions were often inscribed by experiential learning (personal or professional). Further work in the area, including focused practice guidelines, communication strategies and education has the potential to improve emergency care delivered to people living with dementia in the community.

Are the PCOC tools suitable for people with dementia living in residential aged care?

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The Palliative Care Outcomes Collaboration (PCOC) delivers a successful national program in palliative care to improve patient and carer outcomes. PCOC is being piloted in residential aged care (RAC), which includes a comparatively greater proportion of people with dementia. It is known that people with dementia experience unique barriers in the assessment of palliative care outcomes. The aim of this paper is to investigate the suitability of the PCOC assessment tools among this population. Methods: A mixed methods evaluation to explore the feasibility and acceptability of the pilot PCOC program was developed and involves data collection from residents, carers, RAC and PCOC staff. A subset of the evaluation will be used to investigate the palliative care outcomes of residents with dementia and their carers, and the perspectives of RAC staff in using the tools with this population. Results: The pilot PCOC program was evaluated in seven RAC facilities (N=749 beds). Results will provide insight into the suitability of the tools to identify the palliative care needs of residents with dementia and their carers, highlighting any challenges faced and how they were managed. It will also enable a better understanding of the palliative care needs of this population.

Discussion: This evaluation provides the opportunity to learn valuable lessons on how to improve the implementation of the PCOC tools among residents with dementia and their carers. It is hoped this information will contribute to an improved understanding of how to identify and address the palliative care needs of this population.

How, why and for whom do Quality Improvement Collaboratives improve quality of Dementia Care?

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The 'Agents of Change' translational research project created Quality Improvement Collaboratives (QICs) to support clinicians to improve adherence to the Australian Clinical Practice Guidelines for Dementia. This strategy incorporated training in both best clinical practice and quality improvement for clinicians in diverse settings around Australia. Collaborate with peers, researchers and experts enabled clinicians to adapt the guidelines to improve their practice. Objectives: This process evaluation explored how, why and for whom the QICs worked (or not) to build knowledge and skills of clinicians to improve dementia care. Methods: A realist informed process evaluation with mixed methods was used to understand how and why the collaborative process worked or not and for whom. Data was collected through semi-structured interviews with 20 participant clinicians before and after the intervention, surveys of their knowledge and skills, and their process of embedding the changes in practice. The mechanisms by which the collaboratives worked were identified from a stakeholder review of program theory and tested against interview transcripts. Results were combined with survey data to triangulate the data and test the program theory. Results: Key mechanisms for change included collaboration with peers, researchers and experts, commitment to quality improvement, and confidence to make changes in practice. Most participants improved the quality of their care through reflective practice and the quality improvement plan-do-study-act process. Clinicians working in supportive teams were able to adapt processes to their practice most successfully.

Patterns of health service use by people with dementia in their last year of life

Ms Melanie Dunford1, Dr Fleur de Crespigny1

1Australian Institute of Health and Welfare

Dementia is a major health issue in Australia. As dementia progresses, health and functional ability decline leading to increased care needs. Understanding health service usage in the last year of life and how this differs for people with dementia is important for policy development and service planning and delivery to ensure appropriate care is provided. This study contributes to understanding health service utilisation by people with dementia in their last year of life. In one of the first studies of its kind in Australia, health service usage in the 12 months prior to death by over 70,000 people who died in 2013 was examined using linked administrative data. The study examined people from NSW and Victoria who died aged 65 and over with a dementia diagnosis evident in the linked data, with those aged 65 and over without dementia. Services included: hospitalisations, emergency department presentations, GP and specialist services and prescriptions dispensed. With the exception of GP services, people with dementia who died aged 65 and over used health services less than people without dementia in their last year of life. The greatest difference was seen in the use of specialist services. The use of hospital services increased in the final months of life, but overall hospital services were still used less by people with dementia than without dementia.

Reflections on changes to sleep-health through supporting a family member with dementia

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Sleep disturbances are common with dementia and can impact the sleep and wellbeing of family members living with and supporting someone with dementia. This project aimed to represent the sleep experience family supporters across the trajectory of dementia, including transitions into residential care. Method: Semi-structured interviews were conducted with 20 people (median age 75.5 years, 14 female) who had transitioned their family member with dementia into formal care within the previous two years. Qualitative analyses involved software coding of transcripts, participant case studies, and a thematic analysis. Results: Sleep experiences were linked to participants' previous identity around being a good or bad sleeper. As dementia progressed, their sleep got progressively worse due to the less predictable nature of their family member's dementia-symptoms, difficulty maintaining routines, and responsibilities creating a high state of alertness. Sleep and wellbeing of those with dementia was often prioritised over self-care. Retrospectively, family members acknowledged feeling exhausted. Reflecting on transitioning their family member into residential care, some participants reported 'crashing' and not realising how sleep deprived they were; for others the busy momentum continued. Grief was common throughout. Post-transition, ongoing sleep disruptions were common and associated with insomnia, poor habits, or nightmares. Most were optimistic that their sleep would improve as grieving progressed and many enjoyed the luxury of sleeping in response to their own preferences. Conclusion: Sleep health is typically foregone by family in order to fulfil informal dementia-care requirements. Appropriate sleep resources and interventions are required to better support families affected by dementia.

Ethnic disparities in the uptake of anti-dementia medication in young and late onset dementia

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People with dementia (PwD) can face barriers when trying to access care after a diagnosis, particularly in young-onset dementia (YOD). Little is known however about the effects of ethnicity on access to anti-dementia medication and how these differ between age groups. The aim of this study was to analyse national data on variations in the current uptake of anti-dementia medication between people with YOD and late-onset dementia (LOD). Method: Data from the US National Alzheimer's Coordinating Centre was obtained from September 2005 to March 2019. First visits of people with a diagnosis of Alzheimer's disease (AD) dementia, Lewy Body dementia (LBD), and Parkinson's disease dementia (PDD) were included. Logistic regression was used to analyse the effects of education and ethnicity on use of cholinesterase inhibitors and memantine, accounting for YOD/LOD, gender, living situation, severity stage, and comorbidities. Result: In total, 15,742 people with AD dementia and LBD/PDD were

included, with 11,019 PwD having completed a first follow-up visit. Significantly more people with YOD used memantine than those with LOD, whilst fewer used cholinesterase inhibitors. PwD from minority ethnic backgrounds used memantine and cholinesterase inhibitors less often than those from a White ethnic background. Logistic regression analysis showed that ethnicity was a significant determinant of both memantine and cholinesterase inhibitors usage, while education was only a significant determinant for memantine usage. Conclusion: Findings highlight the impact of social factors on current usage of anti-dementia medication, and highlight the need for more resources to enable equitable access to anti-dementia medication.

Bridging the Gap between Academic Research and Industry Research Needs: The PITCH project

Professor Briony Dow1, Megan Corlis2, Ms Stefanie Roberts1, Professor Colleen Doyle1, Professor David Ames3, Dr Margaret Winbolt4, Dr Steven Savvas1, Dr Sue Malta3, Professor Philip Clarke3, Dr Anita Panayiotou5, Professor Claudia Cooper6, Professor Gill Livingston6, Professor Constantine Lyketsos7, Assoc. Professor Frances Batchelor1, Mr Jason Burton8, Assoc. Professor Lee-Fay Low9, Assoc. Prof Samuel Scherer10, Dr Samantha Loi11, Ms Erica Wise1, Ms Nadia Chau1, Ms Ellen Gaffy4, Ms Anne Fairhall12,

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Research should aim to produce practice impact, public health impact, and social impact. For research outcomes to be truly translational and influence health care policy and practice to improve the life of those living with dementia, their families and carers, then industry and academia must work in partnership to add value and deliver results. This presentation will discuss how strategic industry alliances and partnerships encourage innovation and research excellence at the same time as allowing for faster, evidence-based solutions that are co-designed and therefore acceptable to end-users, and more likely to make genuine change. To conduct research that is topical, translational, and to recruit participants, researchers often call on service providers for help but there exist significant differences in the needs and objectives of academia and industry. This co-presented presentation from leaders in academia and an aged care service provider will discuss the mechanisms for bridging the gap between the needs of academic research and industry, and how this relationship can be optimised. This presentation will highlight our experience with building and strengthening collaborations for research and development with industry, academia, government and not-for-profit groups in the Promoting Independence Through quality Care at Home (PITCH) project. The project involves co-designing and evaluating a dementia-specific training program for home care workers to provide care that promotes independence, improves quality of life, and recognises the lived experience of dementia. It is currently being evaluated through a large randomised controlled trial across three states of Australia, with multiple service provider partners.

Making sense of self-reported practice impacts after online dementia education: The example of Bedtime-to-Breakfast

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To satisfy requirements for continuing professional education, workforce demand for access to large scale online non-formal and micro-credential courses is increasing. This study examined the knowledge translation (KT) outcomes for a new short (2 hour) online course about support at night for people living with dementia (Bedtime to Breakfast), delivered at scale by Dementia Training Australia. A sample of the first cohort of course completers were recontacted after 3 months, to complete a KT follow-up feedback survey (n=161). In addition to potential practice impacts in three domains (Conceptual, Instrumental, Persuasive), respondents rated the level of Perceived Improvement in Quality of Care (PIQOC), using a positively packed rating scale. Results showed that 93.8% of respondents agreed the course had positively impacted the support they provided for people with dementia. In addition to anticipated Conceptual impacts (e.g. positive shifts in knowledge, beliefs) a range of Instrumental and Persuasive impacts were also reported, including workplace

guidelines development and passing on knowledge via formal training session for other staff. Tally counts for discrete KT outcomes were high (median 7/10) and could explain 23% of the variance in PIQOC ratings. It is concluded that online short courses delivered at national scale are capable of supporting a range of translation-to-practice impacts, within the constraints of retrospective insight into personal practice change. Topics around professional reflection as KT self-report, and interpretation of positive packing scales for respondent feedback, are discussed.

Creation of a quality improvement collaborative improves adherence to best practice in dementia care

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The quality of dementia care in Australia is dependent on the clinician involved and the extent to which they apply best available evidence. The Clinical Practice Guidelines for Dementia in Australia (the Guidelines) provided comprehensive guidance for clinicians about best practice for people with dementia and their care partners. Dissemination of guidelines is generally insufficient alone to achieve tangible improvements in practice. Method: The Agents of Change project is an implementation research study that aims to improve clinician adherence to three key recommendations from the Guidelines. The clinicians participated in a training program and were supported to develop a quality improvement plan unique to their service context. Clinicians met regularly with their QIC to facilitate benchmarking and problem-solving, and updated their plan iteratively using plan-do-study-act cycles. The primary outcome was guideline adherence which was tracked over a period of 18 months. Results: The majority of the participating clinicians were highly experienced and leaders within their service. Adherence to the specified guidelines increased steadily over time with an overall increase of 42% adherence. Increases in adherence over time were steady suggesting that each element of the quality collaborative intervention contributed to increased guideline adherence. There was great interest in joining the collaborative and few withdrawals over the duration suggesting an appetite from clinicians to be involved in this type of initiative. Conclusions: Agents of Change is an innovative translational research project highlighting key elements of collaborative quality improvement efforts among clinicians working with people with dementia and their supporters.

Implementing an evidence-based program for Australian people with dementia and their families within existing services

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This translational research examined how the evidence based 'Care of People with dementia in their Environments' (COPE) program could be implemented within existing health and aged care services and funding sources in New South Wales and South Australia and outcomes for families receiving the program. Methods: COPE (a structured program provided by occupational therapists and nurses) was implemented in government, non-government and private settings. Strategies to implement the program included: education, process restructure (with an expectation for clinicians to provide data on completed cases), and quality management (reminders, fidelity checking). Data from interviews with clinicians and managers and questionnaires measuring client outcomes were used to understand both the process of adoption of the program and whether it was effective when delivered in real life as when tested in a research project. Results: Thirty eight occupational therapists and 17 nurses from 13 organisations were trained and provided with support to implement the program in practice. A total of 104 dyads completed the program. Results indicated it was possible to implement the program within existing services and funding sources and clients who received the program provided positive feedback which was captured in interviews. Scores of activity engagement were significantly higher following participation in the intervention (p=0.002) as were the levels of perceived change in caregiving reported by caregivers (p=0.000) Conclusions:

Implementing evidence based dementia care programs within existing health services is possible but work is needed to upskill clinicians, provide them with tools and resources and provide tailored implementation support.

Scoping review of electronic assistive technology to support executive functioning of adults with neurological conditions

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While memory difficulties are well-recognised for people living with dementia, executive dysfunction, can also have a large effect on independence and participation. Electronic assistive technology has historically been used to support the executive functioning of other populations. As mainstream and emerging assistive technology expands, this technology may assist people living with dementia. As part of a study investigating assistive technology with people with executive dysfunction related to brain injury, an inclusive scoping study was undertaken. It aimed to explore evidence and approaches for electronic assistive technology to support executive functioning for people with acquired neurological conditions, including dementia. Applying a scoping review process, the project included a comprehensive search of 4 databases using specified search terms. It also consulted with consumers with brain injury and allied health professionals, developers and suppliers, and social and injury insurers. 161 publications were incorporated and key findings were synthesised. The literature identified indicated there is evidence for using electronic assistive technology to support performance and participation for people with executive dysfunction. There were some high quality trials and reviews published, but most described small, preliminary studies. There was consensus that rather than focusing on individual devices, the evidence can be built for mechanisms of support, attributes of usable systems, and clinical approaches to aid successful use. The use of technologies to provide prompts and reminders, development and support of routines, environmental and safety monitoring and management of trouble had the most support. Future electronic assistive technologies should include users in both development and evaluation.

Prioritising the National Dementia Guidelines Recommendations in general practice: views of people from CALD backgrounds

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The national dementia guidelines aim to improve the quality and consistency of care provided to people with dementia and their family members. General Practitioners (GPs) play a key role in delivering this care. Our earlier study with key general practice stakeholders identified those guideline recommendations most important to GPs. This current study complemented these findings by adding the views of people with dementia from Culturally and Linguistically Diverse (CALD) backgrounds and their family members. This is important because people from CALD backgrounds account for a significant proportion of Australians with dementia. Methods: Semi-structured interviews were conducted with family members of 15 CALD people with dementia, including ten Chinese and five Greek people. Participants were presented with 10 recommendations from the Guidelines that were relevant to CALD populations and carers, as well as four recommendations identified in the earlier study. They were asked to consider which recommendations they thought to be the most important for GPs. Results: CALD people considered that: (1) “Medical practitioners working with older people should be alert to cognitive decline;” (2) “Health and aged care services need to recognise and be responsive to the cultural and linguistic needs of CALD people;” and (3) “People with dementia who develop behavioural and psychological symptoms should be offered a comprehensive assessment” as the most important for GPs. Conclusion: The study highlight the need for GPs to recognise and respond to the cultural and linguistic needs of CALD people with dementia and their family members.

Homelessness service use and transition to residential care by older people with complex needs

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Older people who are homeless have a higher incidence of age-related chronic health conditions such as dementia and alcohol-related brain injury. Complex histories (e.g. social disadvantage, abuse), precarious living arrangements, and estrangement from consistent service provision often contribute to premature ageing and mortality. People aged over 55 represent 16% of Australia's homeless population. Only 0.2% of specialised homelessness services focus on older people, with the majority targeted towards the general homeless population. Little is known of how older people who are homeless make use of these general homelessness services. Understanding service use patterns would help to identify the needs of this unique cohort and contribute to development of a better service system. A new purpose-built aged care home has been designed to offer a secure housing solution incorporating intensive service provision for older people with complex needs such as dementia who are homeless. This study will explore experiences of residents who have moved from homelessness to having a permanent home in HammondCare Darlinghurst. Referral pathways and use of services over the 12 months leading up to admission will be examined (service type, occasions and frequency of use). The range of services used by residents will be mapped to identify service preferences for this cohort. Outcomes will inform cost-benefit and social-benefit analyses to evaluate the impact of new service models for older homeless populations such as the aged care home described in this study, and ultimately contribute to an improved system with homelessness services tailored to the needs of older people.

Translating principles about dignity into practice in aged care homes: Phase 1 results

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The majority of residents in Australian aged care homes are incontinent of urine, faeces or both and require high levels of support (1,2). Incontinence increases the risk of falling, pressure injuries and (3) undermines dignity and quality of life. The Royal Commission into Quality and Safety in Aged Care identified a gap between policies and standards that promote dignity in care and actual practice (4). In 2016, the lead researcher developed a conceptual framework (5) that could help aged care providers meet their obligations under the Aged Care Quality Standards (6). Although the framework has a coherent theoretical basis, further research is required to translate it into a replicable intervention for broader dissemination. Aim: To co-produce and pilot test an education program to support dignity-protective continence care in aged care homes. Methods: A two phased knowledge translation mixed methods approach: (i) Phase 1: Stakeholder engagement and collaboration to coproduce a contextually appropriate evidence-based sustainable education program for staff who provide continence care. (ii) Phase 2: A pilot study to evaluate the potential benefits, appropriateness, acceptability and feasibility of the education program. Results: Focus group data from experienced aged care nurses resulted in information about practice-informed strategies that potentially minimise the risk of distress or harm when providing continence care to residents with a diagnosis of dementia. This information was incorporated with evidence to produce a set of learning outcomes for the proposed Dignity in Continence Care Education Program to be piloted in phase 2.

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The impact of sedative load from medicines on movement behaviour of adults in residential aged-care.

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Physical activity is important for older adults in residential aged care as a means of breaking up sedentary time and maintaining physical and cognitive function. Medications intended to support residents' wellbeing may inadvertently result in cumulative sedative effects that can impact cognition and the capacity to be physically active. The objective of this analysis was to examine the impact of medications with sedative effects on movement behaviour. Methods: Twenty-eight adults (68-97 years; 23 females) living in residential aged care participated. Medication data were collected from participants' medical charts and sedative load was determined. Seven-day movement behaviour was objectively assessed by a wrist-worn accelerometer. Raw accelerations were converted to sleep, sedentary time, and time in light, moderate, and moderate-to-vigorous physical activity. Stepwise regression analysis was performed to assess the relationship between sedative load and movement behaviour. Results: Sedative load was associated with movement behaviour, accounting for 27% variance in moderate intensity, and moderate-to-vigorous intensity physical activity (r2 change = 0.27, Beta = - .45, p<0.01; r2 change=0.27, Beta = -.46, p<0.01, respectively). Participants spent 50.3% of their day sedentary and 44.2% sleeping, with only 5.5% of their day spent being physically active, on average. Conclusions: The findings suggest that sedative load may have a negative impact on an individual's movement behaviours. Using accelerometers to objectively examine the movement behaviours of older adults in residential aged care facilities will enable monitoring of movement behaviours and the early identification of decline that could negatively impact physical and cognitive function.

Meeting the aged care and dementia service needs of older Aboriginal Australians: Service provider perspectives

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More Aboriginal and Torres Strait Islander Australians are living to older ages, associated with an increasing demand for culturally appropriate aged care and dementia services. The current aim was to explore service provider perspectives on how well they are meeting the needs and expectations of this population. An environmental scan was conducted of community health, aged care and dementia services available to older Aboriginal and Torres Strait Islander people living in partnering communities in greater Sydney and regional/rural areas on the mid-north coast of NSW. Of 33 relevant services identified, staff from 26 services participated in semi-structured interviews which examined the type of service provided, perceived successes and challenges to service delivery. Interviews were audio-recorded, transcribed verbatim and qualitative data analysed using a grounded-theory approach. The types of services varied widely, the majority catering specifically to Aboriginal clients, with holistic services described as aligning most with community expectations. A key theme emerged around Elders and cultural respect, including cultural obligations to care for Elders, understanding family roles, and shame, fear and trauma. In general, staff who are well-known, trusted, and engaged with the local Aboriginal community were viewed as essential. Funding

constraints and inconsistent services were identified as significant challenges; areas of need included dementia education for families, greater support to access the aged care system, and healing-centred approaches to care. This study provides important insights to guide policy and future translational research to improve aged care with older Aboriginal peoples, their families and communities.

Caregivers' perspectives of medication management advice for people with dementia at hospital discharge: qualitative study

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People with dementia admitted to hospitals are more likely to be exposed to inappropriate polypharmacy and experience worse outcomes than people without dementia. Family and informal caregivers play an important role in managing medications across transition of care; however, studies describing the experiences of medication guidance provided to caregivers at hospital discharge are limited. Aims: To explore caregivers' perceptions on the quality of and factors that influence caregiver participation in medication guidance at discharge. Methods: A qualitative approach using semi-structured interviews was conducted with 29 caregivers of people with dementia across Australia by telephone. Purposive sampling was used to ensure maximum variation of diverse perspectives. Content analysis was used to derive themes. Results: Three themes were derived from analysis: inconsistent approaches to provision of medication information at discharge, caregiver awareness to advocate for the care recipient and managing competing priorities. Some caregivers reported inadequate information was provided because the information was communicated to the patient without the caregiver being present. Other caregivers stated a medication list, discharge summary and discussion with a healthcare profession provided useful information. Caregiver involvement in discussions on medication guidance at discharge was influenced by caregiver awareness to advocate for the care recipient to ensure medication safety and managing competing priorities at the time discharge to manage stress. Discussion: Caregivers flagged the need to establish structured caregiver education at discharge and community-based services to manage medications safely. Future studies are needed to explore development of resources to caregiver encourage participation during medication guidance at discharge.

Medications can be SIMPLER: outcomes of a randomised controlled trial in 8 aged care facilities

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Complex medication regimens are common among people living with dementia, who comprise approximately half of all people living in residential aged care facilities (RACFs). Complex regimens are burdensome for residents and staff. The SImplification of Medications Prescribed to Long-tErm care Residents (SIMPLER) study assessed the application of a structured process to consolidate the number of medication administration times for residents. Methods: A non-blinded, matched-pair, cluster randomised controlled trial was undertaken. The intervention involved a clinical pharmacist applying a validated 5-step process (MRS GRACE) to identify opportunities simplify medications. The comparison group received routine care. The association between the intervention and primary outcome (number of administration times per day for regular medications) at 4 months follow-up were estimated using linear mixed models. Results: 99 residents participated in the intervention group and 143 in the comparison group. The mean resident age was 86 years and 131 (54%) were living with dementia. Medication simplification was possible for 62 (65%) residents in the intervention group and 62% of simplification recommendations were implemented. In intention-to-treat analyses, the mean number of administration times was reduced in the intervention group in comparison to the usual care group at follow-up (-0.36, 95% CI -0.63 to -0.09, p=0.01). There were no differences in falls, medication incidents, hospitalisations and mortality at 4-month follow-up. Discussion: Single application of a validated tool to reduce regimen complexity is a low risk intervention and reduces the burden of medication taking among residents of aged care facilities.

Multi-sensory methodologies: Participatory action research with people with late stage dementia

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People with late stage dementia are frequently excluded from qualitative research, despite an understanding of the importance of inclusive research in maintaining the human rights of people with disabilities. This paper reports on an Australian study, Connections for Life with Dementia: Care Connections, which includes 20 people with late stage dementia living in residential aged care facility. A Participatory Action Research (PAR) framework was used to innovatively develop a range of tactile, multi-sensory and relational methods that included people with late stage dementia and helped to understand and improve their everyday lives and experiences. Interdisciplinary researchers worked in collaboration with diversional therapists, support workers and families to curate a personalised selection of objects (such as photos, images, toys, fabrics, tools) for each participant with late stage dementia. Participants felt, explored and (sometimes) talked about the objects with the researchers and diversional therapists over at least eight informal research sessions. Participant responses were observed using an engagement assessment and reflected on in ethnographic notes. Clothes, photos and everyday objects of significance remain important to people with late stage dementia. In particular, the tactile and multisensory objects give people with late stage dementia a way of connecting with themselves, one another, staff and family. Participants became attached to particular multi-sensory objects, resulting in the study culminating in the creation of co-designed, personalised scarfs or blankets for each participant which held their objects, ensuring that the benefits of the multi-sensory methodologies could be literally carried with them.

Medication misuse and reported poisonings in people with dementia: a retrospective study

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People with dementia are high users of medications. However, cognitive, behavioural and functional changes that occur in this population mean they are prone to potential misuse of medications and other substances. Despite this, there is currently limited research investigating intentional and unintentional drug poisoning in this vulnerable population. The aim of this study was to describe poisonings in people with dementia, including the common types and sources of errors. Methods:

A retrospective study was conducted using data from the NSW Poisons Information Centre from July 2014 to July 2019. All calls pertaining to individuals with a reported diagnosis of dementia (Alzheimer's disease or other) or who were taking an antidementia drug were included. Results:

A total of 2726 cases involving individuals with dementia (mean age = 79.5 [SD 11.0] years; 56% female) were reported to the Poisons Information Centre after intentional or unintentional poisoning. Of these, the most common exposure types were therapeutic errors (62%) and accidental ingestion (26%). Donepezil (8%) and paracetamol (5%) were the most common medications implicated in therapeutic errors. For accidental exposures, hand sanitiser (7%), soap (6%) and denture cleaning agents (6%) were the most common substances involved. Over half (51%) of errors were due to double doses of medication or mistiming of doses, and 15% were due to nursing home or carer error. Conclusion: Therapeutic errors and accidental poisonings are of concern in people with dementia. Strategies to reduce these potentially preventable adverse events should be further explored.

Use of medication reviews among older women with dementia in Australia, 2003-2015: a longitudinal study

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Objective: To determine use of medication management review among Australian women with and without dementia. Method: Data from the 1921-1926 cohort of the Australian Longitudinal Study on Women's Health were linked to Medicare Benefits Schedule (MBS) for obtaining information about medication review for each year 2003-2015. We applied Generalized Estimation Equation (GEE) explore longitudinal impact of dementia and other potential predictors for medication review services utilization. Results: A total of 10,359 women were eligible for the study. The year-wise prevalence of medication review for women with dementia in residential aged care (RAC) was 2-3 times higher

when compared to women not in RAC. Women with dementia had significantly higher odds of having medication review (AOR = 1.18, 95% CI: 1.06 – 1.32) compared to women without dementia. The odds of medication review for women residing in RAC were 3.6 times higher (AOR = 3.61, 95% CI: 3.28 – 3.98) when compared to women not in RAC. Women with higher scores on the frail scale and higher number of chronic diseases were also more likely to have a medication review. Conclusion: Utilization of medication review by older women was modest. Medication reviews were being targeted to women with higher need, however, the study also shows a large potential to improve medication reviews among women with and without dementia. A sustainable and effective system-level interventions or change in policies addressing the barriers for easy access to medication review service may be required to assure timeliness and realistic benefits of medication reviews.

"'Til dementia do us part": Caring and grieving for an intimate partner with dementia

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Our husbands died with Alzheimer's disease. Our caring role involved enormous resilience - accompanied by enormous grief. We have sought to discover meaning in our experiences and to better understand the dementia care experience and the inevitable associated grief. Drawing on the anthropological methodology of auto-ethnography we provide unique insights into the intimate partner care experience, revealing why the grief in which the carer is immersed is both intense and long-lasting. Dementia impacts on the ways people mutually connect. There is no greater impact than on the connection between intimate partners. Changes in their physical and emotional intimacy have implications, and impacts continue long after the death of a partner. Dementia involves a changing of self for the person with dementia. A skilled intimate partner carer may be able to hold their partner in their identity so that more of their old self remains. But what is happening to the carer's own self? To communicate appropriately and effectively with a person who is changing, it is essential that the self of their carer also change to adjust to a different relationship. Grieving for a partner who is changing thus involves grieving for the loss of one's own self. This is a complex grief: for the self and other of a pre-dementia relationship, a partner who has died, and then loss of one's new carer-self. Insights from intimate partner carers provide a window onto the demands of dementia care more broadly and are critical to providing appropriate support for all carers.

Building a clinical quality registry for dementia in Australia: Overcoming barriers to participation and inclusiveness

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The Australian Dementia Network (ADNeT) Registry is a prospective Clinical Quality Registry (CQR) to monitor the quality of clinical care for persons newly diagnosed with dementia or Mild Cognitive Impairment. In order to accurately measure quality, maximising participation is vital. As such, an opt-out recruitment approach is employed by most Australian CQRs and is recommended by the Australian Commission on Safety and Quality in Health Care as a standard recruitment approach. For the ADNeT Registry, informed consent presents challenges in cases where potential participants lack capacity to provide this. A dual recruitment method for the ADNeT Registry was developed following extensive legal and consumer consultation. This comprises an opt-out approach and waiver of consent based on three key determinants: capacity, person responsible and communication of diagnosis. The waiver of consent enables the Registry to include people who risk being excluded but whose participation is essential for providing a complete picture of clinical care, such as those who have neither the capacity to opt-out nor an identified person responsible and those who die during the recruitment stage. ADNeT is developing strategies to promote awareness, engagement and participation among Aboriginal and Torres Strait Islander communities and people from culturally and linguistically diverse backgrounds. The ADNeT Registry recruitment methods will help ensure that the Registry minimises selection bias and maximises coverage, while respecting consumer choice and privacy. This recruitment method has been approved by the Alfred Hospital Human Research Ethics Committee and is well received by participating sites.

A Milestone in Australian Dementia Data and Clinical Care: The Australian Dementia Network (ADNeT) Registry

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The clinical care for people living with dementia and mild cognitive impairment (MCI) in Australia can be improved. Until now there has been no systematic data collection that can inform on important aspects of quality of care. A Clinical Quality Registry (CQR) can fill this gap, by collecting data on the appropriateness and effectiveness of care, and feeding this back to consumers, clinicians and policymakers in order to drive improvement. CQRs operate in Australia for many health conditions, including stroke and cancer. A CQR for dementia has been identified as a priority by the Australian Commission on Safety and Quality in Healthcare, and is being established as part of the Australian Dementia Network (ADNeT), integrated with initiatives to support service improvement (ADNeT-Clinics) and enhanced opportunities for clinical trial involvement (ADNeT-Screens and Trials).

Beginning in 2020 in 15 memory clinics nationwide, ADNeT Registry aims to include the majority of Australian memory clinics by 2023, and ultimately expand to all other diagnostic settings. The registry enrols persons newly diagnosed with either MCI or dementia. A baseline minimum data set will be collected from participating sites. Longitudinal outcomes will be facilitated by linkage with administrative datasets, whilst patient and carer reported outcome and experience measures will also be collected. ADNeT Registry has the potential to significantly transform clinical care of dementia and MCI, by identifying variations in clinical practices, monitoring the uptake and outcomes of any new therapies, and improving research participation opportunities for people living with dementia and MCI in Australia.

Impact of prior home care on length-of-stay in residential care for Australians living with dementia

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Aim: To assess the impact of home and community-based services (HCBS) on length-of-stay within permanent residential aged care (PRAC) among Australians living with dementia. Methods: The cohort comprised 3,151 participants from the 45 and Up Study who were living with dementia and entered PRAC between 2010–2014. Survey data collected in 2006-2009 were linked to claims against the Pharmaceutical Benefits Schedule, hospitalisations, deaths (linked by the Centre for Health Record Linkage) and aged care data linked by the Australian Institute of Health and Welfare. The highest level of HCBS a person accessed prior to PRAC was defined as: no HCBS; home support; low-level home care; and high-level home care. Multinomial logistic regression and Cox proportional hazards were used to investigate differences in Activities of Daily Living (ADL), Behavioural, Complex Health Care scales at PRAC entry; and time spent in PRAC. Results: People with prior high-level home care entered PRAC needing higher levels of assistance compared to the No HCBS group. They also had a shorter length-of-stay in PRAC (median length-of-stay of 1.9 years; 2.2 years for No HCBS). Those using low-level home care were less likely to enter PRAC needing high assistance compared to the No HCBS group. There were no differences between the home support and No HCBS groups. Implications: High-level home care may help people living with dementia stay at home longer. Increased transition options from low-level home care including more timely availability of high-level care packages may help prevent premature entry to residential care.

Mapping the dementia service trajectories of rural carers: barriers and enablers to accessibility

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Mapping the dementia service trajectories of rural carers: barriers and enablers to accessibility

Appropriate and timely access to care and support services for people living with dementia (PLWD) and their families is critical. However, to date there has been little detailed exploration of the process by which carers of PLWD engage with localised service pathways across the continuum of dementia care, or their experiences of these pathways. Consequently, this project sought to critically examine the help-seeking pathways employed by carers of PLWD in a regional Victorian setting and identify barriers and enablers to service accessibility. In-depth service mapping interviews were undertaken with carers of PLWD (n=10) within the City of Greater Bendigo region in Victoria. Participants co-constructed a visual map of their dementia care service trajectory in collaboration with a team of researchers, and then provided contextual information about how these services and supports were identified, in addition to any barriers or enablers they experienced in navigating these dementia care pathways. These mapping interviews were transcribed and analysed thematically using Levesque et al's (2013) five dimensions of service accessibility – approachability, acceptability, availability and accommodation, affordability and appropriateness. Findings indicate that approachability of dementia services at critical points of the dementia care trajectory (post-diagnosis and at times of escalated service need) was challenging, with the ability to perceive and engage with services a significant barrier. High levels of social capital were critical in alleviating these issues. These findings are considered in relation to their implications for the development and translation of dementia care pathway documentation within a regional Australian setting.

Ageing and dementia in the prison setting: Why we should care

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Older people (aged 50+) are the fastest growing prisoner population worldwide. While the younger population has stabilised, the older cohort has risen rapidly and now constitute >13% of the Australian prisoner population. Changes to laws in the 1990s, (e.g. mandatory sentencing) as well as better forensic techniques, have led to increased numbers of older offenders. Notably, the Royal Commission into Institutional Responses to Child Sexual Abuse resulted in many convictions of older men relating to historical offences. Population ageing has also led to increased numbers of people with dementia, for which criminal behaviour can be a presentation. Older people with dementia in prison are a particularly vulnerable population and the aim of this research was to examine the care and needs of this group. Methods: Focus groups and interviews were conducted with Corrective Services Staff at five prisons across NSW. Thematic analysis was used to analyse responses. Results: There are different profiles of offenders, including those on short-term sentences (e.g. for fraud) versus those ageing in place. A frequent theme was premature ageing, with high rates of risk factors for dementia due to "harsh" lives lived prior to prison entry and multi-comorbidities. Cognitive assessments were often with the purpose of determining capacity and safe housing options. More resources are required to allow routine screening of cognition for older offenders. There are no clear care custodians for older prisoners with dementia. Conclusions: Needs include: prison staff training on dementia, rapid cognitive assessments to facilitate mass screening, and care pathways.

Upholding the rights of persons with dementia to be listened to and understood

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The Charter of Aged Care Rights (2019) states that all people receiving aged care services in Australia 'have the right to be listened to and understood'. Yet persons living with dementia who access these services often report experiences of being ignored and misunderstood; resulting in exclusion from decisions made about their health and social care. Method: In this paper, we adopt a critical narrative approach to examining the ways that care decision-making is negotiated in the context of critical care transitions (i.e. transitions from living in the community to living in long-term care). We draw on interview data from a study exploring the intersection of power, decision-making and cognition, as they play out during these transitions. Results: Our analyses reveal the ways that decisions are made by, with, and on behalf of persons living with dementia. Drawing on the theory of 'Epistemic Injustice' (Fricker, 2007), we explore how decision-making practices reflect and perpetuate relative positions (i.e. rights to know and share certain information) of epistemic authority and epistemic subordination. Further, we demonstrate how assumptions about the credibility of the reports of persons with dementia, especially assumptions of cognitive unreliability, constrain the ways that persons with dementia and their family members make and enact social and health care decisions. Conclusion: By understanding how relative positions of power are negotiated during care transitions, we can discover new and innovative ways to listen to and understand the perspectives and preferences of persons with dementia, and promote ways to enable their active involvement in decision-making practices.

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CONSUMER INVOLVEMENT IN RESEARCH PRESENTATIONS

Mrs Betty Sagigi

Collaborating Researcher – Dr Sarah Russell, James Cook University

In this presentation I will discuss my research journey starting with how I came to have an interest in dementia through to my role as part of a team who completed a recent dementia prevalence study in the Torres Strait. Although I have not specifically been the primary carer of a relative with dementia, I have assisted several family members within my community to care for relatives with all stages of dementia. Being the family member who worked in aged care, I became the person in my extended family that was the go to person. I was asked to help family in seeking a diagnosis, was asked how to help them manage difficult behaviours, I provided assistance with hands on personal care and I helped family to access commonwealth aged care supports including respite. It was at this time that I realised I needed to increase my own knowledge base. So when I was approached by the research team to participate in some dementia research work I saw the opportunity to learn more about dementia so I could improve the help I could give to my family and community. I had never done any formal research before and was apprehensive about starting this journey as it differed from my clinical role. I started off providing cultural advice and mentoring and helping with community engagement. But as the study went on, I become more involved in data collection and was keen to do some of the assessments. This facilitated a mutual learning/teaching relationship with the non-indigenous team members as I was then able to advise on cultural appropriateness of some of the tools used and provide feedback from participants about the project. Along the way, I developed research skills in research design, data collection and data analysis. However, one aspect that has really pushed me out of my comfort zone was when I was asked to present our work at conferences with opportunities at national and international meetings. Through these presentations, I have been able to network with other overseas Indigenous researchers and I became part of the International Indigenous Dementia Research Network. This journey has also led me to become involved in doing some consultation for the NHMRC Indigenous Dementia Roadmap and participation at workshops so findings are translated into practice. For the future, I am now a named investigator on two further NHMRC national dementia and ageing projects and will be more involved in the project from the start. However, what is most important to me is that when relatives ask me about dementia, and how to manage the care of our loved ones, I feel confident that the advice and help I give them is correct and they are provided with the best opportunities to improve the quality of life of the person living with dementia.

Mrs Bobby Redman

Collaborating Researcher – Dr Linda Steele, University of Technology Sydney

In 2018, I was invited to sit on the Project Advisory Group for a research project titled Safe and Just Futures for People Living with Dementia in Residential Aged Care. The research was being completed by Dr Linda Steele, Professor Richard Fleming, Dr Lyn Philipson and Ms Kate Swaffer. The subject was of great interest to me, given the potential impact that it could have on my future and that of everyone living with dementia. As my goal is always to gain a greater understanding of the overall picture on dementia and dementia-care, I was also interested on viewing the situation from a moral and legal perspective, rather than from the more common human needs / care perspective. This presentation will look at my personal experience of being involved in this research, both as part of the Project Advisory Group and in the Focus Groups that provided information for the research. It will explore the shift in my personal view of myself as an advocate to that of an activist. It will describe the empowerment I experienced as I gained a greater understanding of the level of injustice and breach of human rights that occur to each and every one of us on our journey with dementia, not only at the point of admission to residential care but from the onset of symptoms (prior to diagnosis).

Mrs Cathy Roth OAM

Collaborating Researcher – Dr Anita Goh, National Ageing Research Institute

Consumer involvement in research can lead to new ideas, innovative approaches, improved quality and outcomes, and research being conducted that is relevant, topical, and important to the dementia community. Integrating people with dementia and their family members also improves research translation into practice, ultimately improving the quality of life of those living with dementia, their families and carers. This presentation will discuss the meaningful partnerships that has developed between them, and the outcomes of this partnership. Cathy will discuss her experience with John as current co-design partners in the NNIDR-funded study Promoting Independence Through quality Care at Home (PITCH) project. The project involves co-designing and evaluating a dementia-specific training program for home care workers to provide care that promotes independence, improves quality of life, and recognises the lived experience of dementia. Cathy and John have been involved as part of the Project Advisory Group for the past 2 years, and have worked with the project team as co-design partners to:

- set research priorities
- comment on and develop research materials
- advise on project design, particularly as it affects people with dementia and their family carers
- help with dissemination and implementation of research findings.

As a result Cathy and John's involvement in PITCH, new collaborations have occurred such as media opportunities, attending meetings, seminars, and conferences, reviewing new grant applications as a consultant, support of PALZ Professionals with Alzheimer's and related diseases (a group that gives high-functioning people with dementia with ongoing intellectual and peer stimulation), and a strong mutually beneficial relationship and friendship. Cathy will discuss the value that PALZ has brought to the project, the things that she and John have learnt and been able to take back to the PALZ organisation, and what they suggest for improvement in the future in terms of being involved as partners in research. Anita will reflect on her experience on having truly embedded consumers as co-design partners, and on the benefits and challenges of this, such as being open to altering the research questions, methods, and outputs based on consumer feedback.

Mr Trevor Crosby

Collaborating Researcher – Dr Michael Inskip, University of Sydney

As a person living with Lewy body dementia, I have participated in many research projects with, both as a participant and advisory group member, including universities' of Sydney, NSW, Newcastle. I became involved in the research project looking at Lewy body dementia and exercise at University of Sydney though Dementia Australia (DA). My philosophy at that stage was to be actively engaged in research, otherwise a cure will not be discovered. This research project with Dr Michael Inskip included an exercise regime, both physical and mental, that led participants to improve their quality of life; my mental and physical health and strength dramatically improved from participating in this project. Initially I felt it was going to be quite a difficult 8 weeks, however the design of the program was structured around incremental results, which were manageable and attainable. The overall results indicated significant improvement in my mental strength and physical strength. I continue to follow the exercise program from this project because of the fact I can see the benefits. The benefits of this research are borne out in many ways; my own personal gain, gain to other people living with dementia, gains to research and knowledge of this aggressive lesser-common dementia. I continue to communicate the outcomes of this study through my advocacy with DA, speaking to media, State and Federal Government, including the current Royal Commission into Aged Care Quality and Safety. Improvement could be made to this research through its continuation, supported by a NATIONAL FULLY-FUNDED DEMENTIA PLAN.

POSTER ABSTRACTS

Prevention

Parvalbumin interneurons identified as a hotspot for L1 retrotransposon activity

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Long Interspersed Element 1 (LINE-1 or L1) retrotransposons are a source of brain somatic genome mosaicism and de novo mutagenesis in the human brain. Through a copy-and-paste mechanism of mobilisation via an RNA intermediate, L1 DNA sequences "jump" from one location in the genome to another location and alter neural genomes. Previous studies have demonstrated that L1 mobilisation is higher in neurons than in other brain cell types, and enriched in the hippocampus. Recent studies showed that L1 mobilisation in the hippocampus play a role in memory formation. Changes in L1 mobilisation have been associated with neurodegenerative conditions, such as Alzheimer's disease. However, many fundamental features of L1 mobilisation in the brain, including neuronal subtype specificity, L1 regulation and the extent to which L1-driven neuronal genome mosaicism influences the functional properties of neuronal networks are unknown. Here, we studied L1 activity via a novel L1 mobilisation reporter mouse, in which an active full-length human L1 element was tagged with enhanced green fluorescent protein (EGFP) that is only expressed after a complete mobilisation cycle of transcription, splicing and integration of EGFP back into the genome. By analysing hippocampal tissue sections from these L1 transgenic mice, we have found that most L1 mobilisation occurs in parvalbumin (PV)-expressing interneurons, which promote network plasticity and long-term memory formation. Consistently, we also observe elevated L1 transcript levels and L1 promoter hypomethylation in sorted PV positive neurons when compared with PV negative cells of wild-type mice. Our ongoing studies are aimed at investigating differences in transcription factors known to repress or stimulate L1 expression in PV interneurons when compared with other hippocampal neurons.

Project DARE – using art to explore children's understanding of dementia

Dr Pippa Burns1, Associate Professor Michelle Eady1, Mrs Carinya Barkley2, Mrs Jennine Primmer3, Dr Jess Baker4, Dr Penny Harris1, Mrs Corinne Green1, Professor Victoria Traynor1

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One way to increase understanding of dementia is to educate children. Project DARE (Dementia knowledge, Art, Research and Education) was specifically developed to increase understanding of dementia amongst children aged 8-11 years through art making delivered by an interdisciplinary team of practitioner-researchers including teachers, artists and health researchers. Methods: Qualitative and quantitative methods were used to measure children's knowledge of dementia before and after a dementia education intervention. The project used art as well as standard quantitative methods to measure these changes. The intervention occurred over three weeks. Week 1: Information on the children's knowledge of dementia was collected prior to the intervention using an already developed tool. Local artists subsequently worked with the children to complete an artwork reflecting their understanding of memory. Week 2: In week two a cross-curriculum lesson on dementia was presented by the class teacher. Week 3: In the final week, children had the opportunity to modify copies of their original artwork based on the information they learnt in the previous week. The survey tool was also administered again. Results: Survey data were matched for 74 children and showed a significant increase in understanding of dementia. The children modified their artwork using collage and various mediums to represent memories fading or being lost. Another common theme in the post-intervention art was using abstract shapes and other artistic techniques to layer meaning and represent a sense of disorder and chaos. The results of this feasibility study showed that a three-stage lesson, delivered in the classroom increased children's understanding and knowledge of dementia.

Quality of social relationships associated with cognition in the Sydney Memory and Ageing study

Dr Anne-Nicole Casey1, Dr Nicole A. Kochan1, Dr Zhixin Liu2, Dr John Crawford1, Scientia Professor Perminder Sachdev1,3, Scientia Professor Henry Brodaty1,4,5

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Social relationships influence brain health. Yet the roles of social relationships in brain ageing remain unclear. Evidence indicates that smaller, unsupportive networks increase dementia risk (Penninkilampi et al., 2018). Concurrently, focusing on fewer and better relationships in older age is considered emotionally adaptive (Scheibe and Carstensen, 2009). We investigated whether number and quality of social relationships was associated with global cognition controlling for demographic and health-related variables (covariates) in the Sydney Memory and Ageing Study. Data were collected from 1037 cognitively healthy community volunteers enrolled at baseline, and follow-up data collected every two years across six years (Sachdev et al., 2010). Global cognition scores were the average of neuropsychological assessment scores from five cognitive domains. Social network size was number of friends/family contacted monthly. Social relationship quality was assessed using relationship dimension scores from the Assessment of Quality of Life (AQoL-6D: Richardson et al, 2012). Analyses incorporated multiple longitudinal modelling methods. Covariates included age, sex, years of education, ApoE4 status, neuroticism score (Costa and McCrae, 1992), depression score (Sheikh and Yesavage, 1986), number of medical conditions, number of mental activities, and minutes of weekly vigorous physical exercise. Our results indicated 1) an association of better perceived relationship quality with better global cognition that remained significant after controlling for influential covariates, and 2) little to no association between social network size and cognition across six years. Meaningful interpretation of the role of social relationships in healthy brain ageing may require both a person-centred approach and more nuanced measures of socialisation.

Dietary Patterns and Cognitive function among Older Adults: Findings from Sydney Memory and Aging Study

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Recent evidence [1] suggested nutrition may be associated with cognitive function among older adults. We aim to investigate relationship between diet, food components and cognition in Sydney Memory and Aging study (MAS). Objective: We aim to examine longitudinal associations between dietary patterns including Mediterranean diet, Dietary Approach to Stop Hypertension (DASH) diet with cognition among older adults at baseline, and over a 6-year period, in MAS. Methods: Participants (n=1037) from MAS were community dwelling, aged 70-90 years at baseline [2]. Diet was assessed using the 80-item Cancer Council of Victoria FFQ at baseline, Mediterranean diet scores and DASH diet scores were generated based on dietary intake [3][4][5]. Neuropsychological tests assessed global cognition and 6 cognitive domains [2] four times, at baseline and followed up every two years. Linear mixed model analyses were conducted to examine the relationship between dietary scores and cognitive function over time, with adjustment for age, gender, race, education, BMI, metabolic syndrome, cardiovascular risk factors, history of stroke, physical activity, smoking, depression and APOE ε4 genotype. Result: No significant association was found between adherence to either Mediterranean diet or DASH diet, and overall cognition in 6 years. However, higher adherence to a DASH diet was associated with better visual-spatial cognition at baseline (β=0.043; 95% CI: 0.008, 0.077; P=0.016). When examined food groups, a total intake of legumes and nuts, as a typical Mediterranean food group, was positively associated with better overall performance in global cognition (β=0.107; 95% CI:0.060, 0.154; P,0.000). Conclusion: Despite that higher DASH score were related to better visuospatial function at baseline, long term adherence to Mediterranean diet or DASH diet were not associated with cognitive performance among older adults. However total intake of legumes and nuts appeared to play a key role in overall cognition over 6 years.

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Neural Correlates of Semantic Fluency Deficits in Parkinson's Disease Patients with Mild Cognitive Impairment

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Cognitive impairment is evident in patients with Parkinson's disease (PD) as early as the time of diagnosis. At advanced stage, 80% of patients with PD experience dementia. Identifying neural substrates associated with mild cognitive impairment (MCI) will allow establishment of markers for prodromal dementia in PD. This study examined functional neuroimaging markers linked to semantic fluency deficits in PD-MCI. Methods: Seventy-nine (79) PD patients and 22 age- and gender- matched healthy controls (HC) participated in neuropsychological and cognitive assessments. PD patients were classified as MCI if they showed impairments using a comprehensive cognitive test battery assessing attention/working memory, executive function, language, memory and visuospatial function. A subset of fMRI eligible participants (37 PD and 20 HC) were scanned using a 3T Siemens Prisma, while performing a semantic fluency task consisting of category generation, category switching, and automatic responses. The number of responses, number of errors, and fMRI data were analysed for category generation and category switching. Results: Patients with PD-MCI (34%) performed significantly worse than PD patients without MCI (PD-NC) and HC during category generation and category switching tasks. Patients with PD-MCI showed greater activity in the right angular gyrus compared to PD-NC and HC during category switching. Increased activity correlated with worse verbal fluency performance during the semantic fluency task. Discussion: Our study provided promising evidence of impaired verbal fluency in PD-MCI. Increased right angular gyrus activity supports a marker for PD-MCI, and suggests either an impaired inhibition or a compensatory mechanism of the non-dominant brain region.

MIND Diet Adherence in Tasmanians Aged 50 and Older

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The Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet, combining aspects of the Mediterranean and Dietary Approaches to Stop Hypertension (DASH) diets, is associated with reduced cognitive decline and dementia risk. This study examined, for the first time, MIND diet adherence in Tasmanian adults aged 50 years and over.A 14-item MIND diet questionnaire was administered online to participants of the Island Study Linking Ageing and Neurodegenerative Disease (ISLAND). Item responses were scored 0, 0.5 or 1 based on pre-defined cut-offs. For olive oil, fish, wholegrains, berries, vegetables, nuts, legumes, and

poultry a score of 1 was assigned for high intake. For butter, cheese, red meat, fried/fast foods, and pastries/sweets a score of 1 was assigned for low intake. Item scores were summed to determine the total MIND score. 3249 ISLAND participants (mean age = 63 years; 72% female; 60% residing in Hobart) completed the questionnaire. Total MIND scores ranged from 2 to 14 with a median of 9.5. Median scores for individual items were 0 for legumes; 0.5 for leafy green vegetables, other vegetables, berries, nuts, cheese, wholegrains, and fish; and 1 for olive oil, butter, poultry, red meat, fried/fast food, and pastries/sweets. Fewer than half of the participants reported eating vegetables daily, consistent with Tasmanian Population Health Survey findings of low and declining vegetable consumption. Tasmanians 50 and older' MIND diet adherence is moderate on average, suggesting dietary interventions should be included in knowledge translation efforts to reduce the impact of dementia in Tasmania's ageing population.

Anxiety is associated with verbal memory impairment in Parkinson's disease

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Cognitive impairment and anxiety are top rated concerns in persons with Parkinson's disease (PWP). Dementia is evident in 80% of PWP at advanced disease. Emerging evidence suggests that patients with anxiety are 3 times more likely to present with mild cognitive impairment (MCI) in PD, which is a prodromal state of dementia. Preliminary evidence has demonstrated a link between memory impairment and anxiety in PWP. The present study aimed to further investigate this association using the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for anxiety disorders and a comprehensive standardised cognitive test battery. The cognitive test battery (N = 82) consisted two tests from each of the following cognitive domains: memory, attention/working memory, executive function, visuospatial and language. Logistic regression models adjusted for age and gender were constructed to identify cognitive characteristics associated with anxiety disorders compared to no anxiety. PWP with DSM-IV anxiety disorders compared to those without anxiety demonstrated both immediate (Odds ratio = 0.44, 95% CI = 0.24–0.81, $p < 0.01$) and delayed recall (Odds ratio = 0.59, 95% CI = 0.37–0.96, $p = 0.03$) verbal memory impairment. These findings present first evidence that anxiety is associated with verbal memory impairment in PD. Further investigations are warranted to understand the neurobiological underpinnings of this association between anxiety and memory impairment in PWP without dementia, and the contribution of anxiety towards future progression to dementia in PWP.

Benefits of Lifestyle Compositions on Neuroplasticity and Dementia Prevention

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Dementia and ageing are often accompanied with changes in cognitive and arterial health, which may lead to arterial stiffness and lower cognitive performance. While there is substantial knowledge about the effects of exercise and sleep on cognitive ability in older adults, recent multi-domain approaches seek to examine the combined effect of protective factors. Considering lifestyle activities across a 24-hour day (physical activity, sleep, and sedentary time) may help to better understand how to optimise one's day to extend healthy cognition for longer, which may delay the onset of dementia. Our

group has established compositional data analysis (CoDA), a statistical model that allows us to consider activity, sleep and other behaviours together in the same model. We can measure how these components impact the arterial health of the brain using a non-invasive optical imaging technique called Pulse_DOT recently patented by our group. Pulse_DOT uses near-infrared light to measure pulse parameters with changes in oxy- and deoxyhemoglobin, and can help determine arterial elasticity health. This PhD thesis will examine how variability in daily composition of activity, sleep and sedentary behaviour affect brain arterial health over the prefrontal cortex, and associated brain functional and behavioural processes. We will present a research plan and methodologies that will be used to investigate arterial and cognitive health based on lifestyle compositions in 225 adults 60-70 years old. The cross-sectional research project is part of the ACVITate study (Project number: GNT1171313), a longitudinal study that seeks to identify 'best day' patterns that optimise cognition and brain function.

Leveraging Evidence into Action on Dementia-LEAD!

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This project is funded through the Boosting Dementia Research Initiative and falls under the theme of Implementing Dementia Risk Reduction and Preventive Research. Our research program focuses on translating the evidence on dementia risk reduction into a series of practical outputs, guidelines, and outcomes within the health system and population. The project works within a population health framework. It builds on two decades of research by the team which has contributed significantly to the evidence base on risk factors and their modification and underpins WHO guidelines on risk reduction for cognitive decline and dementia. The workplan translates evidence at the individual, health care practitioner and population levels. There are three main aims of this project: 1. To develop and validate a new risk assessment tool for dementia and its subtypes. The most recent effect sizes for risk (and protective) factors will be collated from systematic reviews and meta-analysis. This prediction model will be validated using international cohort studies to check for accuracy, reliability and repeatability. 2. To develop multiple ways to support the implementation of the latest dementia risk reduction evidence by engaging with consumers, clinicians, policymakers and the general public. 3. To build a strong framework and methods to assess population level dementia risk reduction based on the recent WHO guidelines that are relevant to Australian and global health. This work will engage with other non-communicable disease areas.

We are currently working on Aim 1 of the research program and our poster will provide an update on progress and preliminary results.

Coping strategies mediate the relationship between anxiety and cognitive decline in older adults

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Stress and anxiety are closely interrelated and are known to have detrimental effects on cognition, including memory. However, less is known about the underlying mechanisms of these processes. We investigated whether coping strategies mediated the

effects of stress and anxiety-related factors on cognitive impairment/dementia, as well as cognitive decline, in older adults. Our study utilised longitudinal data of adults aged 68-72 years from the Personality and Health Through (PATH) Life project. Stress and anxiety measures were collected at Wave 3 (baseline for our study) along with coping strategies (14 strategies which were factor analysed to 4 components- "independently facing a stressor using healthy cognitive strategies", "substance-use", "avoidance coping strategies-non substance", "support seeking"). At Wave 4, four years later, participants were screened for any diagnoses of MCI or dementia (using a novel algorithm; see Eramudugolla et al 2017) and cognitive decline in attention, episodic and working memory domains. Using mediation models, we showed that stress did not have any direct or indirect effect on cognitive impairment/dementia. Anxiety was positively associated with cognitive impairment/dementia when participants were unable to independently face a stressor using healthy cognitive strategies (b=0.097; 95%CI=(0.044-0.164)) as well as when participants used avoidance coping non-substance strategies (b=0.082; 95%CI=(0.029-0.146)). Moreover, anxiety was positively associated to decline in attention when independently facing a stressor using healthy cognitive strategies (b=0.35; 95% CI=(0.11-0.63)). We conclude that anxiety and coping strategies, but not stress, are associated with cognitive function and cognitive impairment/dementia.

White matter microstructural variability mediates effect of cardiovascular risk factors on proactive and reactive control

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For some older adults, cognition declines only minimally. However, for others, the decline in cognitive ability is more severe, and may progress to dementia. Recently, evidence has shown that cardiovascular risk factors (CVRF) are more predictive of cognitive decline than age itself. The present study aimed to extend on these findings using a cued-trials task-switching paradigm with concurrent EEG. This allowed us to differentiate between effects on proactive control (i.e. cue-to-target interval) and reactive control (i.e. post-target period). Participants with cardiovascular risk factors present (CVFR+) had slower RT and higher error rates compared to participants without any cardiovascular risk factors (CVRF-). However, these effects were removed when controlling for whole brain radial diffusivity (RaD), a measure of white matter microstructural organisation. Event-related potential components of proactive and reactive control were differentially disrupted in the CVRF+ group, especially for mixing cost, which has been associated with working memory processes. These effects were again eliminated when controlling for whole brain RaD. This study shows that both proactive and reactive control processes are impacted by the presence of cardiovascular risk factors, and suggests that this relationship is mediated by CVRF-related disruption of the microstructural organisation of white matter pathways. Moreover, this study emphases the importance of differentiating age-related cognitive decline from CVRF-related changes due to damage to white matter pathways.

Clinician-facilitated vs. independent delivery of the CogMax Healthy Brain Ageing intervention – optimizing community translation

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Cognitive training (CT) is effective in older adults with Mild Cognitive Impairment (MCI) and offers an engaging, practical approach to secondary prevention, particularly when combined with optimal techniques (psychoeducation, goal-setting) for addressing modifiable health/lifestyle dementia risk factors. We have previously shown that our group-based, multi-faceted psychoeducation and CT program is highly acceptable and effective for improving cognition and psychological wellbeing in >450 'at risk' older adults; however, we now seek to

adapt the intervention for individual use and to explore optimal delivery methods to increase accessibility to older people within the community. The CogMax study is a randomized-controlled trial directly comparing clinician-facilitated, flexible vs. independent (home-based), structured delivery of our combined psychoeducation and CT program in 100 'at risk' older adults via an interactive workbook comprising evidence-based information, exercises, strategies and homework targeting cognitive functioning and modifiable risk factors for cognitive decline. CogMax also incorporates collaborative goal-setting and strategies to directly support sustainable behaviour change. Outcomes include adherence, cognitive performance, goal attainment and psychosocial functioning immediately post-intervention and after six months. Study findings will inform an optimised approach to research translation – i.e. whether it is more beneficial to facilitate use of this manualized program in clinical practice, via 'train the trainer' workshops and other professional development tools, or whether to make the workbook commercially available to older adults for independent completion at home (e.g. via newsagencies/pharmacies). Recruitment is currently underway. We will present the CogMax methodology, workbook, preliminary qualitative participant feedback and available compliance data across the two delivery modes.

The risk of dementia in individuals with early-life stress (ELS)

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Background: Increasing evidence suggests that severe stress can be a risk factor for dementia, as disruption of stress regulation symptoms can directly impact cognitive brain regions. More permanent brain changes may arise from early-life stress (ELS), due to rapid development of the brain during this period. This study aims to investigate whether ELS is associated with cognitive decline and the incidence of dementia in community-dwelling individuals. Method: Data were derived from the ESPRIT study of later-life neuropsychiatric disorders. ELS was assessed in 1,700 individuals using a 13-item version of the Childhood Trauma Questionnaire, consisting of both adverse and protective experiences. Cognitive function was measured using tests of global cognition, visual memory, verbal fluency, psychomotor speed and executive function. Incident dementia was ascertained over 14 years according to DSM-IV criteria. Logistic regression analysis was used to determine the association between ELS and baseline cognition, and Cox-proportional hazards models were used to determine the association between ELS and incident dementia. Analyses controlled for a range of socio-demographic, lifestyle, and health factors.

Results: Experiencing poverty and financial difficulties during childhood was associated with worse cognition at baseline (psychomotor speed OR: 1.53 [1.11-2.11], executive function OR: 1.38 [1.00-1.92]. There were no significant associations between ELS and incident dementia when controlling for baseline cognition. Conclusion: Whilst ELS did not appear to be a significant risk factor for dementia, there was evidence that it may influence cognitive ageing. Further research regarding how early life adversities, particularly financial distress and poverty impact later-life health are needed.

'Non-self' Mutation: Neurodegenerative diseases have genetic hallmarks of autoinflammatory disease

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About 20 dominantly inherited expanded repeat diseases typically share the symptom of neurodegeneration. The expanded repeats are found in diverse locations of unrelated genes and comprise various repeat length and sequence composition. Either they have commonalities in their pathogenesis or there are a very large number of pathways that cause neurodegeneration. All repeats are transcribed raising the possibility that RNA is a common causal

agent. We have identified a novel mutation mechanism whereby an endogenous mutant gene product is no longer recognised as 'self'. Cellular RNA is usually modified in a manner that avoids it being recognised by RNA-binding Pattern Recognition Receptors (PRRs). Expanded CAG.CUG repeat double stranded RNA causes cell death when expressed as a Drosophila model of neurodegenerative diseases1. The double stranded repeat RNA is recognised by Dicer2 as a foreign or non-self molecule. Drosophila Dicer2 is a member of the RIG-I-like PRRs and in this case acts in this capacity (as neither R2D2 or Loquacious, the cofactors for its RNAi pathway, are necessary for toxicity). When elevated levels of the RNA-editing enzyme ADAR1 are present toxicity is diminished as ADAR1 modifies the CAG to CIG conferring 'self' status. When genes involved in the innate inflammatory response pathway are reduced in expression the pathogenesis is diminished. In addition, elevated levels of TNF and anti-microbial peptide (drosomycin) are produced indicating activation of the inflammatory response. These data are consistent with the emerging evidence that neurodegenerative diseases are autoinflammatory diseases.

References

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Social Health and Reserve in the Dementia patient journey (SHARED): A Protocol

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Research on risk factors for dementia has found that social factors, such as a large social network, multiple social interactions, and being married, are associated with a lower risk of developing dementia (Penninkilampi et al. 2018). How social factors interact with lifestyle and biomedical factors known to decrease or increase the risk of dementia remains an unanswered question. The JPND-NHMRC jointly funded project SHARED: Social Health and Reserve in the Dementia patient journey takes on this challenge. Social health is an umbrella term that brings together the biomedical and psychosocial approaches in dementia research and management (Vernooij-Dassen & Jeon, 2016). Social health is defined as maintaining independence despite having a medical condition, fulfilling one's obligations and goals, and participating in social activities (Huber et al. 2011). The SHARED project is a partnership across seven universities and combines data from longitudinal studies from around the world to identify the aspects of social health that influence the risk of developing dementia. The UNSW Sydney team will focus on the clinical stage from Mild Cognitive Impairment to dementia. Our aims are to: i) examine the impact of social health on dementia risk; ii) explore the trajectory of social health as individuals progress from Mild Cognitive Impairment to dementia; iii) investigate how social health interacts with brain reserve and cognitive reserve; and iv) examine the impact of difference phases of dementia on social health. We hope to guide policy and healthcare systems focusing on modifiable social risk factors for dementia.

Associations between age, sex, menopause and cardiometabolic risk profiles with brain structure

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Background: Older age and female sex are both risk factors for the development of dementia. This may be related to menopause, a midlife event associated with an increased incidence of cardiometabolic conditions for women. We aimed to identify latent groups of cardiometabolic risk, explore their interactions with age, sex and menopause, and examine the associations with brain structure. Methods: Cross-sectional study of participants with cardiometabolic and structural brain magnetic resonance imaging data from the UK Biobank, a community-based cohort of men and women over 40 years of age in the United Kingdom. We applied latent class analysis (LCA) to age, sex, menopausal status and available cardiometabolic measures, and information criteria determined the best model fit. We then used logistic regression to examine class-dependent associations with brain volumes. Results: Data were available for 1824 postmenopausal women, 233 premenopausal women and 2165 men (median age 63.3). LCA identified 4 distinct classes: an "unhealthy" group of men and postmenopausal women (22.5%), a "hypertensive group" of men and postmenopausal women (10.4%), a "healthy" group of postmenopausal women (31.9%), and a younger "healthy" reference

group of men and premenopausal women (35.2%). Mean total brain volume was greatest in the reference group (1517 mL +/- 71.6), followed by the "healthy" postmenopausal group (1516 mL +/- 70.7), the "hypertensive group" (1493 mL +/- 70.8), and the "unhealthy" group (1475 mL +/- 69.2). Conclusion: Older age and menopause are associated with reduced brain volumes. Differences in cardiometabolic risk profiles appear to moderate these associations.

Cognitive impacts of drugs with anticholinergic effects in the Sydney Memory and Ageing Study

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Background: Anticholinergic drugs (ACDs) antagonise central cholinergic pathways critical to cognitive processing, yet continue to be prescribed in vulnerable older populations. This study evaluates the impact of anticholinergic load, quantified using the Anticholinergic Cognitive Burden scale (ACB), on cognition and cognitive decline. Methods: Participants were 828 older adults from the Sydney Memory and Ageing Study (MAS) (Mage 78.7 years), who were assessed at baseline and biannually for six years. Cognition was assessed through neuropsychological battery, Mini-Mental State Examination (MMSE) scores, diagnostic categories and structural magnetic resonance imaging (MRI); MRI was performed for 423 participants. Medications were coded on a scale of 0-3 according to the ACB, and summed for each participant. Linear and logistic regressions were performed to determine the association between ACB scores, cognition, diagnostic categories and brain volumetrics, controlling for demographics, medical history and other risk factors. Results: Increasing ACB scores were significantly inversely correlated with global cognition (B=-0.070, p=0.03) and cortical volume (B=-3287, p=0.016) in fully adjusted models at baseline. However, associations between ACB score and other cognitive and structural imaging variables, MMSE scores, and diagnostic categories were insignificant in both cross-sectional and longitudinal analysis.

Conclusions: As anticholinergic load predicts poorer cognitive performance and smaller cortical volumes, at least cross-sectionally, medical practitioners should limit ACD prescription in older adult populations. Further large-scale longitudinal studies with more detailed medication data are warranted to fully understand the relationship between ACDs and cognitive changes over time.

Neuropsychological profiles and cerebrovascular dysfunction in adults diagnosed with juvenile-onset diabetes

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Background: Adults diagnosed with juvenile-onset diabetes (T1D) may have a specific profile of cognitive dysfunction due to the long diabetes duration. In this cross-sectional study, we characterised the neuropsychological profile of T1D s and its association with cerebrovascular function. Methods: Twenty four adults (29 - 71 years old) who were diagnosed with T1D before 18 years of age and 16 age-gender matched controls underwent tests of processing speed, cognitive flexibility, working memory, visuo-spatial memory, language and psychomotor speed (Grooved Pegboard test). Cerebrovascular stiffness, measured as pulsatility index (PI), and cerebral vasodilator responsiveness to hypercapnia (CVR) were assessed, along with mood, subjective memory complaints (SMC) and metabolic markers. Results: Compared to controls, T1D adults had 25% higher PI ($p<0.001$) and their CVR was 29.3% lower ($p=0.011$), which correlated with higher HbA1c levels ($r=-0.473$, $p=0.006$). Even after controlling for age and education, they performed significantly worse in the cognitive flexibility domain, took twice as long to copy the Rey-Osterrieth complex figure accurately ($p=0.009$) and psychomotor speed was 12% slower ($p=0.006$). Of all the tests, poor Pegboard test performance was significantly associated with high PI and HbA1c levels and low CVR. SMC was also significantly greater in T1D ($p=0.038$) and predicted poorer cognitive performance. Conclusion: Cognitive flexibility and fine motor dexterity are susceptible to accelerated decline in T1D, which may be due to the impact of T1D on the microcirculation. These may have implications for performance efficiency of blood glucose monitoring and insulin injections. T1D adults with SMC should also be closely monitored.

Australian primary healthcare providers' perspectives on dementia risk reduction - Preliminary Results

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The aim of this project was to explore Australian primary healthcare providers' perspectives and knowledge about dementia risk factors and risk reduction. A survey was conducted to assess Australian primary healthcare provider knowledge about dementia risk factors, and barriers and enables to the adoption of dementia risk reduction activities in primary care. Primary healthcare providers (e.g., general practitioners, practice nurses, and registrars; N = 51) were recruited through Primary Health Networks across Australia. The survey results showed that over 85% of Australian primary healthcare providers agree that quitting smoking, increasing physical activity, increasing social activity, and treating diabetes can help to reduce the risk of developing dementia. The top three free-text suggestions for what a person can do to help reduce the risk of developing dementia revolved around the themes of living a healthy lifestyle (36%), managing cardiovascular risk (17%), and cognitive stimulation (14%). The principal identified barriers to working with patients to reduce dementia risk included low patient motivation (e.g., "lack of motivation for something that might not happen") and system level limitations (e.g., "time constraints," "preventative health not considered a priority by Medicare"). The most common recommendations that emerged were increasing resources (e.g., brochures, apps, toolkits) and improving dementia literacy and messaging (e.g., "public health messages re: positive healthy ageing"). The next step in this research is to develop the recommended tools and resources and implement them into primary care settings using effective knowledge translation plans.

The Role of Short Chain Fatty Acids in Alzheimer's Disease

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Gut microbiome and microbial metabolites play an important role in brain function and physiology. However, little is known about the contribution of short chain fatty acids (SCFAs), key microbial metabolites derived from dietary fibre, in Alzheimer's disease. Here, we fed 5xFAD mice, a mouse model for Alzheimer's disease, specialized diets releasing different amounts of SCFAs after bacterial fermentation in the colon. We found that lack of dietary fibre accelerates memory deficit in 5xFAD mice, however, novel object recognition and T maze alternation test revealed that feeding mice SCFAs-yielding diet protects against memory decline at 6 months. SCFAs significantly altered gut pathology by reducing gut fibrosis, increasing goblet cell number and villi length. Microglia are key players in Alzheimer's disease. There is evidence showing that SCFAs regulate microglia homeostasis, however, the role of maternal intake of SCFAs in microglia during pregnancy and lactation is still unclear. We performed RNA sequencing on microglia isolated from pups after weaning. Maternal intake of SCFAs significantly upregulated microglial genes involved in T cell-related immune pathways, such as antigen processing and presentation, as well as T cell activation, suggesting that the T cell-microglia interaction may contribute to the effect of SCFAs on Alzheimer's disease. Our findings highlight the promise of microbiota derived SCFAs in the prevention of Alzheimer disease.

Head injury and late-life cognitive impairment and decline: the Sydney Memory and Ageing Study

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Background: Research has provided somewhat contradictory evidence on whether previous head injury is associated with late-life cognitive impairment and decline. Longitudinal prospective studies with

detailed demographic, neuropsychological, diagnostic and imaging data are lacking on this topic. Objectives: To evaluate the relationship between prior head injury and cognitive ability, cognitive status and brain structure measures both cross-sectionally and longitudinally. Methods: Six years of demographic, clinical and imaging data from a community cohort of older adults aged over 70 from the Sydney Memory and Ageing Study were analysed (n = 839). Head injury was self-reported. Cognitive domain scores were derived from neuropsychological testing, mild cognitive impairment (MCI) and dementia diagnoses from consensus conferences and brain structural measures from magnetic resonance imaging. The data were entered into regression models controlling for potential confounders. Findings: Self-reported head injury was not associated with cross-sectional or longitudinal change in cognitive ability as measured by cognitive domain scores and Mini-mental State Exam scores. Head injury was also not associated with cross-sectional MCI or dementia diagnosis or change in diagnosis over the study period. Additionally, head injury was not associated with hippocampal volume, cortical volume or white matter hyperintensities. Conclusions: Self-reported head injury was not found to be associated with measures of cognitive impairment or decline in this study, suggesting that the effect, if present, is small in a community dwelling cohort. As these results conflict with other research in this area, further investigation of cohorts with detailed head injury and cognitive data are required.

Assessment and Diagnosis

Familial Alzheimer's disease in Australia and New Zealand

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Families with dementia occurring in multiple generations suggest the possibility of inheritance of a single-gene disorder. Since the discovery of the Amyloid Precursor Protein gene (APP) Val717Ile London mutation (Goate et al., 1991) and of mutations in the Presenilin-1 and -2 (PSEN1 & PSEN2) genes in 1995 (Sherrington et al., 1995), many such families with Alzheimer's disease (AD) have obtained a genetic diagnosis for their condition. Here, the details of 28 families in Australia and New Zealand who have been found to carry a pathogenic variant in one of these three genes are reported. Method: Family history and clinical characterisation: we enquired about the presence of dementia in siblings, parents and grandparents of the proband. Clinical features of the illness were recorded. We sought consent for DNA studies from living affected individuals: DNA was screened for mutations in APP, PSEN1 and PSEN2. Neuropathology: we sought consent for post-mortem examination of the brain of affected family members for neuropathological characterisation. Results: From 1988-2019, at least 28 families in Australia and New Zealand have been found to carry pathogenic AD variants. Six families had mutations in APP, and 22 with mutations in PSEN1. No families have yet been found to carry a pathogenic PSEN2 variant. 24 families had AD confirmed neuropathologically. Conclusion: Family history of young-onset dementia in at least two generations suggests dominant inheritance and DNA studies may reveal a pathogenic variant. Such mutations can occur in individuals without a family history, but this was uncommon.

PRKAG2 gene expression is elevated in the Alzheimer's disease brain

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Previous studies of AD brain shows a marked up-regulation of lysosomal activity, including extensive involvement of various acid hydrolases such as cathepsins B and D with Aβ protein deposits. In addition, the AD brain also shows abnormal activation of nutrient sensing kinase AMP-activated protein kinase (AMPK), which is an important regulator of autophagy. AMPK is a heterotrimeric protein complex composed of a 3 subunits including a noncatalytic regulatory gamma subunit PRKAG2. Recent findings show that PRKAG2 has an important role in regulating stress-induced autophagy by AMPK and polymorphisms in PRKAG2 are associated with cognitive impairment and metabolic dysfunction in old age. The main aim of this study was to determine the expression levels of PRKAG2 and whether it correlates with increased autophagy and Aβ levels in the AD brain.

Gene and protein expression analysis of PRKAG2 was conducted in post-mortem brain tissues of patients with AD, FTD (Frontotemporal dementia), LBD (Lewy body dementia) and in healthy controls. Autophagy markers LC3B-I, BECLIN1 and ULK3 were significantly elevated in the AD brain as compared to healthy control and other dementias showing the abnormal activation of autophagy. Gene transcription and protein levels of PRKAG2 was significantly increased in hippocampus and frontal cortex in AD. More importantly, PRKAG2 protein levels were associated with increased Aβ accumulation. In summary, our findings suggest that increased PRKAG2 upregulation may be a response to increased Aβ accumulation and an important contributing factor to lysosomal dysfunction in AD brain.

Developing a quality improvement monitoring system; Mental Health Benchmarking Industry Tool for Residential Aged Care

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MHICare aims to develop a Mental Health Benchmarking Industry Tool for Residential Aged Care to create sustainable quality monitoring behaviours. A significant gap in clinical governance and reporting practices was identified by the Royal Commission into Aged Care. Improvements to the management of mental health is required with 85% of residents in Australian aged care homes currently diagnosed with at least one mental health or behavioural disorder. Results from our research into mental health indicators show that potentially inappropriate psychotropic use is high (54%), depression screening is highly variable (43.3-98.2 %), and behavioural incidents are prevalent and inadequately managed within RAC. MHICare consists of the development of a Balanced Scorecard to provide important information on aged care home policy and practices. An integrative review of similar tools utilised in mental health services identified 11 key themes for quality monitoring: prevalence, accessibility, services provided, clinical outcomes, client satisfaction, client involvement, staff motivation, staffing levels, governance and compliance, development and costs and revenue. A Consumer Reference Group has been established to provide feedback into MHICare's development consisting of aged care consumers and carers. Evidence from aged care staff, residents, family members and mental health experts will be used in a Delphi procedure to establish clear benchmarks for mental health management in aged care. MHICare has the potential to highlight gaps and strengths of current models of mental health care in RAC so that aged care homes can mitigate deficits and maximize their opportunities for improved mental health practices.

Theory of mind and reduced social networks in older adults with cognitive impairment and dementia

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Theory of mind (ToM), the ability to appreciate another person's mental state, is important in maintaining social relationships. While ToM is often affected in people with cognitive impairments, more information is needed on how ToM is related to severity of cognitive impairment, and its relationship with social networks. Methods: Analysis of 152 participants from the Sydney Memory and Ageing Study. ToM was measured using the Reading the Mind in the Eyes Test (RMET), to index ToM ability utilizing immediate perceptual features, as well as the informant-rated Interpersonal Reactivity Index – Perspective Taking subscale (IRI-PT), to index the cognitively complex, higher-level inferences of ToM. The Lubben Social Network Scale (LSNS) measured quality of family and friend networks. Dementia, mild cognitive impairment (MCI), and no cognitive impairment (NCI) participants were classified via expert consensus. Results: 66 participants were NCI, 47 were MCI, and 39 were dementia. Across groups, RMET, IRI-PT, and LSNSF-Friend scores were significantly different. RMET was significantly worse between NCI and MCI, but not MCI and dementia. IRI-PT and LSNS-Friend scores were worse in dementia compared to MCI participants, but were not different in NCI and MCI participants. In regression analysis predicting LSNS-Friend scores, adjusted for age, mood and cognitive status, IRI-PT was significant though RMET was not. Conclusion: Social-perceptual and social-cognitive components of ToM are differentially affected between neurocognitive stages. Impairments in the complex social-cognitive components of ToM, likely representing more multi-faceted impairments in ToM, are also associated with reduced quality of social networks.

Constructing multi-variable disease trajectory curves from longitudinal data: Cognitive test results in Alzheimer's disease.

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To accurately stage Alzheimer's disease, it is important to understand the onset and rate of change in different markers of disease. It is also of particular interest to know how these markers change in comparison to each other. Here we present an extension to our previous work which aims to model the natural history of independent marker changes to look at multivariate markers in comparison to each other. Methods: Cognitive data from the Australian, Imaging and Biomarker study of aging study for N=2151 participants were used to demonstrate the application of the method. The four-step approach [1,2], previously proposed by our group, was applied. Then an additional step was performed, in which the discrepancy between an individual's actual multivariate longitudinal data and the constructed natural history curves is minimised. This allows an estimate for where each participant's multivariate data lies on the trajectory curve to be obtained, which in turn allows the staging of the multivariate curves to be obtained. Results: We show the timing of the decline of multiple cognitive tests, each covering different aspects of cognitive performance, over the course of AD. Conclusion: We present an effective method for constructing multivariate disease progression curves that can be applied to different markers of Alzheimer's disease, which may aid in the staging of this degenerative disease.

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Restricted effect of cerebral microbleeds on local magnetic susceptibility measured by QSM MRI

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Cortical iron accumulation has been shown as one of the pathological features of Alzheimer's disease (AD). This increase may be contributed by hemosiderin deposits in cerebral microbleeds (CMBs) that frequently occur in this disease. Here we investigate the impact of CMBs (which are more frequent in AD) on the magnetic susceptibility of the surrounding brain tissue. Thirty-two cross-sectional MRI scans from the Australian Imaging, Biomarker and Lifestyle (AIBL) study were found to have 77 definite CMBs by manual assessment of susceptibility weighted images (SWI). The subjects were classified as cognitively normal (CN; N=17; Age: 77.4 ± 6.1; CMB:48), mild cognitive impairment (MCI; N=10; 79.1±7.3; 18), or AD (N=5; 77.6±6.2; 11). Quantitative susceptibility mapping (QSM; an MRI technique that is sensitive to iron) was used to estimate iron content in the tissue surrounding the microbleed in four concentric spheres of increasing radius of 1 voxel (~0.93x0.93x1.75 mm3; regions R1-4) starting from the boundary of each microbleed. Furthermore, regions R1-4 were compared to QSM measured in mirror regions of the opposing hemisphere. The ipsilateral side had significant elevation of QSM in the microbleed compared to the same region on the contralateral side ($P<1 \times 10^{-10}$). The immediate region surrounding the microbleed, R1, also had elevated QSM signal in the ipsilateral side compared to the contralateral side (P=0.0083). However, there was no difference between ipsilateral and contralateral QSM values in regions R2-4.

In conclusion, these data indicate the QSM is elevated in the brain tissue in the immediate vicinity of the microbleed, but this does not extend beyond 1 voxel.

Healthy subjects with abnormal level of tau have lower cortical volumes in the mesial temporal

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Post-mortem studies on Alzheimer's disease (AD) have shown that the stereotypical pattern and density of tau deposition is strongly associated with cortical loss. In this study, we investigate if cognitively healthy elderly participants with abnormal level of tau and/or Amyloid-beta in the brain have lower cortical volumes in parahippocampal, entorhinal, inferiortemporal, fusiform, hippocampus and amygdala which are the early region of atrophy. Methods: 232 healthy cognitively normal control (CN) participants from the AIBL cohort underwent an Amyloid-beta PET scan (18F-NAV6240) and a tau scan (18F-MK6240). PET scans were spatially normalized and scaled to the cerebellar cortex. Threshold for Amyloid-beta abnormality was 20CL, and two standard deviations above the SUVR mean in the mesial temporal region on Amyloid-beta- CN participants for tau. Three groups were defined A-T- (n=180, 74.5±5 yrs), A+T- (n=32, 77±6 yrs) and A+T+ (n=16, 78±7 yrs). Cortical volumes in parahippocampus, hippocampus, entorhinal, amygdala, inferior temporal and fusiform were computed. Volumes were controlled for intracranial volumes and normal aging and compared between the different groups using standard T-tests. Results: There were no significant differences in age between 3 groups. A+T+ cohort had lower cognition test score than two groups. A+T+ had a significant lower cortical volume in all examined regions compared to A-T- and A+T-, ($p<0.05$). There were no significant difference in cortical volumes between A-T- and A+T-. Conclusions: Amyloid-beta pathology alone is not associated with lower cortical volumes. However, Amyloid-beta and tau deposition in the mesial temporal lobe is associated with GM loss, even at the presymptomatic stages.

The Peripheral Hearing and Central Auditory Processing Skills of Individuals with Subjective Memory Complaints

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Purpose: The purpose of this study was to compare the central auditory processing (CAP) assessment scores of adults between 45 and 85 years of age with pre-clinical Alzheimer's disease- i.e. individuals with subjective memory complaints (SMCs) as compared to those who not reporting significant level of memory complaints (non-SMCs). It was hypothesized that the SMC group will perform significantly poorer on tests of central auditory skills compared to participants with non-SMCs (control group). Methods: A total of 95 participants were recruited from the larger Western Australia Memory Study and were classified as SMCs (N = 61; 20 males and 41 females, mean age 71.47 + 7.19 years) and non-SMCs (N = 34; 10 males, 24 females, mean age 68.85 + 7.70 years). All participants completed a peripheral hearing assessment, a CAP assessment battery (Dichotic Digits, Duration Pattern Test, Dichotic Sentence Identification, Synthetic Sentence Identification with Ipsilateral Competing Message and the Quick-Speech-in-Noise) and a cognitive screening assessment. Results: The SMCs group performed significantly poorer than the control group on Synthetic Sentence Identification with Ipsilateral Competing Message -10dB and -20 dB Signal to Noise Ratio conditions. No significant differences were found between the two groups on the peripheral hearing threshold measurements. Conclusions: The results suggest that individuals with SMCs perform poorly in CAP assessments in comparison to the controls. The poor CAP in SMC individuals may result in a greater cost to their finite pool of cognitive resources. The CAP results provide yet another biomarker that supports the hypothesis that SMCs may be a primary indication on neuropathological changes in the brain affecting various functions. Longitudinal follow up of individuals with SMCs and decreased CAP abilities should inform whether this group is at higher risk of developing dementia as compared to non-SMCs and to those SMC individuals without CAP difficulties.

Association between mesial temporal tau with age and cognition in amyloid-beta negative cognitively unimpaired individuals

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Primary-age related tauopathy (PART) is a term that describes the age-related occurrence of mesial temporal tau in the absence of amyloid-beta. We investigated the effects of high mesial temporal tau in amyloid-beta negative cognitively unimpaired individuals. Method: 187 amyloid-beta negative cognitively unimpaired adults over 60 years of age from the AIBL cohort were included. Tau tracer (MK-6240) retention was assessed in the amygdala, hippocampus, parahippocampus, entorhinal cortex, and a composite mesial temporal region. We assessed the association between regional and neocortical retention, age and cognition (MMSE, composite memory scores (CMS), composite non-memory scores (CNMS) and the AIBL preclinical Alzheimer cognitive composite (AIBL-PACC)). The cohort was stratified into two groups according to the amount of Me tau retention using the 95th percentile cut-point. Results: MK-6240 Me retention was correlated with age (r_s = 0.19, p = 0.01). Those with higher Me retention also had higher retention in all other neocortical regions, as well as higher retention in all four Me sub-regions. Using the 95th percentile cut-point, those with higher Me retention performed significantly worse on the CMS (t = 1.89, p (one-tailed) = 0.03, Cohen's d = 0.66) and CNMS (t = -1.90, p (one-tailed) =0.03, d = 0.69). These findings should be interpreted with caution, given the small sample of participants above the cut-off (n =10). Conclusion: Mesial temporal tau is associated with age. Even among cognitively unimpaired individuals, higher levels of mesial temporal tau are associated with poorer cognition, suggesting that PART may not be a benign condition.

Australian Dementia Network (ADNeT) Memory Clinics: Connecting clinicians to enhance diagnostic standards and post-diagnostic support

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In Australia, Memory Clinic service provision varies considerably within and across states, including waiting times, access to multidisciplinary teams, and post-diagnostic support. Currently, no national network exists that could improve the quality and efficiency of diagnosis and post-diagnostic care by facilitating peer-support, harmonisation and the sharing of resources. In 2019, the Australian Dementia Network - Memory Clinics (ADNeT-MCs) initiative scoped Memory Clinics services across Australia and developed recommendations for a harmonised neuropsychological assessment (see abstract by Mehrani et al.) to address these issues. Continuous engagement of clinicians and policy makers showed us that there is a large interest for further harmonisation and particularly the development of cost-effective and sustainable post-diagnostic care models in the clinical community and at the government level. Obstacles around the funding and implementation of such plans need to be collaboratively addressed in the near future. Throughout 2020, ADNeT-MC will apply Delphi Methods to develop National Memory Clinics Guidelines in consultation with public and private clinicians, researchers, consumers and other key stakeholders. The guidelines will outline best practice recommendations for the referral, diagnostic and post-diagnostic care process to support further harmonisation. ADNeT-MCs will identify resource gaps and create a web-based network for resources and peer review. Training needs will be scoped to inform national training programs and networking events. Work to date has revealed major gaps in service provision for cognitive decline and dementia. ADNeT-MCs will seek to address these which will ultimately improve quality and access to diagnostic and post-diagnostic support.

The Olfactory System – A possible link between air pollution and Alzheimer's disease?

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By 2050 it is predicted that the number of Alzheimer's disease (AD) patients will rise to over 130 million worldwide. Yet there is a lack of understanding concerning the mechanisms underlying AD, with the genetic basis accounting for less than 50% of the heritable risk. Dysfunctional changes and the pathological hallmarks of AD (Aβ and tau tangles) have been observed in the olfactory systems of AD patients. Evidence has proposed a link to air pollution (largely from motor vehicles, industry, and bushfires etc.) which may lead to the progressive neurodegeneration observed in AD. The olfactory system is directly linked to the brain and contains multipotent stem cells capable of differentiating into neuronal and glial cells. Olfactory cells can provide a potent model for AD as they harbour the epigenetic disease modifiers which directly reflect the environmental inputs such as air pollution. Here we describe a unique application of the CULTEX® air-liquid-interface (ALI) which, for the first time, can be used to mimic the dynamic in vivo properties of the olfactory environment and model air pollution effects on AD. Neurosphere and proliferation assays will be utilised to identify novel biomarkers of AD and impacts of air pollution at the environment-brain interface. This will provide innovative mechanistic insights and aid in the future development of disease diagnosis and treatment. When used in combination with other behavioural and biological markers, olfactory studies may be a simple and economical method to identify appropriate high risk candidates for pharmaceutical intervention and may reduce the future economical and social burden of AD.

Investigating resting state functional connectivity in sub-phenotypes of Mild Cognitive Impairment in Parkinson's disease

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Literature regarding Mild Cognitive Impairment (MCI) in Parkinson's disease (PD) has defined clinically distinct frontal (executive/attention impaired) vs. posterior (memory/executive impaired) cognitive phenotypes. Some evidence has suggested the posterior syndrome may progress more rapidly toward PD dementia (PDD), warranting further investigation into the neural mechanisms of impairment for this potential group of at-risk patients. Thus, the present study aimed to compare the resting-state functional connectivity (rs-fMRI) between PD patients with posterior-dominant impairment and those without signs of cognitive impairment. Method: To determine the posterior and cognitively intact phenotypes, a cluster analysis was performed on 10 frontal-based and posterior-based cognitive variables derived from a large dataset of PD patients without dementia. The rs-fMRI data was available for 17 posterior and 10 cognitively intact patients. Seed-based functional connectivity analysis was performed to identify connectivity in bilateral hippocampus to other regions between groups. Results: A significant difference between the posterior phenotype and the cognitively intact phenotype was revealed, showing decreased activation between the right hippocampus and the right anterior temporal fusiform gyrus at rest ($p = .01$, FDR-corrected). Conclusions: Given that the anterior temporal fusiform gyrus plays a role in semantic dementia, these results set the foundation for future research into potential neuroimaging biomarkers for MCI and dementia in PD. Future research should explore whether weaker connection between the hippocampus and the fusiform gyrus can be used to predict progression toward dementia.

Harmonizing longitudinal measures of cognition across two large cohorts: AIBL and ADNI

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To improve our understanding of Alzheimer's disease larger studies are needed, however the cost and burden of increasing study size is significant. Therefore, combining data from different existing studies would be welcomed. However, the disparity of these datasets, e.g. using differing tests to assess specific cognitive domains, makes this a non-trivial task. Here, we propose a harmonisation solution using imputation strategies for cognitive memory performance in AIBL and ADNI. Methods: AIBL participants (N=1813 [1180 NC, 297 MCI and 328 AD; aged 72.52±7.72; 777 males]) and ADNI participants (N=1945 [756 NC, 820 MCI, 369 AD; aged 73.92±7.23; 1028 males]) were included in this study. Scores for tests administered in one cohort but not the other were imputed in the cohort for which they were missing using non-parametric multivariate imputation using random forests (missForest). Models were informed from the full neuropsychological testing batteries, age, gender, years of education and APOE-ε4 status. The discriminatory power of the actual and imputed scores to differentiate between NC, MCI & AD was assessed. Further, data was simulated to be missing and scores imputed for this simulated missing data were correlated to the actual data to validate the method. Results: High levels of significant discrimination ($p<.001$) between clinical classifications were observed for both the actual and the imputed scores. Comparing simulated missing scores to actual scores resulted in correlation coefficients of 90%. Conclusion: The results here suggest data imputation and capitalising on underlying structures provides a practical solution for data harmonization across large, longitudinal datasets.

Identification and clinical characteristics of Mild Cognitive Impairment in Parkinson's disease

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Cognitive disturbances in Parkinson's disease (PD) detrimentally impact the patient's quality of life and contribute to a high disease burden. PD patients with mild cognitive impairment (MCI), a prodromal state to PD dementia, present with heterogeneous clinical characteristics that can complicate the clinical picture. This study aimed to examine the characteristics of PD-MCI by using level 2 of the standardised criteria for PD-MCI. This study also examined the effectiveness of global cognitive scales in identifying PD-MCI. Methods: Seventy-nine (79) PD patients participated in two interviews consisting of neuropsychological assessments and a comprehensive cognitive test battery. Clinical characteristics of PD-MCI were evaluated using logistic regression analyses. Commonly used cognitive rating scales, Mini-Mental State Examination (sMMSE), Montreal Cognitive Assessment (MoCA) and Parkinson's Disease Cognitive Rating Scale (PDCRS), were examined against a PD-MCI identification. Results: Twenty-seven (27) patients met criteria for PD-MCI (34%). Impairment in multiple cognitive domains was observed in 77.8% of patients with PD-MCI. There was no significant difference in the demographic and clinical characteristics between PD-MCI and PD without MCI, except that PD-MCI patients consisted of a greater number of male patients. Our study demonstrated that the the MoCA and PDCRS can be potentially used as appropriate screening tools, but with a cost of low specificity. Discussion: PD patients with MCI exhibited impairments in a wide range of cognitive domains particularly in the attention/working memory, executive function and memory domains. Considering the heterogeneous cognitive characteristics of PD-MCI, further investigation within specific cognitive domains is essential for understanding PD-MCI.

Intervention and Treatment

A multi-country trial of the SHAPE intervention to improve wellbeing in people living with dementia

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Providing disease-related information and relevant skill training can reduce the impact of dementia on the health and well-being of people with dementia and care partners1. Self-management involves taking responsibility of one's own health and problem solving to tackle challenges associated with chronic conditions2. Health promotion aims to increase health behaviours through self-directed change as well as public policy and community action3. Interventions applying these principles are found to improve health outcomes in people with early-stage dementia4,5. E-learning provides the opportunity for flexible, self-directed learning and online interventions for care partners have been shown to improve well-being6. SHAPE (Self-management and HeAlth Promotion in early-stage dementia with E-learning for carers) is a novel intervention combining self-management, health promotion and e-learning, targeted towards people with early-stage dementia and their care partners. For the intervention, participants with dementia attend a 10-week group program that provides information on dementia and teaches skills for decision-making, symptom management and health behaviours. Care partners access an adjunctive e-learning that provides similar information, plus additional advice and support. This intervention arm will be compared to treatment as usual. The study is a multi-centre, randomised, controlled trial carried out across Australia, Norway and the UK (n=372). We aim to assess the effectiveness of SHAPE in improving self-efficacy and other key health outcomes in people with dementia, as well as in reducing carer stress and increasing dementia knowledge. The Australian team are currently training group facilitators and finalising the e-learning platform. Recruitment from aged care facilities and hospitals will begin shortly.

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Interactions between RNA G-quadruplexes and FUS in Alzheimer's disease

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Dementia encompasses a variety of neurodegenerative diseases, with Alzheimer's disease (AD) accounting for an estimated 60-80% of all cases1. One of the prominent neuropathological features of AD is chronic inflammation, mediated by glial cells such as astrocytes which undergo reactive astrogliosis in response to neuronal damage. The RNA-binding protein Fused in Sarcoma (FUS) is highly associated with neurodegenerative diseases such as Amyotrophic Lateral Sclerosis (ALS) and

Frontotemporal Lobar Degeneration (FTLD) but has not been investigated to the same degree in AD 2. FUS is known to interact with RNA G-quadruplexes (G4s)3. These non-canonical secondary structures that form in certain G-rich regions of nucleic acids are involved in regulation of gene expression and have consequently been implicated in the development and/or progression of several diseases, including neurodegeneration4. This study investigates the interactions between RNA G4s and FUS in cell models of AD, focusing on changes in human astrocyte glial cells upon activation. Astrocyte reactivity was confirmed via detection of activation markers glial fibrillary acidic protein (GFAP) and chondroitin sulfate proteoglycans (CSPG) after which the effects of activation on AD-related genes APP, MAPT, and FUS, and RNA G4 formation were examined. Ligand-induced stabilisation of G4s allowed investigation into the relationship between G4 formation, astrogliosis, and FUS, APP, and MAPT mRNA levels. The occurrence and implications of G4–FUS interactions may provide further insight into the roles of chromatin landscape, nucleic acid–protein relationships, and neuroinflammation in AD. Further work may lead to identification of novel biomarkers and the development of potential therapeutics.

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Deferiprone to delay dementia (The 3D trial)

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Potential therapeutic targets for Alzheimer's disease (AD) outside of β-amyloid are of increased interest. Brain iron has been reported to predict accelerated AD progression. Brain iron may contribute to neurodegeneration by becoming pro-oxidant (e.g. ferroptosis), or by promoting an inflammatory phenotype of microglia. Deferiprone is an orally bioavailable, BBB-penetrant moderate iron chelating drug approved for the peripheral iron overload in β-thalassemia. Deferiprone reported promising evidence for disease modification of Parkinson's disease in two phase II studies; here we report the status of a phase IIb clinical trial of deferiprone for AD. Methods: The primary outcome of this trial is to compare the cognitive performance in a neuropsychological test battery of subjects with mild Alzheimer's disease (confirmed using β-amyloid PET) treated for 12 months with either deferiprone (15 mg/kg) administered orally twice a day or a matching placebo. Secondary outcomes include adverse events (safety analysis), change in brain iron burden measured by quantitative susceptibility mapping MRI (target engagement), and brain volume changes (secondary efficacy measure). 171 participants will be recruited and randomized in a 2:1 ratio (drug:placebo). Results: Ten clinical trial sites have been established in Victoria (6), New South Wales (3), and Western Australia (1). The first patient was randomized in March 2018. As of January 2020, 101 patients have been screened and 45 randomized. 18 patients have completed the treatment protocol of 1 year. Conclusions: The outcome of this trial is scheduled to report in 2021.

Intergenerational learning involving elders and school students using video conferencing

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Well designed and purposeful intergenerational learning involving elders and school students is a personally meaningful activity. It often requires elders to use their memory to remember experiences of their school years. Research indicates that when this mentally stimulating activity occurs in a co-located environment such as school classroom or residential aged care facility (RACF) it can help delay the early onset of dementia. Based on this information, the innovative aspect of my thesis explores how video conferencing can engage residents in an RACF and school students in purposeful dialogue about a curriculum topic. A qualitative approach explored the reciprocal learning and behavioural benefits. In 2019 a six month research pilot project involved Year 6 school students and residents in intergenerational learning activities using video conferencing. Ethical approval from Griffith University was provided to record the video calls and interviews. The Facility Manager stated the participating residents were living with high levels of anxiety, depression and self-isolation. Direct outcomes from the intergenerational learning video calls included less night time Nurse Call requests, decreases in negativity towards family and staff, less confrontations with staff, reduction in complaints about (very good) meals, decrease in residents refusing to eat some meals, less requests to call doctors, calmer mood, happier disposition and more sociable. These interactions also had a positive effect on the staff and organisational culture. Family members and other carers of the participating residents commented about similar lifestyle improvements. The next step is involving persons living with dementia in this intervention.

3D in vitro modelling of patient microglia to study neuroinflammation in Alzheimer's disease

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Current monoculture systems and transgenic animal models have largely failed to predict clinical success for the majority of neurodegenerative diseases, including Alzheimer's disease (AD). Due to disease complexity and heterogeneity of clinical presentations in patients, these models do not comprehensively recapitulate the multistage neuro-glial alterations leading to neuronal degeneration in a patient-specific manner. The dysfunction of microglia, the brain-resident macrophages, is a key factor in disease progression and severity in AD and thus can be a powerful therapeutic target. Here, we have generated hydrogel-based 3D human microglia models as alternative in vitro platforms suitable for patient-specific drug testing. AD patient-derived microglia-like cells were differentiated from peripheral blood monocytes and showed high transcript levels of signature adult human microglia markers. Upon growth in 3D cultures embedded in a hydrogel matrix, microglia-like cells from AD patients and age-matched healthy controls were more mature, lived longer and developed higher branched patterns and more cell processes than in 2D cultures. We observed disease-associated morphological differences between microglia-like cells grown in 3D that were not recapitulated in 2D. To better represent the neuro-glial microenvironmental cues of the human brain, we cultured microglia-like cells in the presence of astrocytes and neurons in 3D co-cultures. We identified differences in expression levels of proinflammatory cytokines and opposite responses to anti-inflammatory drugs between 2D and 3D AD cultures. Overall, our personalised, cost-effective cell-based platforms provide microglia-associated neuroinflammatory AD phenotypes that may potentially be rescued with anti-inflammatory compounds, thus facilitating the identification of drug efficacy based on patient heterogeneity.

The therapeutic potential of ketogenesis in the clinical management of neurodegenerative diseases: A systematic review

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Ketogenesis is a metabolic process whereby fatty-acids are converted to ketone bodies (acetoacetate, 3-hydroxybutyrate, and acetone) in the liver during states of reduced glucose availability such as exercise, fasting, carbohydrate restriction, or via dietary supplementation with medium-chain triglycerides. Ketone bodies exert potential disease-modifying

activity that may represent a novel therapeutic approach for several neurodegenerative diseases, including dementia. This systematic review aimed to evaluate clinically relevant evidence available for ketogenic therapies (dietary or exogenous ketogenic agents) for neurodegenerative diseases, describe their characteristics, assess their safety, efficacy and feasibility, and provide recommendations for future research. Eight databases were searched for controlled-trials (minimum 4-weeks duration) that induced ketosis or elevated serum ketones in people with a neurodegenerative disease. Of 4,498 records identified, 14 papers met the inclusion criteria. Studies primarily implemented a ketogenic diet (n = 8), followed by the administration of exogenous ketogenic agents (n = 5) or intermittent fasting (n = 1). Currently, the most robust evidence for ketogenic intervention efficacy lies in improved cognition in people with mild cognitive impairment or Alzheimer's disease. Dietary interventions were effective, though associated with higher attrition rates and lower adherence. Supplementation with exogenous ketogenic agents had higher compliance rates, although gastrointestinal tolerance was a common issue. No serious adverse events were reported. Despite heterogeneity among studies (in disease states, interventions used, and outcome measures assessed) this review highlights many critical factors involved in the successful clinical implementation and research of ketogenic therapies for neurodegenerative disease. Recommendations for next steps and future research are proposed.

Improving Identification and Treatment of Depression and Anxiety in Dementia: An Integrated Approach

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Depression and anxiety are prevalent concerns in people living with dementia, which contribute to a reduced quality of life, increase in carer burden, and early institutionalisation. However, identification and treatment of depression and anxiety can be poor in persons with dementia living in both community and aged care settings. Our recent studies (N= 441 persons with dementia) demonstrated a poor recognition of depression, high rates of depression and anxiety, and experience of depression and anxiety contributing towards an increased rate of inappropriate prescription of psychotropic medications in persons with dementia (50% inappropriate prescriptions). Barriers towards mental health evaluation, and appropriate treatment applications were examined with the aim of developing a mental health benchmarking tool (MHICare project). Novel non-pharmacological treatment options were explored using technological approaches such as virtual reality (VR). Our recently published systematic review demonstrated effective use of VR for cognitive training in dementia and with limited use addressing psychological treatment. Therefore, the use of VR assisted novel interventions were successfully piloted in persons with cognitive impairment and a program of psychotherapy research (VRAPD project) was developed to effectively treat anxiety and depression in persons living with dementia.

A New Initiative to Tackle Childhood Dementia

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Childhood dementia is a devastating and under-recognised group of disorders with a high level of unmet need. Typically monogenic in origin, this collective of individual neurodegenerative conditions are defined by a progressive impairment of neurocognitive function, presenting in childhood and adolescence. Survival into adulthood is rare. We undertook a burden of illness study to understand the spectrum of childhood dementias, their incidence, prevalence, quality of life, life expectancy and total impact from an economic and societal perspective. More than 80 individual conditions were identified including a range of lysosomal disorders, leukodystrophies, mitochondrial diseases and others. For the decade from 2021 we estimate more than 1800 children will be born in Australia with a childhood dementia, resulting in a loss of greater than 100,000 life years, costs to the health care system of over $500 million and costs to society of approximately $2 billion. To date, there has been limited research undertaken on childhood dementia and no programs that consider them holistically with commonality of presentation and impact – presenting a powerful opportunity to change the way that childhood dementia research is undertaken and to accelerate

progress towards therapeutics. Moreover, insights gained from investigating the pathophysiology of childhood dementias are increasingly informing our understanding of and therapeutic development for adult-onset dementia. A new initiative has been established to drive medical research into childhood dementia. This initiative will enable significant economies of scale and scope through the utilisation of common infrastructure and resources and the development of therapies that address common mechanisms.

Impact of person-centred care on the detection and management of delirium in patients with dementia

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Dementia is associated with increased use of health care services, longer lengths of stay, and adverse outcomes including delirium. Nurses play a pivotal role in the detection and accurate assessment of delirium in patients with dementia in the hospital setting. This study aimed to implement an innovative evidence-based person-centred care (PCC) model for patients with dementia and evaluate the impact on the detection and management of delirium. Methods: Pilot study designed as a non-randomised clustered trial in a tertiary hospital located in metropolitan Sydney, NSW. The nursing and allied health staff in two wards participated in the PCC intervention, including a train-the-trainer staff education and support program in PCC. Two PCC Champions from each ward and a PCC coordinator were trained in the PCC approach to perform a support role and provide ongoing nursing care, education and intervention with staff throughout the intervention period. Results: The paper will report on findings associated with the primary outcomes including the incidence of delirium and agitation and the identification and management of delirium by nursing and allied health staff and secondary outcomes including patient falls and harm from falls, length of stay, re-admission rates within 30 days of discharge, and quality of patient/carer interactions, and, the PCC Champions perception of the education and training program and the feasibility of the model of PCC. Conclusion: The study highlighted a number of contextual differences associated with implementing this PCC approach for hospital patients with dementia compared to previous implementation in residential and community environments.

Components of effective dementia carer training: The Going to Stay at Home Program

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Objectives: To describe components of Going to Stay at Home, a seven-day comprehensive residential training program for community living people living with moderate dementia (PLWD) and carers. Methods: Groups of 4-6 dyads participated in one of 17 programs conducted in a Sydney residential aged care home. Carer training comprised 10 structured sessions focussing on: 1) psychological support through reducing distress; combatting isolation; addressing guilt and separation; 2) education through new ways of thinking; developing coping skills; improving dementia knowledge; coping with changed behaviour; improving wellbeing through diet, fitness and organising daily life; and 3) developing support systems through community services; family support and planning for the future. The PLWD program included pleasant daily activities, exercise, socialisation, cognitive stimulation and memory training. Training delivery comprised small group sessions, modelling of skills, role play and didactic sessions. Main Outcomes: Carer psychological distress and burden, rates of behavioural symptoms and number of persons with dementia living at home at 12-months compared to a post-hoc group of PLWD receiving respite care only at the same aged care organisation over the same time period. Results: Ninety dyads participated. Twelve months after training rates of admission to permanent care were 17.6% in the carer training groups (n=90) compared to 52.9% in the respite only group (n=117). While carer burden and depression were unchanged, carers' needs were met significantly more and behavioural symptoms decreased significantly. Conclusions: GTSAH is a practical, feasible and potentially cost-effective model with benefits for carers and PLWD.

Mouse and human microglial phenotypes in Alzheimer's disease are controlled by amyloid plaque phagocytosis

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The important role of microglia in Alzheimer's disease (AD) is recognized, however their molecular and functional diversity and underlying mechanisms still remain controversial. To transcriptionally and functionally characterize the diversity of microglia in AD and aging, we isolated the amyloid plaque-containing (XO4+) and non-containing (XO4-) microglia from an AD mouse model. Transcriptomics unveiled independent transcriptional trajectories in ageing and AD. XO4+ microglial transcriptomes linked plaque phagocytosis to dysregulated expression of bona fide late onset AD genetic risk factors. We further showed that the XO4+ transcriptional program is present in a subset of human microglia from AD patients and is a direct consequence of plaque phagocytosis. XO4- microglia in AD displayed an accelerated ageing signature and contained more intracellular post synaptic material than plaque-containing microglia, despite reduced active synaptosome phagocytosis. Our computational analyses identified HIF1-alpha as regulating the XO4-/XO4+ axis. To investigate the mechanism in microglia in vitro, we first compared transcriptional signatures of multiple published datasets of human stem cell-derived microglia like cells. Our analysis established the baseline protocol that is most representative of bona fide human microglia. To facilitate microglial studies, we tagged the classic microglial marker CX3CR1 with nanoluciferase and tdTomato, and verified the resulting iMGLs. Using our human stem-cell derived microglia reporter cell line and primary human microglia, we validated that HIF1A controls microglial phagocytosis in vitro. Together these findings unveiled a molecular mechanism underpinning the functional diversity of microglia in AD, providing opportunities to develop treatments targeted at subset specific manipulation of the microglial niche.

'Harmony in the Bush' music intervention for residents with advanced dementia in rural nursing homes

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Prevalence of depression, anxiety and wandering in people with dementia has been assessed to be 80-90% and 80% of these symptoms persist for 18 months. Music, as a non-pharmacological therapy, is useful for managing behavioural symptoms and well-being. This presentation reports the effect of personalised and group music interventions for residents with advanced dementia, a part of two-component [i.e. Progressive Lowered Stress Threshold and Music] Harmony in the Bush study. A quasi-experimental research was conducted in five rural nursing homes. Residents (74) took part in intervention and staff (104) and musicians (6) participated in 65 interviews and 20 focus groups.

One-Way ANOVA and Paired-samples t-test were conducted to understand Music in Dementia Assessment Scale (MiDAS) scores. Thematic analysis was conducted on qualitative data. Analysis revealed the mean effect of personalised music intervention at during [351.22 (93.51)] and post-intervention [315.09 (98.52)]. The residents with (moderate to severe) pain, anxiety, sadness and agitation presented a greater improvement in well-being and behavioural symptoms decline. A paired t-test showed that MiDAS sub-categories means differed significantly between time points: interest [t=2.75, p=0.001]; response [t=2.94, p=0.005]; initiation [t=2.41, p=0.019]; and involvement [t=2.78, p=0.007]. However, the residents were observed at post-intervention with a reduction of agitation (88%); low in mode (88%) and anxiousness (70%), and an improvement in relaxation (76%), attentiveness (57%) and smiling (57%). Themes from qualitative data included behavioural change, meaningful interaction, being initiative, increased participation and contentment. Findings suggest Harmony in the Bush music intervention can be useful in psychosocial health and well-being improvement.

Using program logic to evaluate implementation of interRAI AC and the quality of dementia care

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Cognitive impairment can be difficult to detect without the use of a screening tool. A strategy designed only for patients with CI adds significant burden to the assessment of patients in acute care settings. A "universal" system that assesses the care needs of all adult patients that also deals specifically with the issues related to CI is desirable. The interRAI Acute Care (AC) assessment will be implemented facility-wide to all adult patients (18 years and older) on admission to hospitals to improve the identification and management of people with cognitive impairment. The assessment will be reviewed at handover and again upon discharge. The program logic method has been used to engage stakeholders at all levels in the planning and evaluation of the intervention. Method: Program logic is a thinking, planning and implementation tool that describes and diagrammatically represents how a project intends to impact stakeholders in any given context. Program logic establishes a clear direction for project outcomes, strategies for achieving those goals, and enables evaluations that reflects the quality of the outcomes. The program logic methodology has been used to engage stakeholders at multiple levels (research/policy, service, health professional, and patient) in the design of the pathway to successful quality outcomes and the identification of measures to gauge its success. Conclusion: Program logic is a stakeholder engagement tool which measures impact across multiple levels. Given the scale of the implementation of the interRAI AC across the hospital nursing admission and care planning process, a comprehensive multi-perspective evaluation is required.

Exploring experiences with, reasons for, and attitudes towards complementary medicine use by people with dementia

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The inability of conventional medicine to alleviate dementia symptoms has been associated with high levels of complementary medicine (CM) use. This qualitative study explored experiences with, reasons for, and attitudes towards CM use by people living with dementia and their caregivers. In-depth interviews and focus groups were conducted among 18 people living with dementia and their caregivers, followed by a thematic inductive analysis to organise the data into themes and subthemes. This study found that 72.2% of participants used CM to manage their dementia symptoms, with out-of-pocket spending on CM estimated to be $100 AUD/month. Three over-

arching themes were identified: (1) CM knowledge and use; (2) self-determined reasons for use/non-use; and (3) external determinants of use. Our findings across these themes indicate that CM use is common and also positively viewed by people living with dementia and their caregivers. Decisions regarding CM use were often based on personally meaningful evidence, as opposed to scientific studies. Nearly half of all participants had never discussed CM with their general practitioner (GP), as several participants expressed the belief that GPs do not endorse CM use. These findings, when translated into practice, have important implications for discussions with healthcare practitioners regarding CM use by people living with dementia. This is necessary to improve health literacy, communication, and also to reduce the risk of polypharmacy. Overall, robust population-based research is required in order to develop standardised and readily-available information on the efficacy and safety of CMs commonly used for alleviating dementia symptoms.

Socio-cultural-political context critical to implementing evidence into practice for people with dementia in care homes

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Implementation science is complex, yet necessary to the provision of quality health and aged care. The socio-cultural-political context is a critical component that underpins effective implementation of evidence into routine practice in a timely and pragmatic manner. This paper highlights the complexity of moving evidence into practice for non-pharmacological interventions for people with dementia, within a large Australian residential aged care service. Method: A review of systematic review evidence was undertaken. Quality and ease of implementation were assessed. We developed an implementation framework, whereby all stakeholders, namely older people, front line care staff, management and researchers work together to: identify and prioritise pressing issues within the current socio-cultural-political context; scope current evidence to address these issues; co-design interventions; then pilot and evaluate interventions. Results: Implementation challenges and learnings include: (1) understanding the current aged care landscape (e.g. impact of interim findings of the Royal Commission into Aged Care and competing State-based initiatives); (2) understanding the current state (e.g. gap analysis) and ideal model of care for implementing the evidence into routine practice; (3) co-design of interventions with representatives of all cohorts who will be impacted by the changes (e.g. people with dementia, families and residential care staff and management); and (4) an implementation plan premised on design principles that differs from traditional research intervention studies. Conclusion: Resource-constrained residential care settings require support and guidance to implement evidence-based interventions, accounting for their unique context. Importantly, priorities of all key stakeholders must be aligned and account for the surrounding socio-cultural-political context.

Cortisol, Cognitive Impairment, and the Therapeutic Potential of Xanamem™

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Background: Xanamem™ is a potent and selective 11β-HSD1 inhibitor. 11β-HSD1 amplifies cortisol in brain regions, including the hippocampus. There is abundant evidence from animal and clinical studies linking elevated cortisol with hippocampal dysfunction, leading to poor learning, recall, and objective memory impairment. Thus, interventions that reduce cortisol levels may improve cognition and have long-term benefits in reducing the risk of development and/or progression of dementia. Methods: The development of Xanamem™ will be outlined, importantly the significant effect size results observed with the Cogstate NTB in the XanaHES study.

Additionally, many independent studies have concluded that higher plasma cortisol is significantly related to lower hippocampal and gray matter volume, and that chronically elevated cortisol could exacerbate pathological processes associated with the onset and progression of AD. Results: The clinical development of Xanamem™ will be discussed, inclusive of: 1. Pre-clinical Studies, 2. Phase II XanADu Study, 3. Phase I XanaHES Study, 4. Target Occupancy program, 5. Quantitative Systems Pharmacology modelling, 5. Complementary research

endorsing the cortisol hypothesis, 6. Future Studies. The results achieved indicate successful target engagement and target occupancy of Xanamem™ and highlight the potential that future clinical studies may elicit clinically meaningful results in the target population. Conclusions: Xanamem™ provides a mode of action wherein it inhibits cortisol production; the results achieved in XanaHES further endorse this scientifically robust target for both symptomatic treatment and disease course modification in AD and potentially non-AD dementias and other neurodegenerative disorders.

The Potential Role of PILRB and CHIT-1 in Dysfunctional Microglia from Alzheimer's Disease Patients

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Microglia have been implicated in Alzheimer's disease (AD) pathology by potentiating neuroinflammation, mediating tau phosphorylation and deposition, and undertaking excessive synaptic pruning. Genome-wide association studies (GWAS) have provided strong supporting evidence of their role in AD, with many single-nucleotide polymorphisms being found in microglia-associated genes. However, the mechanistic changes underlying the abnormal function of microglia in AD are yet to be fully elucidated. To investigate microglial function in AD, we have generated microglia-like cells from peripheral blood mononuclear cells (PBMCs) by culturing with interleukin 34 (IL-34) and granulocyte-macrophage colony stimulating factor (GM-CSF). The resultant microglia-like cells have high expression of microglia-specific markers, and functional behaviour of mature human microglia. Significantly, our preliminary results using RNA-sequencing have identified an upregulation of gene expression for Paired Immunoglobin Like Type 2 Receptor Beta (PILRB) and Chitinase 1 (CHIT-1) in AD patient microglia compared to healthy control microglia. Up-regulation of these genes in AD microglia has been confirmed using quantitative reverse transcription polymerase chain reaction (RT-PCR). As PILRB has previously been identified as a risk gene for late onset AD by GWAS, and both genes have key myeloid cell-specific activity, we postulate that they play an important role in AD by modulating microglial function. Hence, we are further investigating the expression and function of PILRB and CHIT-1 in AD microglia-like cells. This may ultimately lead to a greater understanding of the pathological role of microglia in AD, and translation to a therapeutic approach.

Cognitive and non-cognitive outcomes of immersive VR-based cognitive training for MCI individuals: A Scoping Review

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Through repeated practice and use of various strategies, cognitive training (CT) can maintain or even improve cognitive performance in older adults with mild cognitive impairment (MCI). Ways to maximise transfer gains to real life settings, and putative moderators of treatment efficacy are, however, less understood. Immersive virtual reality based cognitive training (VRCT) can potentially add advantages to CT by incorporating ecologically valid settings (e.g., home, city street) which can help overcome some barriers of traditional CT. This scoping review aims to 1) summarise findings of recent studies utilizing immersive VRCT for older adults with MCI and 2) identify gaps for future research. In feasibility studies, older adults with MCI exhibited their enjoyment, satisfaction, and engagement with minimum negative side effects and a low dropout rate. In this review, we found that studies have evaluated changes in general and specific cognitive performance after immersive VRCT, as well as other outcomes such as physical function (gait), physiology (urine, blood), and emotions (stress, contentment). In these studies, a head-mounted display or a wide screen was used for the immersive experience, providing different levels of difficulty in tasks. With qualitative and quantitative analyses of outcomes, these studies suggest a positive outlook towards using immersive VRCT in improving cognitive (spatial skill, visual attention, verbal memory, executive function) and non-cognitive (stress, depressive symptoms) well-being of older adults with MCI. However, some important factors (e.g. demographics, physiological components, and sleep as moderators) need to be further investigated to tease out how we can better provide effective immersive VRCT.

Virtual Reality Assisted Psychotherapy for Anxiety in Dementia Research Protocol

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Anxiety is one of the most prevalent behavioural and psychological symptoms of dementia (BPSD), yet it is still rarely targeted by non-pharmacological interventions. Despite its adverse effects, pharmacotherapy is still used as a convenient method in the context of identified immediate needs and limited available resources for psychological interventions. Virtual Reality (VR) has been increasingly used in psychotherapy to support treatment of anxiety disorders. This technology might be particularly helpful in assisting people with dementia as it can facilitate techniques for managing anxiety through immersive environments as opposed to creating complex mental representations often required in conventional psychotherapy. We aim to present our study protocol which combines two approaches based on previously developed manuals: VR-CBT for anxiety in older adults with Parkinson's disease (currently in trial) and modified CBT for anxiety in older adults with cognitive impairment. Intervention will consist of 6 weekly sessions of 30-60 minutes, tailored to general anxiety and stress management relaxation techniques to be used throughout the course of dementia: a.Psychoeducation and anxiety monitoring, 1.Diaphragmatic breathing, 2.Progressive muscle relaxation, 3.Imagery , 4.Practice of techniques in VR anxiety-provoking environment, 5.Maintenance plan. We plan to test and optimise this VR-psychotherapy in a feasibility study with participants living in communities or attending memory clinics and their informal care-givers. We aim to translate the outcomes directly into clinical practice by providing evidence-based psychological intervention with mobile VR for facilitated home-based practice to maintain long-term outcomes irrespective of geographical location or availability of clinical practitioners.

Dysregulated monocyte-derived microglia contribute to neuroinflammation in Alzheimer's disease patients

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Neuroinflammation is a major pathological feature of Alzheimer's disease (AD). Microglia, the resident immune cells of the brain are implicated in the pathogenesis of AD. However, it remains unclear whether microglial function is detrimental, protective or insufficient during AD. Hence, this study aims to extend the knowledge of microglial function in AD. As an alternative approach to using human brain-derived microglia, we adapted an established protocol to generate human-induced microglia cells (hiMG) derived from peripheral blood mononuclear cells. Blood obtained for this study is through collaboration with the Prospective Imaging Study of Ageing (PISA) and The Australian Imaging, Biomarker & Lifestyle Flagship Study of Ageing (AIBL). To compare microglial dynamics and functional differences between microglia from AD and age-matched individuals, two different assays were used; 1) phagocytosis assay, and 2) gene expression profiles. Phagocytosis of hiMG determined by the uptake of fluorescent beads shows that the AD cohort has a delayed response in engulfing fluorescent beads, which lasted beyond 24 hrs, suggesting an impaired response in phagocytosis in AD patients. Real-time PCR of hiMG in the AD cohort showed an upregulation of several immunomodulatory genes such as IL-6 in comparison to age-matched individuals, suggesting that there may be a cell-intrinsic role for abnormal activation in AD hiMG. Whether these genes have an effect on the functional role of hiMG in AD is in our future studies. Clinically approved drugs such as Dasatinib and Telmisartan were tested on patient hiMG cells to demonstrate patient-specific responses as a basis for a screening platform to 1) improve drug targeting, 2) determine patient suitability, 3) monitor disease progression.

A Grassroots approach to Dementia Risk Reduction for the Torres Strait

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Dementia is a key health priority in Indigenous communities given their increased risk of dementia compared to the general population. At present, there is a lack of evidence around what healthy ageing means in the Torres Strait or how older adults can be supported through the health care system to remain in their communities. In this paper, a study protocol will be presented for review. The aim of the study is to develop a culturally appropriate framework of Healthy Ageing for Torres Strait Communities that will include dementia risk reduction strategies to enable older persons to remain living within their communities for as long, and as healthily, as possible. Method: This project will use Participatory Action Research to enable Torres Strait communities to identify environmental, cultural, spiritual and other priorities to achieve a fulfilling and positive approach to living well as they age and reduce dementia risk. Using a Continuous Quality Improvement framework, primary health care centres will develop quality improvements based on priorities identified by the community. Results: Primary health care centres will implement best practice screening, culturally appropriate assessments, and targeted interventions to support their people to age well and remain on country and implement dementia risk reduction strategies. Conclusion: Results will inform a culturally appropriate framework of Healthy Ageing for Torres Strait Communities to enable older persons to remain living well at home, and on Country for as long as possible with reduced dementia risk.

Clinical checklists: a valuable tool in improving the quality of dementia care in Australia

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Clinical checklists have been previously recognised as a simple but powerful tool for standardising clinical practice and improving healthcare outcomes. Clinical checklists were utilised in the 'Agents of Change' translational research project to evaluate adherence to clinical practice guidelines for dementia, gauge clinical practice, identify some of the barriers to quality care and inform and guide quality improvement. Objectives: This study describes how clinical checklists were utilised to measure adherence to clinical practice guidelines and reports on both intended and unintended consequences of use. Methods: Mixed methods encompassing both quantitative and qualitative techniques were used to assess the success of the quality improvement collaboratives. Clinicians completed checklists and reported data related to the first ten consultations they had with people with dementia and/or their care partners per month over a period of 18 months. Data obtained from the checklists was measured against criteria to evaluate adherence to guideline recommendations utilising segmented regression analysis. Process outcomes and qualitative data within the checklists were collated, analysed and used to describe clinical practice and provide insight into some barriers to quality care. In-depth interviews with participating clinicians provided feedback on the utility of checklists. Results: Over 1700 checklists were submitted. Practice patterns demonstrated there were several challenges in the delivery of evidence-based dementia care in Australia including design and delivery of tailored interventions and addressing needs of care partners Clinicians reported that checklists were valuable in obtaining feedback about the quality of care that they provided and were useful in critical reflection.

Multifactorial omics platforms for studying Alzheimer's disease using olfactory cells

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It has been shown that no drug to date can slow or alter cognitive decline associated with Alzheimer's disease (AD). This, coupled with the ever-increasing incidence, has led to a significant burden on socio-economic sectors worldwide. Standard approaches based on animal models, human autopsies and imaging technology have done little to help develop translational therapeutic strategies or tools for early detection. To address this shortcoming, future

therapeutic paradigms should include cellular and molecular model systems that co-relate with early clinical features observed in AD. One of the earliest symptoms of cognitive decline associated with AD is an impaired sense of smell. However, the cellular and molecular basis of cognitive decline and loss of olfaction remains allusive. Found deep within the naris, olfactory stem cells provide a window into the brain. Their inherent ability to form neuroglia makes these cells an ideal model system to investigate the early pathophysiological changes that take place in AD. These cells can be obtained from patients with relative ease and expanded in the laboratory. Significant changes in gene, protein, lipid metabolism, neuroinflammation and mitochondrial function between control and AD-patient-derived olfactory cells will be determined using global RNA sequencing, proteomic screening of cells using subcellular fractionation and liquid chromatography in combination with tandem mass spectrometry. This study will help elucidate the involvement of the olfactory system in the pathogenesis of AD and provide new insights into pathways, biomarkers and therapeutic targets that may aid in the development of effective therapeutic regimes for this devastating disease.

A research protocol to address dementia rates in Aboriginal and Torres Strait Islander peoples

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Studies have shown that rates of dementia are three to five times higher in Aboriginal and Torres Strait Islander communities than the general population. Research shows that up to a third of dementia cases may be delayed by modifying lifestyle risk factors. Specific risk and protective factors contributing to the increased dementia risk in Aboriginal and Torres Strait Islander communities require clarification as the first step towards developing culturally appropriate interventions. The aim of this paper is to outline a study protocol investigating whether potential protective factors identified in the wider population as supporting cognitive function in later life confer protection to Aboriginal and Torres Strait Islander populations. Method: This project will use a Participatory Action Research approach to enable communities to identify and prioritise dementia risk reduction strategies/potential risk and protective factors. Using a Continuous Quality Improvement Framework, primary health care centres will address modifiable dementia risk factors identified to change practice and systems through the development of culturally appropriate interventions. Results: Resulting interventions will identify and address barriers and enablers unique to Aboriginal and Torres Strait Islander communities. Conclusion: The outcome will be a culturally appropriate framework that incorporates evidence-based best-practice guidelines for delivering community specific interventions for risk reduction and prevention of dementia.

A cortical organoid model for Alzheimer's disease

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At present, there is no therapeutic regimen to slow or alter the progression of cognitive decline associated with Alzheimer's disease (AD). With the number of individuals affected by AD predicted to rise above 130 million, this disease is expected to reach epidemic proportions in the next 30 years. Unless novel therapeutic strategies are established, the exponential rise in the number of AD patients will undoubtedly lead to a catastrophic burden on global socio-economic sectors. Given the complex aetiology of AD, a significant limitation affecting the discovery of translational outcomes is the lack of a model system that faithfully recapitulates both the neuropathological and functional aspects of the AD brain in vitro. Brain-organoids generated from patient-derived induced pluripotent stem cells (iPSCs) have the ability to address this shortcoming. Recent reports have shown that cortical organoids generate intricate electrophysiological patterns similar to a developing human brain. Given that longitudinal changes in electrophysiology is a functional hallmark of AD, comparing oscillatory patterns observed in brain-organoids with those obtained from their isogenic controls would help elucidate the underlying functional, disease-specific deficiencies that have thus far alluded detection. Moreover, combining these trends with transcriptomic analysis using computational network tools could provide novel insights into genetic and environmental factors that lead to the pathophysiological changes characteristic of AD. This will no doubt provide valuable insights into the neuropathology of AD and provide strategies for early detection, novel biomarkers and targets for

therapeutic intervention, thereby reducing the global socio-economic burden and giving hope to those affected by this disease.

Brain endothelial cells with a familial PSEN1 Alzheimer's mutation reveal altered response to focused ultrasound.

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The blood-brain barrier (BBB) presents a barrier for circulating factors, but simultaneously challenges drug delivery. How the BBB is altered in Alzheimer's disease (AD), and how this affects brain pathology and drug delivery is not well understood. To investigate this, we derived brain endothelial cells (iBECs) from human induced pluripotent stem cells (hiPSCs) of several patients carrying the familial AD PSEN1 mutation. We demonstrate that compared to isogenic PSEN1 corrected and control iBECs, AD-iBECs exhibit altered tight and adherens junction protein expression including elevated claudin 5 and decreased VE-cadherin. AD-iBECs also displayed reduced trans-epithelial electrical resistance (TEER) compared to control iBECs, and revealed aberrant efflux properties. Furthermore, we applied focused ultrasound (FUS) that transiently opens the BBB by the interaction with microbubbles and achieves therapeutic effects in AD mouse models. In response to FUS, we found an altered permeability to 3-5 kDa dextran molecules and the amyloid-beta peptide in AD-iBECs compared to control iBECs. AD-iBECs were initially more resistant to FUS-mediated cell displacement, but were subsequently slower to return to a normal state. Our studies present an important advance in human-derived in vitro models of the BBB as a valuable tool to understand its role and properties in a disease context, with possible implications for drug delivery and therapeutic treatment in AD.

Human stem cell models of dementia

Prof Ernst Wolvetang1

1AIBN, the University Of Queensland

The confluence of induced pluripotent stem cells (iPSCs) with CRISPR gene editing and brain organoid models provides new avenues for investigating the etiology of dementia. We combine base editor technology to introduce mutations in human stem cells and next differentiate these into brain organoids that mimic the human cortex make-up and function. Importantly, over time these brain organoids start to show typical disease read-outs also seen in the brains of people living with dementia such as Tau-pathology and amyloid deposits. This has allowed us to study the impact of amyloid precursor protein gene (APP) copy number and APP mutations on neuronal function (using multi-electrode arrays) and gene expression (using single cell RNAseq). Collectively our research exemplifies that iPSCs are useful tools for dissecting the genetic drivers and molecular mechanisms that underlie dementia and constitute a valuable platform for testing of therapeutics.

Living with dementia

Changed behaviours associated with cognitive decline: Views of people living with dementia, families and professionals.

Dr Claire Burley1, Prof Henry Brodaty1,2

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Changed behaviours and psychological symptoms associated with cognitive decline are estimated to affect up to 90-percent of people living with dementia, strongly correlate with functional and cognitive impairment (Cerejeira et al. 2012) and contribute to approximately 30-percent of overall dementia costs (Beeri et al. 2002; Costa et al. 2018). Behaviours and symptoms continue to be a major issue in health and aged care. No study has addressed the views and concerns of people living with dementia about what they think should happen if they experience changed behaviours. This information could be used to educate families and carers, inform clinical guidance and improve care practice. This qualitative study used an integrated approach to investigate the views of people with dementia, their families or carer partners and professionals in separate interviews, on care and appropriate use of language to describe the behaviours. N-Vivo is used to analyse data and develop themes. Twenty-seven volunteers have been recruited so far (from Step Up for Dementia Research: 12 people living with dementia: mean age 71 years, mean Mini-Mental State Examination score 25; 15 family members/ carers). Preliminary analysis indicates that the views of what should happen differ between those living with dementia and their families or carer partners. Views also differ towards what should happen for different behaviours and what language is considered appropriate. Differences and themes will be presented in detail. An integrated understanding of all views involved will assist in improving language use and the quality and availability of care and support.

Living well with dementia in rural communities: an innovative model of care

Dr Marita Chisholm1, Ms Katie Ramsdale1, Mr Kevin Mills1, Ms Jo Martin1,

1Rural Northwest Health

Increased options for community based support for people living with dementia and their families was identified as an important need within the community. To address this gap, Rural Northwest Health, a small rural Victorian health service located within the Yarriambiack Shire, is developing an innovative 'Living Well Centre'. The Centre's focus is to enable people living with dementia to remain independent and living in their own home for as long as possible; support family and friends; offer education and training; and provide a seamless transition to more permanent care when, and if required. Consultation with community members (n=8) helped to inform the development of the Centre and provided an opportunity to review the design plans. The Centre will initially offer a comprehensive day program within a home-like environment, integrating wellness and reablement approaches to assist people to maintain essential life skills including: cooking, shopping, excursions, gentle exercise sessions, art and craft activities, gardening, and interactive programs. The ABLE Model of Care (Abilities and capabilities; Background, Leadership and organisational culture; Environment) developed by Rural Northwest Health for care of people living with dementia in residential care will provide the Centre's framework. Future plans include the provision of overnight accommodation for the person living with dementia as well as extending programs to community members living with other health conditions to support them to remain living at home. The Centre and integrated care model will be formally evaluated to assess impact and outcomes and our experience may inform similar initiatives within other communities.

Valuing quality of life using pictures

Assoc. Prof Tracy Comans1, Dr Kim-Huong Nguyen1

1The University of Queensland

The QOL-AD is a dementia specific quality of life instrument. A five domain version the AD-5D is now available for use in economic evaluation. The domains cover physical health, memory, mood, living situation and doing things for fun. However written questionnaires become increasingly difficult for people with dementia to self-complete as the disease progresses. Using visual communication (images) to represent the levels of health may help people to identify how they are feeling if written communication is a challenge. This preliminary work aimed to understand whether people would be able to select pictures that represented how they felt about quality of life. Methods: We conducted two focus groups with people with dementia, carers, and aged care providers

to test whether people could sort and select pictures to represent the levels of the domains. A range of printed images (>100) of people and activities were presented and the participants were asked to choose pictures that represented excellent, good, fair and poor health to them in the domains of mood and physical health. A consensus exercise in groups then asked people to choose one of the images that all would agree represented that level. Results: A total of 24 people participated in the groups including 5 people living with dementia and their carers. Most people were able to select images and found the task interesting, with three participants unable to complete the task. A variety of images were chosen for each level of physical health and mood however patterns could be found. For example, for excellent physical health, nine different images were chosen which showed people doing strenuous activities such as trail running, running on the beach and boxercise classes. The good level was more likely to contain images of people walking whereas all fair images showed people using some type of walking aid. For excellent mood, most images chosen showed groups of people laughing and enjoying themselves and for poor, images showed people on their own, with white backgrounds. Consensus was able to be reached on one image that best represented each level of the physical health and mood domains of quality of life. Conclusions: This pilot work has established that groups of people can reach consensus on images that represent to them what excellent, good, fair and poor health states look like. This provides the basis for conversion of the AD-5D tool to a pictorial tool in future that will enable more people living with dementia to self-report their quality of life.

The Future Design Hub – developing new innovation and technologies in the ageing space

Ms Megan Corlis1

1Helping Hand Aged Care Inc

The Future Design Hub (the Hub) is Helping Hand's (HH) platform for developing new innovation and technologies in the ageing space. The Hub is both a physical space and an approach. It acknowledges the importance of Design Principles in seeking solutions for the future. The Hub aims to: a. give older people valuable and useful roles in research and innovation from the inception of the idea through to final impact, b. provide an environment for testing innovations in a practical and applied way, c. Foster a collaborative environment focused on translation, commercialization and general interdisciplinary collaboration. Seek a social enterprise approach to commercialisation. The Hub was created in partnership with the University of South Australia to provide a space where researchers, designers and other partners work beside older people to identify problems and work on solutions using a range of co-creation approaches. It is a genuine attempt to work with older people in an authentic way. Our primary relationships are with the School of Art, Architecture and Design. The Hub itself is not a static thing. We are learning more about the potential of this environment and evolving its use. This presentation will include several case studies illustrating the breadth of work we are undertaking, including; Who engages, why they engage and what they get out of it; Partnerships which lead to other work; The ideas which emerge; Ideas which translate into a product leading to new income streams.

Improving dementia diagnosis and post diagnostic support: The COGNISANCE Project

Scientia Professor Meredith Gresham1, Professor Henry Brodaty1,9, A/Prof Lee-Fay Low2, A/Prof Lyn Phillipson3, Professor Greta Rait4, Professor Louise Robinson6, Professor Frans Verhey7, Professor Joanna Rymaszewska7, Professor Isabelle Vedel8, Ms Kate Swaffer10

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Many nations have clinical guidelines for assessment and communication of dementia diagnosis, as well as for post diagnosis intervention that supports well-being of people with dementia and care partners. However, people diagnosed with dementia and their care partners often report being dissatisfied with the diagnostic process and receive limited support following after diagnosis.

The Co-designing dementia diagnosis and post-diagnostic care (COGNISANCE) project aims to co-design and deliver in partnership with people living with dementia, family care partners and health and social care professionals, a new internationally adaptable set of recommendations, toolkits and campaigns to improve the dementia diagnostic process and post-diagnostic support in Australia, Canada, Netherlands, UK and Poland; and to evaluate

the campaigns. The project will (1) explore through surveys and focus groups current experiences, barriers and facilitators to dementia diagnosis and post-diagnosis support from the perspectives of persons with dementia, care partners and health and social care professionals; (2) develop internationally-adaptable toolkits supporting guideline implementation for the groups listed above, as well as the 'at risk public'; (3) devise and deliver campaigns to deliver improved diagnosis and better support using the toolkits in selected regions of participating countries; (4) evaluate the campaigns using the RE-AIM framework including measuring impact on the diagnosis, post-diagnosis experiences, and practitioner attitudes and behavior; and (5) develop an implementation 'playbook' outlining how to deliver similar campaigns internationally.

Review and evaluation of mobile applications for dementia awareness, support and holistic prevention in Australia

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Mobile applications (apps) are increasingly employed to engage consumers with information and support for health challenges. However, limited evaluative data exists for dementia apps that have relevance for consumers, health professionals and researchers. Therefore, this study aimed to document the characteristics and appraise the quality of dementia apps available in the Australian marketplace.

Systematic searches of the Google Play Store, Apple App Store and relevant websites were conducted using the key terms ("dementia", "Alzheimer's"), ensuring searches generated apps available in Australia. Search queries were submitted multiple times to account for uncontrollable factors (beyond keyword relevance) that caused variations in the ranking of search results. Smartphone and tablet apps were included if they offered: dementia awareness and information; support for persons living with dementia, their family and caregivers; or practical guidance on holistic dementia prevention. Apps with a narrow preventative aim (e.g. brain training), those focused on intelligent assistive technology, cognitive testing, or apps designed for other devices, were excluded. Search results were tabulated and a two-stage, independent screening process was conducted initially by title, description and screenshots, and subsequently via the downloaded app.

This presentation will report search yields, summary data for app characteristics (classification, platform, intended user, cost, etc.), and quality assessment scores based on the Mobile Application Review System (MARS) framework (i.e. functionality, engagement, aesthetics, information, affiliations, app-specific ratings). The presence and nature of dementia apps designed for non-dominant cultures will also be noted.

Family-focused services and supports for people living with younger onset dementia

Dr Karen Hutchinson1, Associate Professor Chris Roberts2, Dr Pamela Roach3, Professor Susan Kurrle2

1Australian Institute of Health Innovation, Macquarie University, 2University of Sydney, 3University of Calgary

Younger onset dementia (YOD) is an unexpected diagnosis for people under 65 years, which has far reaching consequences on the individual and their family, including children. Recent research has highlighted social exclusion and discriminatory practices towards people living with YOD and family members, impacting interactions and relationships within the family unit, and with existing services and supports. Methods: Thirty-five data capture events were gained through semi structured interviews with children and young people (17), people living with YOD (5), spouse/caregivers (6) and health and social care providers (7). A thematic analysis was conducted using an innovative theoretical lens drawn from the combined perspectives of the social model of disability and family systems-illness model. Results: Two main themes emerged in the data: Understanding the social demands on the family which include lifecycle challenges and pressures within a social and family context; and interactions of health and social care providers with families living with younger onset dementia highlighting the opportunities and challenges in providing support and services geared to a whole family approach. Conclusion: In order to provide families living with YOD with the optimal assistance and support, the co-creation of a family-focused service model is proposed. This socially orientated model could provide a valuable foundation that underpins effective interactions, and informs service and policy development between service

users, service providers and other stakeholders. This innovative model focuses on actions that foster enablement of the whole family to function well as disease progresses, an important consideration under the National Disability Insurance Scheme.

The Visit: An immersive experience engaging with the lived experience of dementia

Dr Gail Kenning1,2, Scientia Professor Jill Bennett1,2, Volker Kuchelmeister1, Dr Natasha Ginnivan1,2,3, Melissa Neidorf1, Dr Christopher Papadopolous1

1fEEL (Felt Experience and Empathy Lab), UNSW, 2Ageing Futures Institute, NSW, 3ARC Centre of Excellence in Population Ageing Research (CEPAR)

Despite the increased awareness of dementia, there remains a surprising lack of understanding in the general population about the different types, manifestations and impact of dementia. In addition, the stigmatization of ageing and ongoing ageism also carries through to dementia. The ageing population and dementia are key issues facing society in the 21st century. However, there is limited research that explores the lived experiences of people living with dementia and makes it available to a general population. This project develops new methodologies to understand and document their experiences and communicate those findings to the public in an engaging way by utilising immersive visualisation. This presentation will discuss and present an interactive real-time video installation, developed by artists and psychologists working with women living with dementia. Visitors are invited to sit with Viv, a life-sized, photorealistic animated character whose dialogue is created largely from verbatim interviews, drawing the viewer into a world of perceptual uncertainty, while at the same time confounding stereotypes and confronting fears about dementia. The project investigates the affective potential to promote empathy of immersive technologies and content from in-depth qualitative research with people with lived experience of living with dementia. It takes on the issues related to ageism and stigmatization in relation to dementia. It engages in innovative ground-breaking methodology development for understanding lived experience. It investigates how the audience become immersed in the visit with Viv and become aware of their own responses to the character and the condition.

Mealtime in frontotemporal dementia: an assessment of aberrant eating behaviours and swallow function

Ms Courtney Lewis1, Prof Amy Brodtmann1,2,3, Prof Mark Walterfang2,3, Prof Dennis Velakoulis3, Prof Adam Vogel1

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Changes to mealtime are common in frontotemporal dementia (FTD) and may contribute to caregiver distress. Difficulties surrounding eating in people with FTD include aberrant eating behaviours, such as eating too quickly or poor table manners, changes in diet preference or coughing and choking during meals. Prior research has focused primarily on the behavioural variant of FTD and not incorporated caregiver distress. Here we provide a comprehensive characterisation of symptoms which affect mealtime in individuals diagnosed with FTD and its impact on caregiver distress. Methods: Sixty-two individuals with FTD were assessed at home during a single, 90-minute session. Outcome measures included swallow function, frequency and severity of aberrant eating behaviours, changes in dietary preferences global behaviour severity and caregiver distress rating and eating-specific distress. Results: Individuals diagnosed with FTD display an increased prevalence for changes in eating behaviour. A preference for sweets was the most frequent and severe behaviour but correlated poorly with eating-related caregiver distress (r=.12). An increase in appetite was the third most frequent reported symptom and correlated the strongest (r = .58) with eating-related distress. Duration of diagnosis was moderately correlated with reports of coughing and choking during meals (r = .59) but not to overall severity (r = .3). Conclusion: Findings contribute to enhancing our knowledge of behavioural changes in FTD and providing a better understanding of the patient and caregiver experience.

Co-creating technology with people living with dementia and care partners: How, what, why it's important

Dr Jacki Liddle1, Mr Peter Worthy1, Mr Dennis Frost1, Mrs Eileen Taylor1, Mr Dubhglas Taylor1, Dr Avelie Stuart2, Prof Linda Clare2, A/Prof Anthony Angwin1, Prof Nancy Pachana1, Prof Janet Wiles1

1The University of Queensland, 2the University of Exeter

There are expectations that technology will support people living with dementia. Alongside this, there is growing awareness that the development needs to include users so that meaningful technology is created. However, it is unclear how best to engage people living with dementia in technology design. This description of the methods and experiences within two participatory design studies advances this issue. Study 1 involved co-creating a series of personalised technologies (each designed for a specific person living with dementia and their care partners). Co-design followed a cyclical design process: identifying key issues affecting daily life, generating ideas, setting goals and creating, reviewing and improving prototypes. Case studies from two participating families will be described, illustrating the diversity of needs and solutions. Study 2 explored connections to people and places through technology to inform technology development. Connection experiences were elicited from older people, people living with dementia and disabled people (n=10). Key considerations from these experiences were developed through workshops with older people, people living with dementia and other stakeholders (n = 29). The focus areas formed the basis of an online flexible and inclusive design event (Collab). Design teams included designers, developers, older people, people living with dementia, disabled people and students (overlapping categories, n = 21). Designs focused on improving or meeting connection needs in an inclusive way. Experiences and designs will be described. These studies provide insights into how people living with dementia can be meaningfully involved in different stages of technology design and highlight opportunities for technology development.

Knowledge of reporting a missing person with dementia in Australia: Results of a national survey.

Dr Margaret MacAndrew1, Professor Elizabeth Beattie1, Mr Dubhglas Taylor3, Snr Sergeant Jim Whitehead2, Mr John Quinn4, Ms Katy Wyles1

1Queensland University of Technology, 2Queensland Police, 3Care partner to person with dementia, 4A person living with dementia

People with dementia are at greater risk of becoming lost if areas of the brain responsible for navigation are damaged. Misconceptions about how to report a missing person in Australia can delay Police notification contributing to the person being found injured, deceased or not found at all. This study explored the general public's current knowledge and understanding of how to report a missing person with dementia in Australia through a national online survey. In total 284 surveys were completed with all states and geographical types represented. 54% (n=153) of respondents identified as a carer of a person with dementia. Alarmingly 48% (n=137) of responders did not know how to report a missing person and half believed that you need to wait more than 1hour before reporting to Police: 14% of carers and 33% of non-carers believed it was necessary to wait 24 hours or longer. Not being able to contact a person and knowing the person had a health issue were key factors for prompt reporting by a non-carer, while carers would report the person quickly if not at the intended location and at night. The main reasons for delaying a report to police for both carers and non-carers were: wanting to conduct an initial search first, worried about calling too soon, and worried about wasting police time. Standardising the protocol for reporting a missing person and raising awareness about this procedure could be key to improving health outcomes for missing persons with dementia in the future.

Green spaces, dementia and a meaningful life in the community: A mixed studies review

Mrs Nkolika Mmako1, Dr Helen Courtney-Pratt2, Dr Pauline Marsh3

1Wicking Dementia Research and Education Centre, University of Tasmania, 2Wicking Dementia Research and Education Centre, University of Tasmania, 3Centre for Rural Health, University of Tasmania

Engagement in green spaces impacts positively on wellbeing and quality of life. But how exactly does green space engagement impact on people living with

dementia in the community; people with a heightened need to maintain quality life? Using a mixed study review, we explore existing evidence for the impacts of contact with green spaces on people living with dementia in the community.

Findings reveal four key mechanisms: Engaging in meaningful activities; Empowerment; Positive risk taking; and Reinforcing Identity; through which gardens and horticultural programs, green care farms, parks, urban woodlands and neighbourhood outdoor environments could impact on community dwelling people living with dementia. We conclude that, although evidence is limited, the conceptual links between interactions with the natural environment and rights-based dementia discourses is worthy of consideration by policy makers, practitioners and carers as that could be one way of providing accessible, enabling, inclusive, dementia friendly communities to promote living well with dementia.

Batten disease, childhood dementia and behaviour support

Dr Tom Morris1, Dr Ineka Whiteman2, Ms Marie Alford1, A/Prof Colm Cunningham1

1The Dementia Centre, 2Batten Disease Support and Research Association Australia

Batten disease, or neuronal ceroid lipofuscinosis, is one of the most common forms of childhood dementia and along with memory and cognitive decline, children and adolescents typically suffer vision loss, seizures, language and motor decline and, ultimately, premature death. Like other childhood dementias, managing the heterogeneity of Batten disease symptoms and the impact these have on carers poses a significantly complex medical challenge requiring coordinated multidisciplinary approaches. This paper examines the role and importance of one such multidisciplinary relationship, the recent education and training collaboration between Batten Disease Support & Research Association of Australia (BDSRA Australia) and Dementia Support Australia (DSA). A chapter of the global BDSRA organisation, BDSRA Australia is dedicated to improving the lives and well-being of patients and families affected by Batten disease through family support, funding vital research and advancing education and awareness of Batten disease in Australia. DSA is the leading provider of behaviour support for all people living with dementia in Australia, irrespective of their age, dementia diagnosis or location. In this joint presentation, representatives of both BDSRA Australia and DSA will discuss personal and professional insights into the complex delivery of support to children and adolescents with Batten disease, their families and carers. Within this presentation, these representatives will showcase some of the early materials and training packages that will be utilised throughout their organisations nationally.

Preliminary development of an audit tool for the homes of community dwelling people with dementia

Assoc. Prof Lyn Phillipson1, Dr Keryn Johnson1, Prof Richard Fleming1, Mr Dennis Frost1, Prof Tim McCarthy1, Mr Clayton McDowell1

1University of Wollongong

Environmental design and modification has emerged as an important intervention which can be used to enhance the social health of people living with dementia and to create more dementia enabling communities. To this end, environmental design and modification aim to minimise the difficulties and risks that people with dementia may encounter within different settings, and to facilitate and support engagement in meaningful activities through better accessibility and structural, technological or behavioural supports to promote quality of life. Whilst valid and reliable tools exist for auditing within residential care homes and public buildings, a gap exists in the availability of robust tools for use in the homes of community dwelling people with dementia. To address this gap, this paper documents the three stage methodology used by an interdisciplinary team to create a prototype home environment audit tool. This prototype tool aims to provide a person-centred, salutogenic framework to support auditing features of home environments and the tasks and objects that support life within the home against dementia design principles. Ultimately the aim is through use in the homes of people with dementia, the tool can be further developed to provide a reliable and valid set of scores which can be used to assess and monitor the relationship between design features and quality of life for people with dementia.

Associations between neuropsychiatric symptoms and cognition in people with dementia: Protocol for a systematic review

Ms Julieta Sabates1, Dr Amit Lampit1, Dr Hanna Malmberg Gavelin1, Dr Samantha Loi1, Dr Anita Goh1, Mr Terence Chong1, Prof Amy Brodtmann1, Prof Nicola Lautenschlager1, Dr Alex Bahar-Fuchs1

1University of Melbourne

Neuropsychiatric symptoms (NPS) include anxiety, depression, agitation and aggression, among many others, and are experienced by most of the people with dementia (PWD). These symptoms have been found to be associated with worse quality of life in the patient and greater distress in the caregiver.1 Several studies have explored the relationship between NPS and cognition in various populations. However, no review has systematically examined the cross-sectional links between impairment in specific cognitive abilities and specific NPS in PWD. Proper understanding of these associations could inform the design of an intervention capable of reducing the frequency and severity of these symptoms. This review aims to investigate these specific associations as well as potential moderators, including age of onset and aetiology of dementia, and it will form the first step in the design and development of a novel mobile application-based intervention targeting NPS.

We will search relevant databases for interventional and observational studies looking at these associations and convert outcome data from primary studies to standardised mean difference, correlation coefficient or odds ratios. We will then synthesise the data by conducting multilevel random effects analysis. We believe that the findings from this review are likely to make a big contribution to the field and have important implications for the treatment of NPS in PWD.

a. Appelhof, B., Bakker, C., Zwijsen, SA., Smalbrugge, M., Verhey, F. R., de Vugt, M. E., ... & Koopmans, R. T. (2017). The determinants of quality of life of nursing home residents with young-onset dementia and the differences between dementia subtypes. Dementia and geriatric cognitive disorders, 43(5-6), 320-329.

Community mobility and participation goals after driving cessation reported by people living with dementia

Dr Theresa Scott1, Dr Jacki Liddle1, Professor Elizabeth Beattie2, Professor Louise Gustafsson3, Professor Geoffrey Mitchell1, Mrs Donna Rooney1, Professor Nancy Pachana1

1The University of Queensland, 2Queensland University of Technology, 3Griffith University

Driving is a complex task requiring skills and functions that are impacted by dementia. Consequentially, all drivers with dementia will eventually have to stop and the transition comes at significant personal cost. Loss of mobility, and decline in community connectivity and social participation have a substantial negative impact on quality of life and mortality.

We delivered an innovative driving cessation intervention to support self-identification and achievement of desired goals related to community mobility and engagement after driving. Methods: Goal setting took place either in person or via telehealth. We used a modified version of the Canadian Occupational Performance Measure (COPM) and motivational interviewing techniques to support clients to self-identify goals for continued community participation and engagement. We explored pre- and post-intervention achievement of, and satisfaction with identified goals with 24 participants, and report the quantitative (COPM) and qualitative (interviews) outcomes. Results: Quantitative analysis of pre- to post-intervention difference scores showed significant positive improvements in goal performance and satisfaction, $p<0.001$. Thematic analysis highlighted several themes: Emotional, Practical, Contributing, and Shared/Family goals. Emotional goals related to adjustment. Practical goals were linked with combatting isolation. Contributing goals related to sharing experiences and helping others. Family goals were about community activities, and respite. Conclusions: The ability to get out and about and to participate in social activities is vital to maintaining wellbeing and to live an autonomous life in the community for as long as possible for people living with dementia. This research highlights that providing person-centred lifestyle adjustment counselling related to community participation and engagement, can help lessen the negative effects of driving cessation.

Coexistent seizures and Alzheimer`s dementia: incidence, prevalence and characteristics

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Epilepsy and Alzheimer's disease (AD) are major causes of disability and financial burden globally, with clusters of comorbidities, and an increasing awareness of the overlap between them. Estimates of epilepsy incidence rates range from 418 to 1,190 per 100,000 person-years, and prevalence from 3% to 27% among people with AD, depending on different AD duration and severity. In turn, seizures adversely impact AD prognosis, accelerating cognitive decline and impairing activities of daily living. A recent scoping review by the authors reveals at least six relevant publications that have not been accounted for in earlier reviews. Furthermore, characteristics of these two diseases (e.g. seizure presentation, type, cognitive performance) and their impact on the prognosis of one another have not been investigated. Methods: MEDLINE, EMBASE and PsycINFO were searched, using the following search terms as free text or controlled vocabulary: (epilepsy, seizures, convulsions) AND (dementia, cognitive dysfunction). Risk of bias will be assessed using a quality assessment tool which considers the representativeness of the study sample, validity of diagnostic criteria and statistical methods. Incidence and prevalence will be synthesized in forest plots. Subgroup analysis or meta-regression will be conducted based on case selection, age, time since AD diagnosis and cognitive performance. Discussion: Data were available from 43 studies, reporting various frequencies and factors. The results of this review will be presented at the conference and will help inform more precise epidemiological estimates, earlier identification of disease, intervention strategies, ways to ease disease burden, and advise on health services and care planning.

Falls risk factors in Alzheimer's disease: the Australian Imaging, Biomarker and Lifestyle Study of Ageing

Dr Paul Yates1,2,3, Dr Andrew Huynh1,3, A/Prof Michael Woodward1, Dr Henry Zeimer1, Mr Georgios Zisis2,3, Prof Ralph Martins4,5, Dr Stephanie Rainey-Smith5, Dr Belinda Brown6, Dr Warnakulasuriya Fernando5, Dr Samantha Gardner5, Prof Christopher Rowe1,2,3, Prof Colin Masters1,2,3,

1Austin Health, 2University of Melbourne, 3Florey Neuroscience Institute, 4Macquarie University, 5Edith Cowan University, 6Murdoch University

Falls are a major cause of morbidity and mortality in older people, particularly people living with dementia. This study aimed to identify factors associated with falls in a cohort of older Australians with Aβ PET imaging and clinical follow-up. Methods: Participants from the Australian Imaging, Biomarker and Lifestyle Study of Ageing (AIBL), with baseline 11C-PiB PET and 18-monthly review for 6 years, including self-reported falls. Participants with severe illness, alcohol abuse and cerebrovascular disease were excluded. Multivariable logistic regression was used to identify factors associated with falls, including Aβ PET status (elevated/not elevated). Results: 293 participants (mean age 72.6 years, 52% female, 62% cognitively-normal, 20% MCI, 18% AD) reported 50 falls during the study period. Female gender (adjusted odds ratio [aOR] 3.17, 95% CI 1.53-6.58, p=0.002), impaired vision (aOR 2.32, 95% CI 1.08-4.99, p=0.031) and education (>12 years) (aOR 2.40, 95% CI 1.20-4.82, p=0.014) were associated with incident falls. Age (p=0.172), elevated Aβ (p=0.549) and cognitive status (p=0.799) were not associated with falls. Conclusion: While the findings that female gender and visual impairment are associated with increased risk of falls are consistent with other studies, an association with higher education is intriguing and warrants further investigation. Recruitment methods and reporting biases may contribute to the lack of observed association between falls and Aβ or cognitive diagnosis. Future analyses should also consider cerebrovascular disease, physical activity, medications and alcohol intake.

Including persons with dementia in interview-based research: A consideration of epistemic (in)justice

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Persons with dementia often are deemed ineligible for involvement in interview-based research, due to assumptions about communicative (in)competency and (un)reliability. This systematic exclusion limits the opportunities for persons with dementia to inform research that ultimately shapes the care provided to them. This study critically examines 'shared interviewing' (i.e. interviews involving a researcher, participant with dementia, and a family member) as a candidate method to enable involvement of all persons with dementia in interview-based research, regardless of dementia severity. Firstly, we present an interactional analysis of triadic interviews with persons with moderate-severe dementia and a family member, informed by a Conversation Analytic approach to exploring the 'Epistemics of interaction' (Heritage, 2012). Our findings demonstrate the ways that researchers and family members: (1) provide supportive context to/ interpretation of the knowledge claims made by persons with dementia; (2) validate the knowledge claims made by persons with dementia; and (3) challenge the knowledge claims made by persons with dementia. Secondly, we present further consideration of the epistemic implications of such interpretation, validation or challenges in the context of 'selfhood' and 'Epistemic justice' theories. The findings of this study inform the design of innovative and inclusive methodologies and methods to facilitate meaningful involvement of persons with dementia in interview-based research.

Heritage, J. (2012). Epistemics in action: Action formation and territories of knowledge. Research on Language and Social Interaction, 45(1), 1-29.

Care

Using data to drive improvement: the Australian Dementia Network (ADNeT) Registry

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The Australian Dementia Network (ADNeT) Registry is a Clinical Quality Registry (CQR) for people newly diagnosed with dementia or Mild Cognitive Impairment (MCI). The registry will describe, monitor and provide feedback regarding patterns of disease and clinical care within the Australian setting to drive clinical improvement. The Registry will commence in a pilot phase in 2020 at participating memory clinics. The CQR will provide core baseline data that will service much of the broader ADNeT initiative, which also includes a clear pathway for entry to clinical trials.

In a 2012 report, the Australian Institute of Health and Welfare highlighted the lack of dementia-specific data available from existing datasets, in particular data regarding dementia incidence, without which policy and service planning is challenging. Beyond diagnosis, systematic collection of dementia data is similarly difficult, due to multiple care providers and settings involved in the management of persons with dementia and MCI. Internationally, there are examples of successful clinical registries of dementia; most notably in Sweden (SveDem registry), Norway (NorKog registry) and Denmark. The International Consortium for Health Outcome Measurement has also developed a standard dataset for persons diagnosed with dementia. This poster will showcase the initial minimum dataset for the ADNeT CQR that will be collected in participating memory clinics at baseline, and the key measures that will be derived from this. Proposed follow up data via data linkage and patient and carer reported outcome measures will also be described. These data will be compared with those from similar international registries.

Health service usage by people with younger-onset dementia in their last year of life

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An estimated 27,000 Australians have younger onset dementia with this figure expected to increase in future years. Due to differences in aetiology, dementia progression and the overall health profile of people with younger onset dementia, understanding their health service usage and how this differs to those with dementia at older ages is critical for policy development, service planning and delivery. In this novel study, health service usage in the 12 months prior to death was examined for people with dementia who died in 2013. Health service usage of people with younger onset dementia (died aged less than 65) was compared to service use by those with dementia who died aged 65 and over. The study used linked NSW and Victorian health administrative data and services examined included: hospitalisations, emergency department presentations, GP and specialist services and prescriptions dispensed. Proportionally more people with younger-onset dementia used a health service at least once in their last year of life than people with dementia who died aged 65 and over, with the greatest difference in use of specialist services. In the final month of life, hospital services were used by a greater proportion of people with younger onset dementia than those with dementia who died aged 65 and over. Antiepileptics, anxiolytics, hypnotics and sedatives were more commonly dispensed to people with younger-onset dementia.

Improving care in dementia - the End-of-Life Care Assessment Tool for Dementia: mixed method study.

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The palliative care experiences of people living with dementia in Australian residential aged care (RAC) services is variable. Concerning is aged care staff fail to recognise when a person with advanced dementia requires palliative care. There is a paucity of reliable tools to support end-stage care for people with dementia internationally. This study aimed to develop and establish the reliability and validity an end-of-life

care assessment tool (EoLC-ATD) people experiencing end-stage dementia whilst living in RAC. Method: This study will test reliability and validity of the EoLC-ATD for use in aged care services and explore the perceptions of RAC staff in supporting end-stage dementia assessment and associated clinical nursing practice. This issue underpins the research application which has ethical approval from University of Notre Dame Australia, Sydney. The study supported by an Expert Advisory Group (n=8) to develop constructs and themes. A Delphi Panel (n=31) participated in three E-Delphi rounds. People with advanced dementia, (n=70) living in DSUs are being tested following a pilot. Registered nurses in this setting (n=25) attended focus groups and trained to test the tools. Reliability and validity testing in 4 DSUs and comparing EoLC-ATD data with data from the Global Deterioration Scale (Reisberg 2006) will occur. Re-testing data and factor analysis of item scores to develop the final EoLC-APTD and Guidelines will occur. Conclusion:

Future reliability and validity testing of the tool will occur. The EoLC-ATD will be used to assess, plan and monitor EoLC for people with advanced dementia in receipt of RAC.

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How do staff report and mitigate perceived Behaviours of Concern within Residential Aged Care?

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Behaviours of Concern (BoC) in Residential Aged Care (RAC) are frequently cited within the literature. However, there is a paucity of research evaluating the characteristics of BoC and the care practices used to mitigate these as recorded by aged care staff. This project sought to address this significant gap. Methods: Residents (N=25) with a range of cognitive function and mental health concerns were recruited from a 160 bed RAC facility in Brisbane, Australia. A care plan analysis, including behavioural report logs, was conducted to elucidate the prevalence of BoC and associated factors including cognitive impairment and dementia diagnosis. Results: There were 395 BoC recorded within a two month period. Physical agitation (40.3%), interfering while wandering (13.9%), trying to get to inappropriate places (12.4%), and verbal refusal of care (11.9%), were the most commonly reported. Mitigation strategies included redirection, prn psychotropic medication, reassurance, routine care practices, offering of beverages, repositioning, and rarely pain relief. In 45 instances (17%) no intervention was recorded. A case analysis of a 99 year old male resident over a 24 hour period revealed how staff utilised redirection and multiple doses of PRN antipsychotics to manage BoC

without sustained improvement in resident behaviour. Conclusion: This study provides the first analysis of BoC using a RAC facilities' own eHealth records to examine commonly reported BoC and the staff response. This preliminary evidence provides insight into the difficulty for staff in responding to BoC in an effective manner.

Researching Care Concerns: Insight into Strategies Supporting Medication Management for People with Dementia

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The purpose of this study was to report carer strain and carer coping with medications for people with dementia with an unplanned admission to hospital, and evaluate the impact of a safe medication intervention on carer coping and carer strain. This was a quasi-experimental pre/post controlled trial that included a post discharge survey of carers about managing medications for people with dementia. For carers who completed surveys (n=88), 33% were concerned about managing medications including medication changes. Forty percent reported difficulties managing medications including resistive behaviours by people with dementia. Dose administration aids were used by 72% of carers who found them helpful for managing medications. Seventy six percent reported that people with dementia were taking other medicines that they had been taking prior to admission to hospital, however, only 15% reported receiving a recent home medicines review by a community pharmacist. Seventy four percent of these carers suffered very high carer strain. Carer comments about managing medications for people with dementia indicated that there were many perceived issues for carers that contributed to high carer stress, and their engagement in vigilant activities to maintain medication safety. These results indicate that carers need additional support and education to assist them to manage medications effectively for people with dementia and to reduce carer strain. Strategies that can contribute to them managing medications include increased use of dose administration aids, increased provision of home medicines reviews, and increased education of health professionals to provide adequate support and education about managing medications.

How can we improve outcomes in those with dementia in residential aged care?

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Addressing the high symptom burden in people diagnosed with dementia who reside in long-term care settings is an international priority. Undetected and untreated symptoms lead to decreased quality of life, increased carer burden and service delivery challenges, especially at the end of life. Routine use of outcome measures in RACs is a potential solution, but a national outcomes programme in aged care in Australia is lacking. We present an intervention to improve outcomes in residents with dementia in RACs who require palliative care, the methodology for its development, and the research protocol to evaluate its feasibility and impact. Methods: The literature regarding the use of proxy-completed outcome measures in long-term care settings, outcome measurement implementation, and national outcome measurement approaches were scoped. An approach was identified and modified. A mixed methods study design resulted. Results: Validated, multi-symptom outcome measures for use are limited, and applied mostly by clinical staff. One national palliative care outcome measurement programme to result in improved outcomes in those requiring palliative care was identified: the Palliative Care Outcomes Collaboration. Modifications included screening and monitoring for palliative and end-of-life care needs, the involvement of care worker staff, and a response protocol to aid palliative care access. Conclusions: Addressing the complex relationship of context, evidence and implementation is essential to developing a programme to support routine use of outcome measures in RACs. A national approach to help address the challenge of detecting and responding to the high symptom burden of those with dementia in RACs is possible.

The feasibility of virtual cycling in residential aged care for people with cognitive impairment

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The use of virtual reality to increase physical activity represents a novel opportunity to promote well-being of people with cognitive impairment living in residential aged care through meaningful activity. This randomised, controlled, crossover study, aimed to assess the feasibility and acceptability of a projector-based group virtual cycling experience and its effects on mood, engagement, apathy and environmental stimulation. Ten residents (8 female; mean age: 86.1±8.06 years) with cognitive impairment were recruited from one aged care facility located in Canberra, Australia. Residents participated in a single self-paced small-group virtual experience where they observed locally filmed footage on a projector and cycled using pedal exercisers while seated for 25 minutes. The time-matched control condition consisted of seated mobility exercises. Participants eligibility and safety were confirmed by a nurse and physiotherapist. The residents' mood was assessed pre and post using a visual analogue scale of emoticon faces and video recordings were evaluated for levels of apathy and engagement using validated methods. No differences between conditions were observed in pre and post mood measurements, engagement and apathy. There was a lack of response to environmental stimulation in the intervention compared to the control condition ($p=0.032$), due to lower scores in physical accessibility in the intervention ($p=0.012$). Thematic analysis of interviews with eight participants and the activities manager highlighted the immersive nature of the experience, enabling of reminiscence, and the importance of safety and preparation. The virtual cycling experience was found to be enjoyable, and an engaging feasible alternative to seated mobility exercises.

What is the return on investment of establishing Quality Improvement Collaboratives to improve Dementia Care?

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'Agents of Change' was a translational research trial that established a low cost, light touch Quality Improvement Collaborative (QIC) to increase adherence to recommendations from the Clinical Practice Guidelines for Dementia. In Australia on-line learning and collaboration with peers, researchers and experts aimed to reduce the costs normally associated with quality improvement collaboratives. Objectives: A cost benefit analysis (CBA) was used to compare the costs and benefits of the QIC, to inform decision makers of the return on investment that could be made by reducing costs and implementing clinical guidelines for dementia care at scale. Methods: Costs were identified from program records for establishment of the collaboratives, creation of the learning modules, the involvement of experts, researchers and time of participants. Benefits were identified using a willingness to pay questionnaire administered through telephone interviews with participants. Using a contingent valuation approach, a shadow price representing the benefits associated with the intervention was determined. CBA results over 18 months were presented as benefit-cost ratios (BCRs) -total discounted benefits of the quality improvement collaboratives divided by the total discounted costs of the project. Results: BCRs > 0 will be presented to indicate if the QIC was value for money. We hypothesise that the on-line nature of the QIC provided lower costs than comparable collaboratives while the coaching and access to experts enabled improvement to clinical practice. Scaling up the use of quality improvement collaboratives would increase the value of the intervention.

Improving dementia care for people with Intellectual Disability: Consensus results from a modified Delphi study.

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People with Down syndrome are at high risk of dementia, and those with other forms of intellectual disability (ID) may also experience dementia at younger ages compared with those without ID. Dementia care for people with ID lies at the intersection of the healthcare, ageing and disability sectors, and care pathways for this group can be difficult to navigate. The aim of this study was to explore potential improvements to care for people with ID and dementia, using a modified Delphi methodology. The Delphi technique aims to aggregate opinions from a small group of respondents through iterative surveys which provide controlled feedback from prior rounds. Methods: Participants were 20 professionals with at least two years' experience in both dementia and intellectual disability, drawn from a diverse range of disciplines and across multiple sectors. A series of open-ended questions elicited participants' opinions regarding current problems with service provision for people with ID living with dementia, as well as potential improvements. The statements generated were refined over 3 subsequent rounds. Consensus was defined as greater than 75% agreement, with small interquartile range and no inconsistent qualitative feedback. Results: Sixteen composite statements reached consensus. 100% of participants agreed that current service provision was inadequate. Agreed-upon improvements focused on capacity building for mainstream service providers, improved policy and funding arrangements, clearer referral pathways, and promoting cross-sector collaboration. Conclusion: Innovative approaches to improve service provision are required. The suggestions generated in this study can support advocacy and inform policy and service development.

Implementing a hospital-wide awareness program to improve outcomes for patients with cognitive impairment

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Around 30% of patients over 70 years of age experience Cognitive Impairment (CI) during hospitalisation. Patients with dementia in acute medical and surgical wards have 2.5 times the risk of an adverse event compared to patients without dementia. The Cognitive Impairment Support (CIS) Program is an all of hospital awareness program based on the Dementia Care in Hospitals Program. It aims to increase CI screening rates, embed a care pathway, use of an identifier, and a program to improve staff communication with patients. This research will explore the implementation of the CIS program and evaluate the impact on hospital acquired complications (HAC), healthcare cost per hospital episode, patient and carer satisfaction, staff knowledge and confidence in caring for patients with CI. Additionally, the feasibility and impact of concurrent implementation with other initiatives will be reported. An 18-month study will be conducted across acute care wards of a metropolitan hospital. A before and after design will measure incidence of one or more HACs: pneumonia, urinary tract infection, pressure injury, falls and/or delirium in patients experiencing CI. Secondary measures include constant patient observation, patient quality of life, carer satisfaction, staff knowledge and confidence, cost of health service utilisation, cost of the intervention and evaluation of implementation alongside other initiatives. Results will inform the implementation of the CIS program and other initiatives across Queensland health services and the impact implementation of this program has had on patient, staff and health service delivery outcomes.

Self-reported evidence-to-practice impacts via national workforce training and education in dementia

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Established in 2016, Dementia Training Australia (DTA) is funded by the Australian government to deliver a nationally consistent program of education and training for the workforce providing care and support for people living with dementia. In the first three years of operations, DTA provided 52,586 occasions of training, with 49% delivered via a purpose-built web portal (dta.com.au). The majority of participants were staff working in residential aged care (64.2%), followed by community care (21.1%), acute care (8.6%), and primary care (7.1%). Knowledge translation is a core DTA mission. This is realized through (a) ensuring content currency (with respect to best available evidence), and (b) participant follow-up via survey to measure impact on care practices. When contacted after training completion (3-months+), 99% of surveyed staff reported a positive knowledge transfer outcome, e.g. increased awareness of new ways to deliver care. Concerning practice impact, 95% of respondents self-reported at least one initial change in routine care practice, with 86% also indicating a sustained change in knowledge, attitude, or action. Overall, the majority of surveyed staff (96%) claimed that these knowledge transfer and practice change outcomes, attributed to DTA training, had also resulted in perceived improvements in the quality of care for people living with dementia. Notwithstanding potential biases in the self-report method of participant follow-up, there is emerging evidence that the DTA program is delivering measurable evidence-to-practice impacts in dementia care via national workforce training and education.

Translating human rights into practice through use of the Dignity in Care Questionnaire

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There's a lot of evidence that hospitals are hazardous for older people, and that includes the danger of indignity. Dignity is a Human Right1, a Health Care Right2 and an Aged Care Right3. More needs to be done to make sure older people, including people with dementia, do not experience a breach of these rights. More effort is required to measure translation of these rights into practice. The 10 Principles of Dignity in Care 4 align well to human, health and aged care rights. These principles undergird the UK's Dignity in Care Campaign. With the blessings and involvement of the UK's Dignity Council, I have developed a questionnaire based on the 10 Principles of Dignity in Care, for use by older people (and their family / friend) when they are in hospital. I worked with a Delphi panel of 57 experts (including 21 consumers) to determine the items to include in the questionnaire. The questionnaire demonstrates unidimensionality, validity and internal reliability, as assessed using Rasch analysis and Confirmatory Factor Analysis, with data from 277 patients and carers across four South Australian hospitals. Future plans include validation studies in aged care and disability services, because everybody has a right to dignity!

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What does self-management of dementia mean to family carers? A hybrid concept analysis

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Self-management is an important aim of support interventions for people with dementia and family carers. As dementia progresses, self-management of dementia increasingly becomes the responsibility of family carers. The effectiveness of these interventions is measured using distal measurements, and is not consistent nor conclusive. This indicates that the concept of self-management of dementia by family carers is not well understood and that these measurements may not necessarily be relevant to self-

management of dementia. Objective: To conceptualise self-management of dementia by family carers. Design: A hybrid concept analysis. Methods: The three phases of a hybrid concept analysis included: 1) theoretical phase which comprehensively explored the literature to develop a working definition of self-management of dementia by family carers; 2) fieldwork phase conducted a qualitative study with 7 family carers and 5 dementia experts; and 3) analytic phase extracted the findings from Phases 1 and 2 to yield the conceptual elements of self-management of dementia by family carers. Findings: Three major domains were identified for the concept of self-management of dementia by family carers: 1) managing the impact of dementia on care recipients (caregiving); 2) managing the impact of dementia on carers (self-care); and 3) managing the relationship between carers and their care recipients (taking care of the relationship). Conclusions: This rich description of what self-management of dementia mean to family carers can be used as a conceptual framework of self-management by carers. The study sheds lights in designing and evaluating self-management support interventions for family carers.

Validation of the Intimacy & Sexual Expression Preferences Tool: A Delphi Study

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Individuals' intimate relationships, sexual activity and expression of sexuality can change as a result of their dementia experience. Nevertheless, they can continue to engage in and develop new and meaningful relationships. Understanding and honouring preferences for expression of sexuality are fundamental in improving physical and sexual health, quality of life and psychosocial well-being for people with dementia. An innovative Intimacy & Sexual Expression Preferences (ISEP) tool was developed to assess preferences for the expression of sexuality that are relevant and important to people living with dementia. The ISEP tool was validated via a Delphi study (two rounds) with a panel of experts consisting of consumers (i.e. people living with dementia and family carers), health professionals, service providers and dementia researchers. This paper presents the newly developed ISEP tool and outcomes from the Delphi study. It also discusses plans for the implementation and evaluation of the ISEP tool to improve the care and support of people with dementia in long-term care settings from a person-centred approach. Knowledge gained from the ISEP tool will allow health professionals to extend care provision in a previously neglected area through the development and revision of guidelines for practice, such as care plans for people with dementia.

Translating research into care – an interdisciplinary student approach

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There is a considerable evidence showing the benefits of Cognitive Stimulation Therapy (CST) for people living with dementia. So how can we embed CST into practice? Aged care staff often learn by doing. We have developed an approach to knowledge translation engaging students as contributors to our learning. Traditional student placements aim to develop students' skills and knowledge to demonstrate competence to achieve a qualification. Helping Hand has pioneered a student placement approach that aims to do more than that i.e. to provide enhanced services for aged care residents at the same time as demonstrating new approaches to our staff. For example, our Helping Hand facilitators support Speech Pathology, Social Work and Occupational Therapy students to develop and run our CST group sessions to older people living with mild to moderate dementia related illness. Students report on weekly outcomes and group outcome reports are shared with the residential site. Site staff work alongside the students and benefit from watching how the Groups are run and learning more about CST. This initiative is supported by Helping Hand's Student Participation Program, an industry-leading approach to engaging students both as learners and contributors while on placement. This presentation will: provide a brief overview of our Student Participation approach, describe how this initiative was developed and implemented, demonstrate the outcomes for residents in terms of communication and socialisation skills and demonstrate the outcomes for students in learning how to work with older people living with dementia.

Toward the development of Vietnam's national dementia plan – the situational analysis

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Objective: To examine barriers and opportunities for improving dementia care, treatment and support in Vietnam. Method: A desk review was conducted, collecting key WHO Global Dementia Observatory indicators. Results: Vietnam has a high level institutional and policy framework on aging, non-communicable diseases (NCD), mental health and disability including the 2009 Law on the Elderly, which provides the legal umbrella for policies on older people. However, no dementia-specific policy exists. Rapid aging significantly contributes to the explosion of dementia in Vietnam with 660,000 Vietnamese people estimated to be living with dementia and resultant dementia related costs of US$ 960 million. The healthcare system is not yet prepared for the shift to NCD from an acute, communicable disease burden. Health service delivery is hospital-centric, with over-reliance on hospitals and under-utilization of primary care system that in turn is fragmented and poorly prepared to address the rising challenge of dementia. Social care and support specific for dementia is lacking although there is an impressive grassroots organisation of older people with nearly 100,000 branches. Conclusion: To allow for a more harmonized response across the health sector and more effective use of limited resources, an integrated national action plan for dementia is sensible. However, Vietnam should take into consideration the potential for fragmentation and lack of dedicated resources being allocated to dementia. A new, integrated model of care focusing on a stronger primary healthcare system, community-based social care and a healthy aging approach is needed to improve dementia prevention, care, treatment and support in Vietnam.

What are the top 10 unanswered questions about medicines in people living with dementia?

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Quality Use of Medicines (QUM) means using medicines safely and effectively to get the best possible health outcomes. It also means only using medicines when they are needed. People living with dementia represent the diverse adult health population, having multiple other medical conditions and from all socio-cultural backgrounds. There are many potential areas of research that could improve QUM for people with dementia. Aim: To identify the top 10 unanswered QUM questions for people living with dementia. These questions will be generated and prioritised by Australians living with dementia, carers, and health care providers (clinicians). Method: We will determine priorities using a multi-step research process. A national survey conducted with stakeholders and championed by a stakeholder Steering Group will determine what questions participants have had about medicines and dementia. These questions will be checked to determine if there is already an 'answer' – that is, has high quality research already been done? A second survey followed by a workshop will prioritise the unanswered questions, resulting in a top 10 list. Significance: In the past, research questions have been led by drug companies or researchers, with little involvement of clinicians and consumers. This project will determine which questions are important to people living with dementia and their care team and ensure that outcomes of research are directly relevant to the care of people living with dementia. This will lead to improving how medicines are used which in turn will

improve health outcomes in people living with dementia.

Social Connectedness upon Relocation to Residential Care

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Relocation to a residential aged care facility [RACF] can lead to the disruption of usual social connections for older adults. Of those who move into permanent care, over half are living with dementia. While there has been a shift away from the conventional medical model of care to a person-centred care approach, this has been difficult to translate into practice. Physical safety and clinical care needs, while important, are typically seen as the priority. However, maintaining meaningful connections with others such as family, friends and the community, has been described by people living with and without dementia as a fundamental need upon relocation. This presentation will describe a study protocol for PhD research that aims to undertake an in-depth exploration of how social connectedness is maintained, or otherwise, upon relocation to a RACF. Participants will include people with or without dementia, family members or friends, and staff across three aged care sites in Southern Tasmania. Data will be collected via multiple sources (semi-structured interviews, document analysis and participant observation), utilising an inductive qualitative case study approach across three time-points (0 months: upon relocation; 3 and 6 months: post-relocation). Findings from this research will inform recommendations which may have a positive impact on the health and wellbeing of older adults relocating to permanent care. Increasing awareness of the importance of maintaining social connectedness upon relocation may improve the transition process and may identify ways to translate person-centred care into practice, ensuring a high quality and individualised approach to care.

Transitions and time travel: Transition types and transitional support for people with late stage dementia?

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The concept of transition is often used in health and life course research to understand a significant movement from one state or place to another. While people with dementia experience more major health transitions than their peers (1), people with dementia are often excluded from transitional care research (2). The Australian study, Connection for Life with Dementia: Care connections, set out to develop transitional supports for people with late stage dementia moving from one residential aged care facility to another. However, through the use of Participatory Action Research with people with late stage dementia, it became clear that participants required support around every day or micro transitions. Five types of micro-transitions needed support: physical transitions; social transitions (entering or exiting interactions); activity transitions (moving between activities); relational transitions (moving between different roles); and temporal transitions (moving between different times of day and different times in the past). To support micro-transitions personalised transitional objects were developed. While these transitional objects proved useful in the macro transition (from one residential aged care facility to another), it is how they were used by people with late stage dementia to smooth and manage everyday transitions which became more meaningful for them, staff and carers.

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2. Hirschman KBPMSW, Hodgson NAPRNF. Evidence-Based Interventions for Transitions in Care for Individuals Living With Dementia. The Gerontologist. 2018;58.

Perspectives of professionals during care transitions for people with dementia: systematic review of qualitative studies

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The complexity of dementia care makes navigating transitions in care locations challenging and poses risks of miscommunication and fragmentation in continuity of care. The aim of this review was to describe perspectives of healthcare providers on the transitions of care for people with dementia. Methods: MEDLINE, Embase, PsycINFO and CINAHL were searched from inception to August 2019. Thematic synthesis was used to analyse results. Results: Thirteen studies involving 259 professional care staff from seven countries were included. Five studies examined transitions out of community care, three studies focussed on discharge from acute care, and five studies were about transitions from long-term care facilities. Three themes were identified: insufficient information exchange (limited medication history, frustrated by withheld knowledge, valuable insights from family caregivers); constrained by inadequate resources (under pressure to discharge, lacking dementia-specific training, overstretched and undermined); and accountability in safeguarding wellbeing (prioritising safety of person with dementia, minimising unwarranted changes in care, transparency and preparedness, alleviating emotional burden on family, ensuring capacity to meet needs). Conclusion: Healthcare providers for people with dementia feel a strong sense of accountability for care transitions but are frustrated by insufficient communication and resources impeding the transition process. More research is needed to develop strategies to facilitate information exchange within the care network for people with dementia.

Building the capacity of the Australian aged care workforce to translate evidence into practice

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Contemporary dementia practice needs the right environment, the right catalyst and the right knowledge to flourish. These elements are addressed through the Dementia Training Australia (DTA) Fellowship program. This presentation will describe how the design of the Fellowship program in its current form was informed by the evaluation of the Advancing Practice in Dementia Care National Practice Improvement Program (NPIP). The aim of the NPIP program was to build the capacity of residential aged care sector health care professionals to facilitate knowledge translation and lead effective and sustainable change. These leaders, named 'Fellows' were provided with access to evidence-based resources, support from an external mentor, oversight from a senior manager within their organisation and a $5,000 stipend. Twenty Fellows were each tasked with implementing practice change in one of four critical care areas: medication management, sexuality and dementia, environmental design and the behavioural and psychological symptoms of dementia. The NPIP program evaluation affirmed the need for a multimodal approach to support the acquisition, dissemination and transfer of new knowledge into workplace practice to achieve positive outcomes for people with dementia. The factors that appeared to have the greatest impact were: staff or team ownership of change, involvement of residents and family, support from an external mentor, support from the organisation's executive team, alignment of the practice change with the organisation's strategic direction.

The results of the NPIP program evaluation provided an evidence base for the structure of DTA's current Fellowship program which now successfully facilitates knowledge translation.

AUSTRALIAN DEMENTIA FORUM 2020

DEMENTIA RESEARCH: INNOVATION, DISCOVERY AND TRANSLATION

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