

Women's Reproductive Health (InterLACE): Case Study

The *International collaboration for a Life course Approach to reproductive health and Chronic disease Events* (InterLACE) is an international research collaboration on women's reproductive health that includes the *Australian Longitudinal Study on Women's Health* (ALSWH) as a core dataset. InterLACE has provided detailed and robust evidence on reproductive characteristics and disease risk factors across global populations, and is contributing to preventive strategies and targeted approaches to women's health.



Origin

Chronic diseases like diabetes and cardiovascular disease are typically characterised by long latency and complex causal pathways, with clear sex differences in risk for these diseases. This highlights the need to understand the role of reproductive characteristics and sex hormones in chronic diseases across life.

InterLACE commenced in June 2012. It drew on data from ALSWH—also known as Women's Health Australia—a longitudinal survey of over 57,000 women in three cohorts who were aged 18-23, 45-50 and 70-75 when surveys began in 1996.

InterLACE initially comprised individual-level data from 200,000 women from 13 studies on women's health, with a study profile published in 2013. As the project became more established, numerous studies subsequently joined the collaboration, including the UK Biobank and the China Kadoorie Biobank.

The combined and harmonised dataset enables the study to generate robust evidence across population groups for a more targeted approach to women's health and preventive strategies to reduce chronic disease risk.



International collaboration for a Life course Approach to reproductive health and Chronic disease Events.

Grants and Investments

The Australian Government Department of Health has funded ALSWH since 1996. Out of the capability built by support for ALSWH, key investigators conceived of and received support for the InterLACE international study.

NHMRC
NHMRC has supported key InterLACE researchers over their careers.

Professor Gita Mishra

- Project Grants: 2012, 2014, 2017
- Principal Research Fellowship: 2017
- Centre of Research Excellence on Women and Non-communicable Disease (CREWaND): 2019

Professor Annette Dobson

- Project Grants: 1988, 1993, 2000, 2003
- Targeted Calls for Research: 2002, 2006
- Centre of Research Excellence in Women's Health in the 21st Century (CREWH21): 2010
- Boosting Dementia Research Initiative: 2019

Professor Debra Anderson

- Partnership Project: 2013

Dr Nirmala Pandeya

- Postgraduate Scholarship: 2006
- Early Career Fellowship: 2010

Other funding

- ARC Future Fellowship (Mishra): 2013
- Commonwealth Scholarship Commission, UK
- Funds for the promotion of Joint International Research, Japan Society for the Promotion of Science

Collaborations/Partnerships

InterLACE undertakes cross-cohort research by pooling individual-level data from more than 800,000 women from 26 observational studies across 11 countries to advance understanding of reproductive health across the life course in relation to chronic disease risk.

Key collaborations include:

Australia

The Melbourne Collaborative Cohort Study and Healthy Ageing of Women Study.

United Kingdom

Medical Research Council National Survey of Health and Development, National Child Development Study, 1970 British Cohort Study, English Longitudinal Study of Ageing, UK Women's Cohort Study, Whitehall II Study, Southall And Brent Revisited, UK Biobank.

United States of America

Study of Women's Health across the Nation, Seattle Midlife Women's Health Study, and Decisions at Menopause Study (USA, Lebanon, Spain and Morocco).

Others

Danish Nurse Cohort Study, Women's Lifestyle and Health Study (Sweden), French Three-City Study, Japanese Nurse's Health Study, China Kadoorie Biobank.

InterLACE consortium members contribute data on socio-demographic and lifestyle factors, female reproductive characteristics and chronic disease outcomes, and co-author InterLACE research papers.

Research and Translation

The InterLACE study has shown that the timing of reproductive events is linked to the risk of adverse hormone-related outcomes for women.

Data show that, for more recent generations, age at menarche (first menstrual period) has declined progressively by almost one year and age at first birth has increased by two and a half years. Women with early menarche:

- who have never had children have an increased risk—over five fold—of premature menopause (before age 40 years)
- are at higher risk of type 2 diabetes; the effect is only apparent among those who are overweight or obese in midlife.

Premature and Early Menopause

Weight affects menopause—underweight women are twice as likely to have early menopause and those overweight are 50% more likely to have late menopause.

Smoking is associated with an increased risk of early menopause, but smokers who quit smoking for more than ten years prior to the menopause can minimise this risk.

Women with premature menopause have nearly a two-fold increased risk of experiencing a non-fatal cardiovascular disease event before the age of 60 years.

Translation and dissemination activities have involved the collaboration of major international agencies. Australian investigators on InterLACE are also working closely both with national women's health organisations and the Department of Health.

Outcomes and Impact

Benchmarking the reproductive characteristics of different groups of women helps us to understand not only their reproductive health needs today, but also their risk of chronic diseases in later life. This is essential to developing preventive strategies for targeted approaches to women's health and understanding intervention points across the life course.

Findings from the InterLACE study have informed practice and policy and have improved research. Some examples are:

Informing Practice

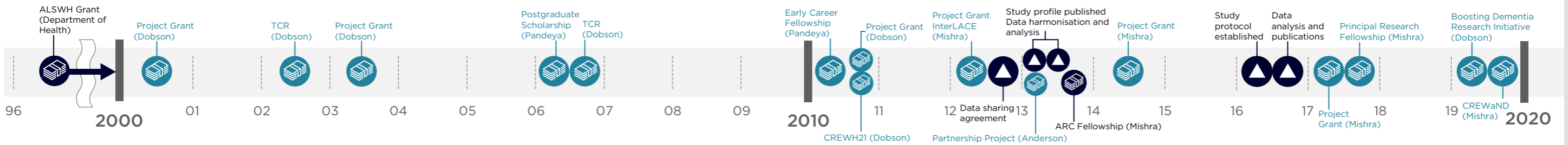
- Contribution to the European Menopause and Andropause Society (EMAS) position statement on the predictors of premature and early natural menopause

Informing Policy

- Input into the development of the National Women's Health Strategy 2020-2030, particularly in the priority areas of maternal, sexual and reproductive health and healthy ageing

Improving Research

- Establishment of data harmonisation protocols and guidance for future multi-cohort studies. Standardisation of study methods will become increasingly important to enhance the value of studies of women's health in low- and middle-income countries, and where currently there are manifest gaps in knowledge.



Professor Gita Mishra

Professor Gita Mishra is an NHMRC Principal Research Fellow, Professor of Life Course Epidemiology and the Director of ALSWH at the School of Public Health, The University of Queensland (UQ). She has held positions as Senior Research Scientist and as Program Leader at Medical Research Council units at Cambridge and University College London and is internationally recognised for her contribution to research on life course epidemiology and women's health. Professor Mishra leads the InterLACE consortium.

Professor Annette Dobson

Professor Annette Dobson is Professor of Biostatistics and Director of the Centre for Longitudinal and Life Course Research at the School of Public Health, UQ. She was the founding Director of ALSWH and led the NHMRC funded CREWH21 which built on ALSWH, including extensive record linkage of survey data to administrative health datasets. She has also led large scale, long term epidemiological studies and is internationally recognised for her expertise in statistical modelling.

Professor Debra Anderson

Professor Debra Anderson is Associate Dean Research in the Faculty of Health at the University of Technology Sydney and Director and Founder of the Women's Wellness Research Program. She was formerly the Head, School of Nursing and Midwifery at Griffith University and the Director of Research at the School of Nursing, Queensland University of Technology. She is a leader in the field of women's health research, a collaborator in ALSWH and a chief investigator in the InterLACE consortium.

Dr Hsin-Fang Chung

Dr Hsin-Fang Chung is a Research Fellow at the Centre for Longitudinal and Life Course Research in the School of Public Health at UQ. She has been involved in the InterLACE consortium since 2015 and has substantial experience with data harmonisation, analysing pooled datasets and conducting cross-cohort investigations of female reproductive factors across the life course. Her current research focus is on women's health and non-communicable diseases, as well as nutrition and biomedical research.

Dr Nirmala Pandeya

Dr Nirmala Pandeya is a senior research officer in the Cancer Control Group, QIMR Berghofer Medical Research Institute and adjunct senior lecturer at the School of Public Health, UQ. Her research focuses on methodological aspects of modelling environmental exposures. She has collaborated in research on cancer and modifiable risk factors through the International Agency for Research on Cancer and a commissioned project through Cancer Council Australia.

Dr Dongshan Zhu

Dr Dongshan Zhu recently completed his PhD from the School of Public Health at UQ using InterLACE data. His PhD thesis was on women's reproductive health across life and the risk of cardiovascular disease in later life. Before he pursued his PhD degree, he was a Research Fellow at the George Institute for Global Health, where he worked on the diabetes control program for Chinese patients.