

# Indigenous children's oral health: Case Study

Tooth decay (caries) remains one of the most common health problems for both adults and children in Australia. Collaborative research in oral health is delivering improved basic health outcomes to the most disadvantaged Australians, including Indigenous children. NHMRC-funded researchers from the Australian Research Centre for Population Oral Health (ARCPHO) at The University of Adelaide have developed and trialled oral health promotion activities and a variety of preventive practices. ARCPHO's work has been positively influencing both public health policy and dental service delivery, and is benefitting Indigenous children and their families.



## Origin

A range of factors, including a person's access to dental services, socio-economic background, place of residence (urban vs rural/remote) and the costs of dental treatment, influence oral health. Tooth brushing, nutrition, access to fluoridated water, sugar consumption and smoking also impact oral health outcomes.

Historically, oral diseases were almost unknown among Indigenous Australians. In the 1970s, reports noted the low levels of dental caries of Indigenous children compared with other Australian children. This was largely due to the lack of sugar in traditional diets.

Nearly 50 years later, Indigenous children experience dental caries at rates that are 1.5-2.5 times higher than the national average and have a twofold increased risk of being hospitalised due to oral health conditions. This discrepancy has implications for the quality of life and chronic disease burdens for Indigenous children in adulthood.

NHMRC-funded researchers, including Professor Lisa Jamieson, Dr Kostas Kapellas and Dr Peter Arrow, are engaging with Indigenous communities to develop evidence-based public health policy and dental service delivery strategies to reduce this health inequality.

### ARCPHO Indigenous collaboration

Indigenous communities across Australia have reached out to ARCPHO for collaborations and research translation opportunities. Indigenous collaborators have ownership of the study designs and data-driven processes, and ARCPHO's findings are disseminated back to these communities and translated through culturally-safe policy change.

## Grants and Investment

NHMRC has established three Centres of Research Excellence (CREs) in oral health and has supported a number of ARCPHO lead researchers and their collaborators including:

### Professor Kaye Roberts-Thomson

- Project Grant (PG): 2001, 2008, 2011
- Targeted Call for Research (TCR): 2002

### Professor Lisa Jamieson

- Early Career Fellowship (ECF): 2005
- Career Development Fellowship (CDF): 2009, 2013
- PG: 2010 (x2), 2015, 2017
- International Partnership (IP): 2010
- Research Fellowship (RF): 2018
- TCR: 2019

### Professor Loc Do

- PG: 2007, 2009, 2013, 2018, 2019
- CDF: 2012
- Ideas Grant: 2020

### Dr Kostas Kapellas

- ECF: 2016

### Dr Peter Arrow

- PG: 2017

### Professor Peter Morris

- PG: 2005

### Professor Newell Johnson

- PG: 2015

### Professor Gary Slade

- PG: 2004, 2005
- CRE: 2005



Credit: ARCPHO

## Research and Collaborations

Researchers such as Ms Joanne Hedges, senior Aboriginal research officer at ARCPHO's Indigenous Oral Health Unit (IOHU), help build relationships, foster engagement and facilitate acceptance in the Indigenous community.

Jamieson and her team worked with communities in South Australia to develop an oral health promotion initiative to reduce children's experience of dental disease at age 2 years. This included providing services to pregnant mothers of Indigenous children. Follow-up occurred at child ages 3, 5, 7 and 9 years.

Morris worked with researchers from ARCPHO (led by Professors Gary Slade and Kaye Roberts-Thomson) so that a Darwin-based team could repeatedly apply fluoride directly to the teeth of young Indigenous children in the Northern Territory (NT). This was done in combination with training for health staff, health promotion campaigns, and support for clinic, school and store programs to encourage tooth brushing and drinking water.

Arrow, working with Indigenous children and in partnership with the Kimberley Aboriginal Medical Service and ARCPHO researchers, tested a new intervention known as atraumatic restorative techniques (ART). ART can eradicate active dental caries without the use of drilling and filling, or the need for hospital-based dental anaesthetic.

Professor Newell Johnson and several ARCPHO researchers implemented a 'big bang' intervention (annual placement of fissure sealants, application of povidone-iodine and fluoride varnish) and cost-effectiveness trial to prevent early-childhood caries among Indigenous children in Far North Queensland.

In 2011, NHMRC funded the first National Child Oral Health Study (NCOHS). Conducted in 2012-14, it involved researchers at The University of Adelaide and in every Australian state and territory health authority.

## Results and Translation

Jamieson's research has shown that the provision of dental care to pregnant women, application of fluoride varnish to teeth of children at ages 6, 12 and 18 months, anticipatory guidance and motivational interviewing were effective in reducing dental caries when children were 2 years of age and that this benefit persisted at ages 3 and 5 years.

When Morris and his team compared the teeth of children treated with fluoride with children in other communities randomly assigned to routine care, they found up to 36% fewer cavities. Researchers recommended local health staff in remote Indigenous communities receive training and support in the delivery of a comprehensive program to prevent dental caries.

Professor Roberts-Thomson's research showed that silver fluoride was well received by the Indigenous community, easy to implement and at least as effective a treatment as ART for dental caries in primary molars among Indigenous children in remote locations.

Dr Peter Arrow's ART-based approach, trialled successfully with non-Indigenous children in Western Australia, resulted in improved child oral health-related quality of life and fewer referrals for expensive and time-consuming travel for hospital-based care under a dental anaesthetic. A study with Indigenous children was recently completed.

The 'big bang' intervention, led by Professor Newell Johnson, showed that community buy-in and acceptance are crucial, and that a 'fly-in, fly-out' approach to applying intense and varied preventive treatments results in reduced dental disease levels.

Professor Loc Do co-edited the 2016 *Oral Health of Australian Children* report, which was based on NCOHS data. The report identifies a variety of factors, including at the family and community levels, relevant to improving child oral health.

## Health Outcomes and Impact

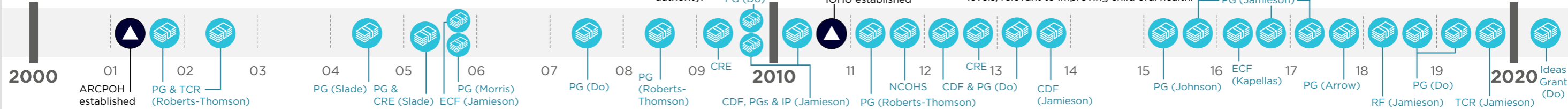
NHMRC-funded research by ARCPHO has led to the following improvements:

### Better treatments and outcomes

- The NT Government undertook programs putting Morris's findings into practice.
- ARCPHO's interventions with Indigenous women and their children have helped prevent dental disease among children in both metropolitan and non-urban settings.
- An ART-based approach was effective in eradicating active dental caries in regional/remote-dwelling Indigenous children.
- Silver fluoride varnish application helped arrest dental caries in remote-dwelling Indigenous children with no regular access to dental care.
- Remote Indigenous children who received the 'big bang' intervention experienced fewer carious lesions at the 2-year follow-up, compared to children who did not receive this intervention - a protective factor of 23%. It has proven cost-effective in preventing disease and improving quality of life.

### Improved understanding

- NCOHS found that the prevalence of untreated caries and missing teeth in the primary dentition in Indigenous children was related to parental education, household income and reason for last dental visit.
- Building capacity of Indigenous health workers in Aboriginal Community Controlled Health Organisations through training programs in oral health aids better oral health outcomes.
- Cultural competency training programs in the curriculum of dental teaching institutions can help increase understanding and combat misconceptions about Indigenous culture.



## Professor Lisa Jamieson

Professor Lisa Jamieson is an NHMRC Senior Research Fellow at ARCPHO and Director of the IOHU at The University of Adelaide. Her work focuses on Indigenous oral health including in the areas of childhood caries, periodontal disease and the connection between oral health and risks of cardiovascular and chronic kidney diseases in adults. Professor Jamieson's work has informed the development of national Indigenous oral health and dental services policy in Australia. Internationally, Professor Jamieson has undertaken National Institutes of Health funded research on the oral health of Native American child populations.

## Prof Kaye Roberts-Thomson

Professor Kaye Roberts-Thomson was professor in dentistry at The University of Adelaide. She is Adjunct Professor at ARCPHO and was formerly its Director (2011-2014).

## Professor Loc Do

Professor Loc Do is a dentist and oral epidemiologist at The University of Queensland with a special interest in social and clinical oral epidemiology. In 2017 he received the EW Borrow Memorial Award from the International Association for Dental Research (IADR).

## Ms Joanne Hedges

Ms Joanne Hedges has been a senior Aboriginal research officer in ARCPHO since 2011. She trains students and staff within IOHU, ARCPHO, The Adelaide Dental School and the wider University faculty to develop Indigenous cultural competence.

## Dr Kostas Kapellas

Dr Kostas Kapellas is a research officer at ARCPHO and Deputy Director of IOHU. His research interests include the influence of periodontal diseases on cardiovascular disease and diabetes.

## Dr Peter Arrow

Dr Peter Arrow is a dental officer involved in research and evaluation for the Dental Health Services, Health Department of Western Australia. He is also a Visiting Adjunct Senior Lecturer at The University of Adelaide, and has been a Senior Research Fellow at ARCPHO.

## Professor Peter Morris

Professor Peter Morris is Deputy Head, Child Health Division, at the Menzies School of Health Research. He is a hospital clinician and visiting paediatrician to the Tiwi Islands.

## Professor Newell Johnson

Professor Newell Johnson is Emeritus Professor of Dental Research at Griffith University. He received the 2019 IADR Global Oral Health Research Award for his work in the field of oral health.

## Dr Gary Slade

Dr Gary Slade is John W. Stamm Distinguished Professor at the School of Dentistry, University of North Carolina, and former Professor of Oral Epidemiology at ARCPHO. He received the 2008 IADR H. Trendley Dean Memorial Award.

## ARCPHO

ARCPHO was established at The University of Adelaide in 2001 to undertake research and research training in population oral health. ARCPHO researchers collaborate with Australian universities and those in the United States, New Zealand, Canada and Brazil on early intervention strategies to improve Indigenous oral health. IOHU was launched in May 2011 to focus specifically on the oral health of Indigenous Australians, continuing and expanding on the work already carried out by ARCPHO. Guided by IOHU's Indigenous Advisory Committee, all projects have Indigenous participation as either researchers, students and/or consultants.



Australian Government  
National Health and  
Medical Research Council



## References

This case study was developed in partnership with ARCPOH at The University of Adelaide.

The information and images from which Impact Case Studies are produced may be obtained from a number of sources including our case study partner(s), NHMRC's internal records and publicly available materials.

The following sources were used for this case study:

- Arrow P, Forrest H. Atraumatic restorative treatments improve child oral health-related quality of life: A noninferiority randomized controlled trial. *Community Dentistry and Oral Epidemiology*. 2020 Aug;44(4):349-356. DOI: <https://doi.org/10.1111/cdoe.12539>
- Arrow P, Piggott S, Carter R, McPhee D, Atkinson T, Maclean S, et al. Atraumatic Restorative Treatments in Australian Aboriginal Communities: A Cluster-randomized Trial. *JDR Clinical and Translational Research*. 2020 Oct. DOI: <https://doi.org/10.1177/2380084420963949>
- Australian Research Centre for Population Oral Health, The University of Adelaide, South Australia. Oral health of Aboriginal Australians. *Australian Dental Journal*. 2004;49(3):151-153
- Jamieson L, Roberts-Thomson KF. Indigenous children and receipt of hospital dental care in Australia. *International Journal of Paediatric Dentistry*. 2006 Sep;16(5):327-334. DOI: <https://doi.org/10.1111/j.1365-263X.2006.00749.x>
- Jamieson L, Smithers L, Hedges J, Parker E, Mills H, Kapellas K, et al. Dental Disease Outcomes Following a 2-Year Oral Health Promotion Program for Australian Aboriginal Children and Their Families: A 2-Arm Parallel, Single-blind, Randomised Controlled Trial. *EClinicalMedicine*. 2018 Jul;1:43-50
- Lalloo R, Tadakamadla SK, Kroon J, Jamieson LM, Ware RS, Johnson NW. Carious lesions in permanent dentitions are reduced in remote Indigenous Australian children taking part in a non-randomised preventive trial. *PLoS ONE*. 2021 Jan;16(1): e0244927. DOI: [10.1371/journal.pone.0244927](https://doi.org/10.1371/journal.pone.0244927)
- Manton DJ, Foley M, Gikas A, Ivanoski S, McCullogh M, Peres MA, et al. Australia's oral health tracker: Technical paper. Australian Health Policy Collaboration. Victoria University, Melbourne. 2018 Feb
- Oral Health Monitoring Group. Healthy mouths, healthy lives: Australia's National Oral Health Plan 2015 - 2024. Canberra: COAG Health Council. 2016
- Roberts-Thomson KF, Kapellas K, Ha DH, Jamieson LM, Arrow P, Do LG. Oral health status and behaviours of Indigenous Australian children. In: *Oral health of Australian children: The National Child Oral Health Study 2012-14*. Do LG, Spenser AJ, editors. Adelaide: University of Adelaide Press; 2016. p.264-287. DOI: [10.20851/ncohs-10](https://doi.org/10.20851/ncohs-10)
- Rogers J, Adams GG, Wright F, Roberts-Thomson K, Morgan MV. Reducing Potentially Preventable Dental Hospitalizations of Young Children: A Community-Level Analysis. *JDR Clinical & Translational Research*. 2018 Mar;3. 238008441876431. DOI: [10.1177/2380084418764312](https://doi.org/10.1177/2380084418764312)
- Slade GD, Bailie RS, Roberts-Thomson K, Leach AJ, Raye I, Endean C, et al. Effect of health promotion and fluoride varnish on dental caries among Australian Aboriginal children: results from a community-randomized controlled trial. *Community Dent Oral Epidemiol*. 2011 Feb;39:29-43. DOI: [10.1111/j.1600-0528.2010.00561.x](https://doi.org/10.1111/j.1600-0528.2010.00561.x)

### Notes

\* from title on front page: 'Indigenous' refers to Aboriginal and Torres Strait Islander

## Partner



THE UNIVERSITY  
of ADELAIDE