

Australian Longitudinal Study on Women's Health



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Introduction

Funded by the Australian Government Department of Health since 1995, the Australian Longitudinal Study on Women's Health (ALSWH) assesses women's physical and mental health, as well as socio-demographic and lifestyle factors, and their use of health services. The Study is a national research resource, and since its inception has provided an evidence base to the government and other decision-making bodies within Australia for the development and evaluation of policy and practice in many areas of service delivery that affect women.

ALSWH now involves more than 55,000 women in four cohorts that encompass the adult lifespan:

- Young women born 1989-95 (now aged 23-29 in 2018)
- Women born 1973-78 (now aged 40-45)
- Women born 1946-51 (now aged 67-72)
- Women born 1921-26 (now aged 92-97)

ALSWH strongly supports the use of linked data in health services research to provide evidence for evaluation of the use and impact of health services. Study data is currently linked with data from national administrative datasets (e.g., Medicare Benefits Schedule, Pharmaceutical Benefits Scheme, National Death Index, and Aged Care) as well as state/territory datasets (e.g., hospital admissions, perinatal data, and cancer registries).

This report outlines the Study's progress and achievements during 2018.

Directors Report

During the year, the 1989-95 cohort received their fifth survey, and women in the oldest cohort continued to receive surveys at six-monthly intervals, with surveys sent in May and November. A major report examining caring was prepared during the year for the Australian Government Department of Health. The report, 'From child care to elder care: Findings from the Australian Longitudinal Study on Women's Health' is available on the Study <u>website</u>, and a summary is included in this report.

Anonymised ALSWH data are available for research use. Over fifty new projects using ALSWH data, including some with linked administrative data, involving national and international collaborators began during the year. Over 70 peer-reviewed scientific papers, on all aspects of women's health, were published or accepted for publication, and over 50 presentations were made at national and international conferences. Findings from the ALSWH continue to be used to support policy development and review across different levels of government, for instance, in our submissions to three separate Senate Inquiries during the year (which are listed in this report).

Throughout the year we have continued to maintain and enhance data quality and documentation. We have also continued to work on developing our linked data capacity and improving access to linked data. ALSWH data and linked administrative data (where the custodians have approved) are now available via the Sax Institute's cloud-based Secure Unified Research Environment (SURE), and dedicated facilities for accessing linked data are also available at the University of Queensland and the University of Newcastle.

We would like to thank the Department of Health for their ongoing support of the Study, our colleagues for all their hard work, and the women who have continued their participation in the research over the last 23 years.

Professor Gita Mishra Professor Julie Byles



Study Management Committee

Professor Julie Byles

BMed, PhD Director Australian Longitudinal Study on Women's Health Research Centre for Generational Health and Ageing The University of Newcastle

Professor Gita Mishra

BSc, MSc, PhD Director Australian Longitudinal Study on Women's Health School of Public Health The University of Queensland

Associate Professor Leigh Tooth

BOccThy (Hons), PhD Deputy Director Australian Longitudinal Study on Women's Health School of Public Health The University of Queensland

Professor Deborah Loxton

B Psych (Hons), Dip Mgt, PhD Deputy Director Australian Longitudinal Study on Women's Health Research Centre for Generational Health and Ageing The University of Newcastle

Collaborators and Investigators

This list includes the first named investigator or collaborator from all currently active projects using ALSWH data. For further information, please <u>visit the ALSWH website</u>.

Dr Shazia Abbas Research Centre for Generational Health and Ageing, The University of Newcastle

Prof Rosa Alati Institute for Social Science Research, The University of Queensland

Dr Amani Hamad Alhazmi King Khalid University, Saudi Arabia

Prof Marie-Paule Austin Perinatal and Women's Mental Health, University of New South Wales

Grace Baxter School of Public Health, The University of Queensland

Dr Alissa Beath Macquarie University

Kassia Beetham Australian Catholic University

Christie Bennett School of Clinical Sciences, Monash University

Jason Brandrup Health Analytics Branch, Australian Government Department of Health

Prof Wendy Brown School of Human Movement and Nutrition Sciences, The University of Queensland

Dr Leanne Brown The University of Newcastle

Meredith Burgess Institute of Social Science Research, The University of Queensland Amee Maret Buziau Wageningen University and Research

Prof Julie Byles Centre for Generational Health and Ageing, The University of Newcastle

Prof Janet Cade School of Food Science and Nutrition, University of Leeds

Dr Denton Callander Kirby Institute, University of New South Wales

Alice Campbell Institute for Social Science Research, The University of Queensland

Sifan Cao School of Public Health, The University of Queensland

Dr Monica Cations Flinders University

Dr Sungwon Chang University Technology Sydney

A/Prof Karen Charlton School of Medicine, University of Wollongong

Dr Catherine Chojenta Research Centre for Generational Health and Ageing, The University of Newcastle

Dr Hsin-Fang (Evelyn) Chung Centre for Longitudinal and Life Course Research, The University of Queensland

Prof Flavia Cicuttini Department of Epidemiology and Preventive Medicine, Monash University

Prof Lindy Clemson Faculty of Health Sciences, The University of Sydney

Prof Clare Collins School of Health Sciences (Nutrition and Dietetics), The University of Newcastle

Dr Jacqueline Coombe Melbourne School of Population and Global Health, The University of Melbourne

Tessa Copp School of Public Health, The University of Sydney

A/Prof Reinie Cordier

Faculty of Health Sciences, Curtin University

Prof Hugh Craig

School of Humanities & Social Sciences, The University of Newcastle

Cassie Curryer

Research Centre for Generational Health and Ageing; ARC Centre for Excellence in Population Ageing Research (CEPAR), The University of Newcastle

Veerle Dam Julius Centre, University Medical Center Utrecht, The Netherlands

Prof Annette Dobson

Centre for Longitudinal and Life Course Research, The University of Queensland

Dr Xenia Dolja-Gore

Research Centre for Generational Health and Ageing, The University of Newcastle

Dr Katherine Downing Institute for Physical Activity and Nutrition (IPAN), Deakin University

A/Prof Mitch Duncan

School of Medicine and Public Health, The University of Newcastle

A/Prof Leah East University of New England

Dr Anastasia Ejova Department of Psychology, The University of Auckland

Dr Christina Ekegren School of Public Health and Preventive Medicine, Monash University

Dr Roger Engel Macquarie University

Dr Renae Fernandez Paediatrics and Reproductive Health, The University of Adelaide

Prof Jane Fisher School of Public Health and Preventive Medicine, Monash University

Dr Lisa Fitzgerald School of Public Health, The University of Queensland

Dr Cynthia Forlini

Sydney Health Ethics, The University of Sydney

Dr Lyn Francis Western Sydney University

Dr Rosanne Freak-Poli Monash University

Dr Paul Gardiner Centre for Research in Geriatric Medicine, The University of Queensland

Dr Gerrie-Cor Gast National Institute for Public Health and the Environment, The Netherlands

Dereje Gedle Gete School of Public Health, The University of Queensland

Dr Ellie Gresham Health Intelligence Unit, NSW Health

Alison Griffin School of Public Health, The University of Queensland

Dr Megan Gu Centre for Economic Research and Evaluation, University Technology Sydney

Dr Melissa Harris Research Centre for Generational Health and Ageing, The University of Newcastle

Prof James Hebert Cancer Prevention and Control Program, University of South Carolina

Prof Isabel Higgins Research Centre for Generational Health and Ageing, The University of Newcastle

Dr Briony Hill Monash Centre for Health Research and Implementation, Monash University

Dr Madeleine Hinwood School of Medicine and Public Health, The University of Newcastle

Marlise Hofer University of British Columbia

Dr Libby Holden School of Psychology, The University of Queensland

Carl Holder Clinical Research Design & Statistics, Hunter Medical Research Institute Dr Alexis Hure School of Medicine and Public Health, The University of Newcastle

Dr Caroline Jackson School of Molecular, Genetic and Population Health Sciences, The University of Edinburgh

Prof Carol Jagger Institute of Ageing and Health, Newcastle University, United Kingdom

Nanda Gopal Jayaraman Research Centre for Generational Health and Ageing, The University of Newcastle

Dr Anju Joham Monash Centre for Health Research and Implementation, Monash University

Dr Melissa Johnstone Institute of Early Childhood, Macquarie University

A/Prof Mike Jones Psychology Department, Macquarie University

Dr Enamul Kabir The University of Queensland

Dr Nadira Kakoly Monash Centre for Health Research and Implementation, Monash University

Jeeva Kanesarajah School of Public Health, The University of Queensland

Nathan Kettlewell The University of Sydney

Dr Asad Khan School of Health & Rehabilitation Sciences, The University of Queensland

Dr Luke Knibbs School of Public Health, The University of Queensland

Sonja Kubik School of Applied Psychology, Griffith University

Dr Maarit Laaksonen Centre for Big Data Research in Health, University of New South Wales

A/Prof Ratilal Lalloo School of Dentistry, The University of Queensland

Dr Romy Lauche

Australian Research Centre in Complementary and Integrative Medicine, University Technology Sydney

Joanne Lewis

Faculty of Health Sciences, The University of Sydney

Dr Derrick Lopez

Centre for Health and Ageing, The University of Western Australia

Prof Deborah Loxton

Research Centre for Generational Health and Ageing, The University of Newcastle

Prof Jayne Lucke

Australian Research Centre in Sex, Health & Society (ARCSHS), La Trobe University

Dr Lesley MacDonald-Wicks Nutrition & Dietetics, The University of Newcastle

A/ Prof Lynette MacKenzie Faculty of Health Sciences, The University of Sydney

Dr Zachary Marcum University of Washington, Seattle

A/Prof Mark McEvoy Centre for Clinical Epidemiology & Biostatistics, The University of Newcastle

Alemu Sufa Melka The University of Newcastle

Gabriela Mena The University of Queensland

Gabrielle Menolotto The University of Southern Queensland

Dr Seema Mihrshahi School of Public Health, The University of Sydney

Prof Michelle Miller Flinders University

Prof Gita Mishra Centre for Longitudinal and Life Course Research, The University of Queensland

Dr Lisa Moran

Monash Centre for Health Research and Implementation, Monash University

Dr Katrina Moss Centre for Longitudinal and Life Course Research, The University of Queensland

Anton Pak The University of Queensland

Prof Lynne Parkinson Health CRN, CQ University Australia

Dr Amanda Patterson School of Health Sciences (Nutrition), The University of Newcastle

Dr Toby Pavey School of Exercise and Nutrition Sciences, Queensland University of Technology

Dr Geeske Peeters Global Brain Health Institute, Trinity College, Dublin

Dr WenBo (Penny) Peng Faculty of Health, University Technology Sydney

Melissa Sherrel Pereira Research Centre for Generational Health and Ageing, The University of Newcastle

Dr Sabrina Pit Northern Rivers University Department of Rural Health, The University of Sydney

Regina Prigge The University of Edinburgh, UK

Dr Nicole Reilly Research Centre for Generational Health and Ageing, The University of Newcastle

Johanna Rienks The University of Wageningen, The Netherlands

Dr Danielle Schoenaker School of Medicine, University of Wollongong

Prof Margot Schofield School of Public Health, La Trobe University

Christine Sefton The University of Newcastle

Dinberu Shebeshi The University of Newcastle

Prof David Sibbritt

Faculty of Health, University of Technology Sydney

Dr Michelle Smith

School of Health and Rehabilitation Sciences, The University of Queensland

Dr Elizabeth Spencer

School of Humanities & Social Sciences, The University of Newcastle

Dr Meredith Tavener

Research Centre for Generational Health and Ageing, The University of Newcastle

Prof Helena Teede

Monash Centre for Health Research and Implementation, Monash University

Dr Eleanor Pei Hua Thong

Monash Centre for Health Research and Implementation, Monash University

A/Prof Leigh Tooth

Centre for Longitudinal and Life Course Research, The University of Queensland

Dr Luciana Torquati

Centre for Research in Exercise, Physical Activity and Health, The University of Queensland

Dr Elizabeth Tracey

Hunter Medical Research Institute (HMRI), The University of Newcastle

A/Prof Jannique Van Uffelen

Department of Kinesiology, University of Leuven, Belgium

Dr Michael Waller

School of Public Health, The University of Queensland

Dr Mary Welsh

Department of Education and Training, Australian Government, Canberra

Dr Jananie William

School of Finance, Australian National University

Xiaolin Xu School of Public Health, The University of Queensland

Yi Yang The University of Melbourne

Dr Serena Yu University Technology Sydney

Dr Isabella Zhao

Faculty of Health, Queensland University of Technology

Current Students

PhD STUDENTS

Dr Shazia Abbas

The University of Newcastle Supervisors: Prof Julie Byles, Prof Kichu Nair and Dr Tazeen Majeed

Akilew Adane

The University of Queensland Supervisors: Prof Gita Mishra and A/ Prof Leigh Tooth

Meredith Burgess

The University of Queensland Supervisors: Dr Francisco Perales and Prof Janeen Baxter

Sifan Cao

The University of Queensland Supervisors: Prof Gita Mishra, A/Prof Leigh Tooth and Dr Mark Jones

Dr Abhijit Chowdhury

The University of Newcastle Supervisors: Dr Milton Hasnat, A/Prof Mark McEvoy and Dr Liz Holliday

Dr Parivash Eftekhari

The University of Newcastle Supervisors: Prof Julie Byles, Peta Forder and Dr Melissa Harris

Carole Fisher

University Technology Sydney Supervisors: Prof David Sibbritt and Prof Jon Adams

Dereje Gedle Gete

The University of Queensland Supervisors: Prof Gita Mishra and Dr Michael Waller

Chris Harrington

The University of Newcastle Supervisors: Prof Julie Byles, Dr Melissa Harris and Dr Paul Saul

Nanda Gopal Jayaraman

The University of Newcastle Supervisors: Prof Julie Byles, Dr Xenia Dolja-Gore, Dr Tazeen Majeed, and Prof John Hall

Dr Nadira Kakoly

Monash Centre for Health Research and Implementation, Monash University Supervisors: Dr Anju Joham, Dr Lisa Moran, Prof Helena Teede and A/ Prof Arul Earnest

Jeeva Kanesarajah

The University of Queensland Supervisors: Prof Gita Mishra, A/ Prof Jenny Whitty and Dr Michael Waller

Sonja Kubik

Griffith University Supervisors: A/Prof Frances O'Callaghan and A/Prof Grant Devilly

Suzy Ladanyi

University Technology Sydney Supervisors: Prof David Sibbritt and Prof Jon Adams

Stephanie Lithgow

The University of Newcastle Supervisors: Prof Julie Byles, Prof Deborah Loxton, and Dr Elizabeth Spencer

Alemu Sufa Melka

The University of Newcastle Supervisors: Dr Catherine Chojenta, Prof Deborah Loxton, and Dr Liz Holliday

Gabriela Mena

The University of Queensland Supervisors: Prof Wendy Brown

Sophie Meredith

University Technology Sydney Supervisors: Prof Jon Adams, Prof David Sibbritt and Dr Jane Frawley

Anton Pak

The University of Queensland Supervisors: Prof Brenda Gannon and Prof Pravin Trivedi

Melissa Sherrel Pereira

The University of Newcastle Supervisors: Dr Catherine Chojenta, Prof Deborah Loxton, and Dr Nicole Reilly

Dr Mijanur Rahman

The University of Newcastle Supervisor: Prof Julie Byles

Kailash Thapaliya

The University of Newcastle Supervisors: Prof Julie Byles and Dr Melissa Harris

Daniel Tollosa

The University of Newcastle Supervisors: A/Prof Erica James, Dr Meredith Tavener, Dr Alexis Hure

Louise Wilson

The University of Queensland Supervisors: Prof Gita Mishra, Dr Nirmala Pandeya and Prof Julie Byles

Dr Michael Wright

Health Economics Centre for Health Economics Research and Evaluation, University Technology Sydney Supervisors: Prof Jane Hall, Prof Marion Haas and A/Prof Kees van Gool.

Befikadu Wubishet

The University of Newcastle Supervisors: Prof Julie Byles, Dr Melissa Harris and Danielle Lang

Xiaolin Xu

The University of Queensland Supervisors: Dr Mark Jones and Prof Gita Mishra

Masters Students

Grace Baxter The University of Queensland

Xue Ni Nikita Khoo

The University of Queensland

Project Staff

The University of Queensland

ALSWH Director

Professor Gita Mishra

Deputy Director/Principal Research Fellow

A/Professor Leigh Tooth

Professorial Research Fellow

Professor Annette Dobson

Senior Research Assistant

Dr Hsiu-Wen Chan

Statisticians

Richard Hockey Dr Ingrid Aulike

Biostatistician

Dr Michael Waller

Research Project Manager

Megan Ferguson

Data Manager

David Fitzgerald

Communication and Engagement Officer

Helen Gray

Data Access and Liaison Officer

Leonie Gemmell

Research Support Officer

Christine Coleman

The University of Newcastle

ALSWH Director

Professor Julie Byles

Deputy Director

Professor Deborah Loxton

Research Fellows

Dr Melissa Harris Dr Jacqueline Coombe

Senior Research Officer

Dr Amy Anderson

Statistician

Peta Forder

Operations Manager

Anna Graves

Database Developer

Ryan Tuckerman

Data and Statistical Support Officer

Dominic Cavenagh

Research Manager

Natalie Townsend

Administrative Officers

Clare Thomson Katherine Bailey

Project Assistants

Jenny Helman Jemma O'Carroll Kristee Lee Jobson Anna Dawes Alyse Berrigan Ursula Horton Sarah Morris Linda Smythe Megan Son Hing

2018 Major Report From child care to elder care: Insights from the Australian Longitudinal Study on Women's Health

The provision of informal care (that is, unpaid care) to another person is an important and often significant part of women's lives. Statistics from Australia and countries across the OECD show that over two-thirds of primary caregivers, and over half of all caregivers, are women. In Australia, the economic value of informal care in 2015 was estimated to be over \$1 billion per week. The Study's 2018 major report, the latest in a series for the Department of Health, examined informal caregiving across the life course - here we provide a summary of the report's key findings.

For many women, caregiving roles and responsibilities occur at multiple points along the life course, with these life course variations largely driven by relationships between and within generations. For example, women may care for their own children and grandchildren, care for parents, other family members or friends, and in later decades, care for spouses or partners. Women can provide primary, often higher intensity, care for people living with them or secondary, often lower intensity, care for people living elsewhere. Women often transition in and out of caregiving roles while managing other responsibilities, for example, employment and family life.

This report presents an analysis of the patterns of caregiving by Australian women across the life course using data from women aged from 18 to 97 years, the socio-demographic factors associated with caregiving patterns, and the impact of caregiving on social, employment and health outcomes of caregivers including their health service use. Both quantitative and qualitative data from the ALSWH cohorts have been used.

Provision of care to children in young adult life: Women in the 1973-78 cohort

While less than 10% of women aged 18 to 23 in 1996 had at least one child, by the time they were 31 to 36 years, 79% of women had at least one child. When aged 28 to 33 years, 75% of women used informal and/or formal child care with this percentage dropping to 60% by the ages 37 to 42. Child care use, particularly informal child care, was highest in women who were working (either part-time or full-time) and those with higher levels of education. The percentages of women who used informal child care were similar amongst those who lived in major cities, and inner and outer regional areas with those in remote areas being the least

likely to use this type of care. Use of formal and informal care was similar regardless of how well women reported managing on their income.

The majority of women using formal child care considered it to be convenient and available when aged 37 to 42 years. The convenience and availability of formal child care was perceived to be more of a problem by women who did not use formal child care than by women who did. One-third of women using formal child care reported that the cost of this service was a problem. Higher socio-demographic status was associated with the perception that formal child care was more conveniently located and affordable. Overall, the majority of women experienced high levels of satisfaction with their child care arrangements and were happy with their share of child care activities.

In an analysis of the women's own words (free-text comments), flexible employment conditions were important to facilitate returning to paid work for women after having children. However, a better understanding of the types of flexibility that are most useful would be helpful. Some women felt the cost of formal child care negated their potential earnings. An investigation into the costs to families and the economy of this lost productivity would be useful, in order to more fully understand the benefits of high quality affordable child care. Alternatives to formal child care include care by family members and social support networks. However, these are not available to all women. Further investigation of social support, child care and paid employment could illuminate the value of social networks to women with children. Furthermore, support for building networks to assist with child care could provide an affordable alternative to parents who wish to undertake paid work.

Provision of care to children in mid-age and later life: Women in the 1946-51 and 1921-26 cohorts

The percentage of women in the 1946-51 cohort who provided care for their grandchildren or other people's children steadily increased up to 60% by the time they were 62 to 67 years. Women in the 1946-51 cohort who worked full-time or had a university degree were less likely to provide care than women not in the labour force or with lower educational attainment. Women who found it impossible or very difficult to manage on their income were more likely to provide daily child care compared with women who found it easiest to manage on income. The percentage of women in the 1921-26 cohort who provided child care steadily decreased from 45% when they were aged 73 to 78 to 12% when they were aged 85 to 90. In this cohort, women who had better self-reported health were more likely to provide child care than women who reported their health as being fair or poor.

Provision of care to somebody because of their long-term illness, disability or frailty in mid-age: Women in the 1946-51 cohort

Provision of care for somebody because of their long-term illness, disability or frailty was highest in women in the 1946-51 cohort (who were aged between 45 and 72 years across eight successive surveys). Over the surveys, between 24 and 30% of these women reported caring for another person. There was a high degree of movement into and out of caregiving over time, with only 4% of women providing this care at every survey. As these women aged, the percentage who cared for someone they lived with increased while the percentage who cared for someone they lived with increased while the percentage who cared for someone they lived after 2004 when they were aged 53 to 58 years. Of the caregivers living with the person they cared for, most were not in the labour force and had less education. Caregivers living with the person they cared for also reported more difficulty managing on their income than non-caregivers.

There was no difference in the percentage of caregivers among women living in major cities, regional, or remote areas.

Table 1 below shows a summary of the most common associations between intensity of caregiving, age of caregiver, relationship between caregivers and care recipient, location of the care recipient and conditions of the care recipient. For example, the table shows that high intensity caregiving was most often provided by women when they were aged 56 to 67 (across surveys 5 to 7) and that this care was usually provided to a spouse/partner who lived with the women and who had a serious medical issue like a mental health condition or cancer.

Table 1 Associations between intensity of caregiving, age of caregiver, relationship between caregivers and care recipient, and location and conditions of the care recipient.

Intensity level	Most prevalent ages	Most prevalent type of care recipient	Most prevalent location of care recipient	Most prevalent condition/s of care recipient
Low: caregiving once per week for one hour at a time; or every few weeks for several hours at a time	53-64 years	Sibling/sibling-in- law Friend Neighbour	Lives elsewhere to caregiver	Frailty in old age Visual impairment Alzheimer's disease/dementia
Medium : caregiving several times per week for several hours at a time; or every day for about an hour	53-64 years	Parent/Parent-in- law Child Grandchild	Lives elsewhere to caregiver	Frailty in old age Visual impairment
High : caregiving all day, several times a week, or every day for several hours at a time	56-67 years	Spouse/partner Child	Lives with caregiver	Mental health problem Heart condition Alzheimer's disease/dementia Cancer Respiratory condition Stroke

Overall, the majority of women in the 1946-51 cohort who provided care (66-81%) were happy with their share of caregiving activities and approximately 10% reported at each survey that they would prefer another arrangement.

Provision of care to somebody because of their long-term illness, disability or frailty in early adult life: Women in the 1973-78 cohort

When aged in their 20s and 30s about 6% of women in the 1973-78 cohort provided care for other people, with this prevalence increasing as the women entered their 40s. Similar to women in the 1946-51 cohort, those caring for other people had poorer socio-demographic status than non-caregivers and those caring for someone who lived elsewhere. No particular trend for caregiving intensity was found in women born in 1973-78 when they were in their mid-30s to early 40s (the question about caregiving intensity was only asked in survey 6 and 7 of this cohort).

Provision of care to somebody because of their long-term illness, disability or frailty in later life: Women in the 1921-26 cohort

In the 1921-26 cohort, the percentage of women who were caregivers peaked when they were aged 76 to 84 years before sharply decreasing. In contrast to the 1973-78 and 1946-51 cohorts, there were no differences in socio-demographic indicators between caregivers and non-caregivers. Low and medium intensity care was provided by caregivers in the 1921-26 cohort who did not live with the person they cared for. High intensity care was provided by caregivers was provided by caregivers who lived with the person they cared for.

Factors influencing transitions in caregiving

A summary of previously published research using data from the ALSWH revealed insights into caregiving transitions in women in the 1973-78 and 1946-51 cohorts. In the 1946-51 cohort, women who provided care when aged 47 to 55 had lower engagement in the labour force compared with non-caregivers, which is possibly due to their poorer health status and greater use of health services. As women aged from their early to late 50s, the percentage of women who provided care increased and, simultaneously, participation in paid employment decreased. Transition into caregiving was not influenced by the number of hours of paid employment undertaken prior to caregiving, however once caregiving commenced, women in the 1946-51 cohort subsequently reduced their hours of employment.

In the 1973-78 and 1946-51 cohorts, women who provided continuous caregiving over time had poorer socioeconomic indicators at baseline; no other socioeconomic or health-related associations were apparent for other types of caregivers or non-caregivers. Turning points in the percentage of different types of caregiving over time by women in the 1946-51 cohort suggest that the women were engaging in a new type of caregiving behaviour, or that factors that influence the decision to be a caregiver had changed.

Caregiving and health, health behaviours and health service use

Overall, women in the 1946-51 cohort who provided care for somebody who lived with them reported poorer health, health behaviours and greater health service use when compared to caregivers who did not live with the person they cared for or non-caregivers, namely, they:

- had poorer self-reported health
- were more likely to be less physically active, to smoke and be obese
- had poorer adherence to guidelines for fruit intake
- were less likely to adhere to pap test recommendations
- reported three or more chronic conditions

- had higher levels of stress, anxiety and depression
- had more visits to the general practitioner and a higher number of prescriptions filled.

Similar findings were found for women in the 1973-78 cohort. Women living with the person they cared for had poorer health and health-related behaviours, and greater use of health services than women caring for someone living elsewhere and non-caregivers. There was however no difference between caregivers and non-caregivers for specific lifestyle behaviours such as smoking, drug use, alcohol consumption and adherence to dietary guidelines.

For women in later life, a different pattern emerged likely reflecting that at these later life stages, mostly women who were in good health were able to provide care for others. Caregivers aged 79 to 84 who were not living with the person they cared for had better self-rated health and were more physically active than live-in caregivers and non-caregivers. Caregivers who lived with the person they cared for were more likely to be obese than caregivers who lived elsewhere and non-caregivers. There were no differences in self-reported anxiety and depression, and MBS service use between caregivers and non-caregivers. Amongst the women aged 79 to 84 years, non-caregivers were the most likely to require help with their own daily tasks, followed by live-in caregivers, and caregivers living elsewhere.

An analysis of the women's own words (free-text comments) revealed that ensuring they have sufficient personal and emotional care when they become widowed is essential to their ongoing health and ability to live independently. Formal and informal care assists women to not only care for their husbands but also for themselves. Most women reported being able to access the care they required. Many women reported the desire to remain independent and in their own homes as long as possible, and ensuring that there are services available to facilitate this is important. As most women reported that the person they cared for was their spouse, some caregiving burden for these women, who are also in need of assistance, could be alleviated by a coordinated approach. This might include a couple's care plan, rather than individual care plans, potentially provided by different administering bodies (e.g., DVA and State-based community services).

Caring for multiple generations and 'sandwich' caregiving

Many women who provide care do so for more than one person. In the 1973-78 cohort, about 11% of women with children were also caring for another person who was ill, disabled or frail when they were aged 37 to 42. A larger percentage of women in the 1946-51 cohort

were providing care for multiple generations (25% at Survey 8, when the women were aged 67-72), while 10% of women in the 1921-26 cohort (when aged 79-84 years) provided care for more than one generation. Associations between providing multi-generational care were influenced by whether the women lived with the person they cared for or elsewhere. A summary is presented in Table 2.

Table 2 Associations between women in the 1973-78, 1946-51 and 1921-26 cohorts who provided multi-generational care and varied socio-demographic and health indicators.

Cohort	Socio-demographic indictors	Health indicators
1973-78	If lived with care recipient - more likely to have more than 3 children	If lived with care recipient – more inactive, depression, higher stress
1946-51	If lived with care recipient – more likely to also provide daily care for grandchild	If lived with care recipient - more inactive, depression, higher stress,
1921-26		If lived with care recipient - poorer self-rated health, fewer visits to the GP
		If lived elsewhere to care recipient – higher physical activity

Note: In this table care recipient refers to someone who is ill, disabled or frail.

In an analysis of the women's own words (free-text comments from women in the 1946-51 cohort), more accessible and affordable child care options for parents returning to work may reduce the burden on grandparents of caring for their grandchildren. More research is needed to investigate the impact of long-term multigenerational caregiving among those who are reaching retirement age, and who are experiencing their own age-related health issues. While child care and respite care may be available to caregivers, these are rarely, if ever, offered as a coordinated support service. The complex support needs of caregivers in this position warrant assessment at the individual level.

From 1996 to 2018: 1921-26 cohort snapshot

12,432 women, aged 70-75, completed their first survey in 1996.877 surviving women, aged 92-97, completed surveys in May 2018.



New Projects in 2018

Since the Study began in 1995, ALSWH data have been used in over 800 collaborative research projects. More than 50 new collaborative projects began in 2018 – the titles, lead collaborators, and synopses of the new projects are listed here.

A715: Social interactions and loneliness in older Australian women.

• Dr Roseanne Freak-Poli, Monash University

Social isolation and loneliness increase the risk of depression and death and likely represents a greater public health hazard than obesity. Last year, researchers found that Irish and English older adults who reported being not socially isolated but lonely were more likely to have cognitive decline. This example illustrates the adverse health effects of being "alone in a crowd" and how social interactions should be assessed in combination with loneliness. This proposal outlines several key concepts to progress our understanding of how the combination of social isolation and loneliness affects our health and longevity.

A717: The impact of historical intimate partner violence on survival and risk for chronic illness in older women.

• Dr Monica Cations, Flinders University

Intimate partner violence (IPV) negatively affects the physical and mental wellbeing of victims even many years after the abuse has ended. However, it is not known whether IPV at some time in life puts older women at risk for chronic health conditions such as dementia, diabetes, and heart disease, or whether it shortens their lifespan. This analysis explores the effect of historical IPV on risk for death and serious illness over 15 years in older women.

A718: How are different patterns of physical activity, sleep and diet related to health status and do these relationships differ by socio-demographics?

A/Prof Mitch Duncan, The University of Newcastle

Physical activity, sleep and dietary behaviours are related to various health outcomes including diabetes, cardiovascular disease, and quality of life. Little is known, however, about the combined patterns of these behaviours, how the patterns differ between different population groups, or influence risk of ill health. This study will identify the different patterns of these behaviours in middle aged women, examine how these behaviours change over time and how the patterns influence risk of diabetes, cardiovascular disease, poor quality of life and all cause mortality. The study will also examine if the relationship between behaviour patterns and health outcomes differ by family structure (married, caring responsibilities) occupation (e.g., shift work, employment level, ASCO category), education, socio-economic status (e.g., income, financial stress), and residential location (e.g., metropolitan, regional, remote). Findings will help to better understand how these complex behaviours influence health and enable health promotion efforts to be directed to those in greatest need.

A719: A qualitative investigation into women's caring responsibilities.

• Prof Deborah Loxton, The University of Newcastle

This project will explore the experiences of women providing care and support to others. Specifically, this project will examine the experiences of women who are providing care for their children and other adults simultaneously, the experiences of women who both provide and require care from others, and the experiences of women returning to paid work after having children. This project will use comments provided by ALSWH participants to examine these experiences.

A722: Prevention and early intervention for maternal mental illness: A research program that will inform policy and clinical practice.

• Dr Nicole Reilly, The University of Newcastle

In Australia, local, state and national initiatives for maternal mental health, such as the NSW Safe Start initiative and National Perinatal Depression Initiative, have focused on prevention and early intervention for nearly two decades. The aims of this research are to 1) examine changes in mental health service use and psychological wellbeing among women who gave birth in Australia over the previous 20 years, 2) evaluate the impact of key perinatal-specific mental health initiatives on these outcomes, and 3) examine adherence to best practice guidance for the prevention and management of maternal mental health, and to identify barriers and facilitators to adherence.

A723: Are older women prescribed Amiodarone receiving recommended thyroid function tests?

• Dr Catherine Chojenta, The University of Newcastle

Amiodarone is one of the most popular antiarrhythmic drugs prescribed in Australia. It is commonly used to treat atrial fibrillation, ventricular tachycardia and prescribed to patients at high risk of cardiac death. Amiodarone, however, has a number of adverse effects and is therefore only prescribed when necessary. Due to its structural similarities with thyroxine, it is recommended that thyroid function tests be conducted every six months to check for thyroid dysfunction. These guidelines however are not well adhered to by health professionals. Therefore this project will examine the risk factors for non-adherence to thyroid function testing in older Australian women prescribed Amiodarone.

A724: Beyond successful ageing: Longevity and healthy ageing among Australian women.

• Prof Julie Byles, The University of Newcastle

We will examine changes within cohorts of Australian women born 1921-26 and 1946-51 to identify trajectories of Healthy Ageing as defined by WHO, and compare these as to whether or not women can be considered to have achieved Successful Ageing using disease and disability based models of ageing. We argue that Healthy Ageing allows for more diversity in ageing trajectories, with interaction between intrinsic capacities and external supports.

A725: How are the sociodemographic characteristics of young Australian adult women associated with differences in the nutritional quality of their dietary intake?

• Prof Annette Dobson, The University of Queensland

Research has shown that the sociodemographic characteristics of individuals are associated with their dietary intake - however what remains unclear is the extent to which human nutrition, and more specifically macronutrient/micronutrient intake, is associated with these sociodemographic characteristics. In analysing data from the fourth survey of the 1989-95 cohort of the Australian Longitudinal Study on Women's Health, which included the MyFood24 tool, this project will estimate the strength of associations between sociodemographic characteristics of women and their nutritional intake. This information will

provide a valuable resource for the formulation of prevention strategies and education to target at risk groups with the goal to reduce illness brought about by poor nutrition.

A726: Assessing patterns of change in lifestyle behaviours following birth.

• A/Prof Lisa Moran, Monash University

Up to 1 in 2 Australian women are overweight and obese, which can be worsened by excessive weight gain during pregnancy and after childbirth. Postpartum weight retention is common and fewer than 50% of women are estimated to return to their pre-pregnancy weight. Changes in diet and physical activity after childbirth can contribute to parity-related weight gain. However, it is not known if specific groups of women (e.g., based on factors such as age, health status, education, income, occupation and ethnicity) have particular difficulties in following healthy lifestyle behaviours that may in turn be associated with greater parity-related weight gain.

A727: Health inequalities and social determinants of health amongst young mothers.

• Catherine Gatta, The University of Queensland

Often, health cannot be explained in terms of germs and genes alone. Broader social factors influence our health and well-being too, such as the environment in which we live and work, the quality of our social networks, and our access to education, health care and leisure time. Differences in these social determinants of health can lead to poorer health outcomes and health inequalities amongst different sub-groups in the Australian population. This project seeks to investigate the social circumstances and health trajectories of young mothers - participants in the 1989-95 cohort who reported having had a child by Survey 4 (in 2016), compared to young women who have not had children.

A728: Understanding the relationships between weight gain, physical activity and indicators of women's reproductive health.

• Gabriela Mena, The University of Queensland

The purpose of this research is to better understand the relationships between weight gain, physical activity and aspects of young women's reproductive health, with a focus on the potential effects of physical activity and menstrual irregularities on weight-reproductive

health relationships. We will examine relationships between weight gain and indicators of reproductive health in young women (ability to have children, use of in vitro fertilisation (IVF), use of fertility hormones, PCOS, endometriosis etc.). As women gain weight, they may develop menstrual irregularities that are precursors to infertility. However, physical activity may modify the relationship between weight gain and these health outcomes. The results will inform the development of practices which may help to establish better reproductive health in young women.

A729: Prevalence and predictors of alcohol risk behaviours.

• Prof Julie Byles, The University of Newcastle

To get a more accurate understanding of the health risks associated with alcohol consumption amongst the ALSWH 1989-95 cohort, a set of questions examining the risk behaviours that occurred in relation to alcohol consumption were devised and used in the 2015 survey of this cohort. The questions asked about the frequency of pre-drinking, vomiting, forgetting things, self-injury and seeking medical attention because of drinking. This project will examine the following: the prevalence and predictors of these alcohol risk behaviours; how these behaviours relate to self-reported alcohol intake and binge drinking frequency; the role of pre-drinking in alcohol related risk behaviours and injury; and how alcohol risk behaviours relate to changes in alcohol consumption patterns as women move from their teens to their 20s.

A730A: Association between dairy intake and cardiometabolic risk.

• Amee Buziau, Wageningen University

The number of people living with type 2 diabetes (T2D) is sharply rising, causing global concern1. T2D patients are at high risk of cardiovascular diseases (CVD), which remains the biggest cause of deaths worldwide2. In recent years, an increased interest was observed in the potential role of dairy intake in relation to these chronic diseases. However, the magnitude and strength of the association remains uncertain. Therefore, the aim of the present study is to investigate the association between intake of different quantities and types of dairy foods and incident T2D and CVDs in Australian women.

1. World Health Organization. Global Report on Diabetes. ISBN. 2016;978:88. doi: ISBN 978 92 4 156525 7. [Retrieved 1 May 2017]. 2. Mathers CD & Loncar D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. PLoS Medicine, 3(11), e442.

A731: Patterns in long term weight change and the incidence of adverse urogynaecological health issues in middle aged Australian women.

Gabrielle Menolotto, University of Southern Queensland

This project explores the relationship between long-term weight change and the incidence of urogynaecological health issues in middle aged Australian women. Obesity is a risk factor for adverse urogynaecological conditions including forms of urinary incontinence, urinary tract infection, genital prolapse, menstrual irregularity and more. In severe cases, surgical interventions are undertaken. Surgical alternatives include weight loss interventions, however research into long-term weight change remains underexplored. Middle age is a time of hormonal change for many women and by using this cohort we will explore the association between prolonged weight change and the incidence of urogynaecological symptoms, urogynaecological surgeries and menopause.

A732: Mapping the K10 to the SF-36 in young Australian women and investigating intra- and inter-cohort trends.

• Prof Annette Dobson, The University of Queensland

This project will explore the level of agreement between the K10 and the SF-36 within a cohort of young Australian women and construct a mapping algorithm to calibrate them. The project will also investigate trends in the prevalence of mental illness: both within a single birth cohort and between generations of birth cohorts of Australia women.

A735: Obesity-related behaviours of children with and without a family history of lifestyle diseases.

• Dr Katherine Downing, Deakin University

Physical inactivity, sedentary behaviour and poor sleep are independently associated with cardiovascular disease and type 2 diabetes, and contribute substantially to the global burden of chronic disease. However, little is known about whether the profile of children's obesity-related behaviours (physical activity, sedentary behaviour) and sleep is different for children with and without family history of these diseases. This study aims to assess differences in

BMI and obesity-related behaviours of children with and without a family history of lifestyle diseases (type 2 diabetes, heart disease and hypertension).

A736: Screen time in Australian children: Socioeconomic, maternal, parenting, time use and family environment factors associated with meeting screen time guidelines (Analysis of data from the MatCH study).

• A/Prof Leigh Tooth, The University of Queensland

Recently released guidelines from the Australian Government recommends maximum daily screen time for children aged 0 - 1, 1-2, 3-5 and 5-12 years. Previous Australian research has linked screen time in children with socioeconomic factors in their parents (for example years of education) as well as with parenting style and home environment. However, the majority of this research has investigated this issue in older children, has not linked long standing maternal factors and has not examined associations between and within families. This research aims to determine the associations between children's screen time and sleep, diet, physical activity, physical and cognitive development, quality of life, behaviour, maternal factors, parenting styles and the home environment.

Publications

Summary

During 2018, 70 papers were published or accepted for publication in peer reviewed academic journals. These publications covered a wide range of research themes, including:

- Chronic conditions
- Reproductive health
- Weight, nutrition and physical activity
- Health service use
- Mental health
- Abuse
- Ageing
- Methodology
- Tobacco, alcohol and other drugs
- Medications
- Caring
- Social factors in health and wellbeing
- Health in rural and remote areas
- Roles and relationships
- Intergenerational issues
- Formal and informal work patterns and work-family balance

Themes with the most publications in 2018 were reproductive health; weight, nutrition and physical activity; ageing; chronic conditions (diabetes, musculoskeletal, cardiovascular conditions, cancer) and health service use. Details of journal publications relevant to each theme are shown in the table below, and a full list of publications begins on p. 45.

Reproductive Health (24 Publications)

Adane A, Dobson A, Tooth L & Mishra G. **Maternal preconception weight trajectories are associated with offsprings' childhood obesity.** *International Journal of Obesity,* 2018; 42, 1265-1274.

Adane A, Mishra G & Tooth L. **Maternal preconception weight trajectories, pregnancy complications and offspring's childhood physical and cognitive development.** *Journal of Developmental Origins of Health and Disease,* 2018; doi: 10.1017/S2040174418000570

Adane AA, Tooth L & Mishra G. The role of offspring's birthweight on the association between pre-pregnancy obesity and offspring's childhood anthropometrics: A mediation analysis. *Journal of Developmental Origins of Health and Disease*. (accepted for

publication).

Chojenta C, William J, Martin M, Byles J & Loxton D. **The impact of a history of poor mental health on health care costs in the perinatal period.** *Archives of Women's Mental Health,* 2018; doi: 10.1007/s00737-018-0912-4.

Chung HF, Pandeya N, Dobson AJ, Kuh D, Brunner E, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods N, Bromburger JT, Thurston RC, Joffe H, Yoshizawa T, Anderson D & Mishra G. The role of sleep difficulties in the vasomotor menopausal symptoms and depressed mood relationships: An international pooled analysis of eight studies in the InterLACE consortium. *Psychological Medicine*, 2018; 48(15):2250-61.

Damone AL, Joham AE, Loxton D, Earnest A, Teede HJ & Moran LJ. **Depression, anxiety** and perceived stress in women with and without PCOS: A community-based study. *Psychological Medicine,* 2018, 1-11, doi: 10.1017/S0033291718002076.

Davis D, Brown WJ, Foureur M, Nohr EA & Xu F. Long-term weight gain and risk of overweight in parous and nulliparous women. *Obesity*, 2018; 26(6), 1072-1077.

Holden L, Hockey R, Ware RS & Lee C. Mental health-related quality of life and the timing of motherhood: A 16-year longitudinal study of a national cohort of young Australian women. *Quality of Life Research,* 2018; 27(4), 923-935.

Holowko N, Jones M, Tooth L, Koupil G & Mishra D. Socioeconomic position and reproduction: Findings from the Australian Longitudinal Study on Women's Health. *Maternal and Child Health Journal*, 2018; 22(12), 1713-1724.

Looman M, Schoenaker D, Soedamah-Muthu SS, Geelen A, Feskens EJM & Mishra GD. **Pre-pregnancy dietary carbohydrate quantity and quality, and risk of developing gestational diabetes: the Australian Longitudinal Study on Women's Health.** *British Journal of Nutrition,* 2018; 120(4), 435-444.

Mishra GD, Chung HF, Gelaw YA & Loxton D. The role of smoking in the relationship between intimate partner violence and age at natural menopause: A mediation analysis. *Women's Midlife Health*, 2018; 4(1), 1-10.

Mo L, Teede H, Joham A, Cain S, Bennett C, Blumfield M, Loxton D, Mansfield D & Moran L. Sleep disturbances in women with and without polycystic ovary syndrome in an Australian national cohort. *Clinical Endocrinology*. (accepted for publication).

Pandeya N, Huxley RR, Chung HF, Dobson A, Kuh D, Hardy R, Cade JE, Greenwood DC, Giles GG, Bruinsma F, Demakakos P, Simonsen MK, Adami H-O, Weiderpass E & Mishra G. Female reproductive history and risk of type 2 diabetes: A prospective analysis of 126,721 women. *Diabetes, Obesity and Metabolism*, 2018; 20:2103-2112.

Peng W, Lauche R, Frawley J, Sibbritt D, Adams J. **Utilization of complementary and alternative medicine and conventional medicine for headache or migraine during pregnancy: A cross-sectional survey of 1,835 pregnant women.** *Complementary Therapies in Medicine*, 2018: 41: 192-195.

Schoenaker DAJM, Vergouwe Y, Soedamah-Muthu SS, Callaway LK & Mishra GD. **Preconception risk of gestational diabetes: Development of a prediction model in nulliparous Australian women.** *Diabetes Research and Clinical Practice,* 2018; 146, 48-57.

Steel A, Wardle J, Frawley J, Adams J, Sibbritt D, Lauche R. **Associations between complementary medicine utilisation and the use of contraceptive methods: Results of a national cross-sectional survey of 8009 Australian Women.** *Complementary Therapies in Clinical Practice*, 2018, 33: 100-106.

Stephenson J, Heslehurst N, Hall J, Schoenaker DAJM, Hutchinson J, Cade J, Poston L, Barrett G, Crozier SR, Barker M, Kumaran K, Yajnik CS, Baird J & Mishra GD. **Before the beginning: Nutrition and lifestyle in the preconception period and its importance for future health.** *Lancet,* 2018; 391(10132), 1830–1841.

Taft A, Powell R, Watson L, Lucke J, Mazza D & McNamee K. Factors associated with psychosocial induced abortion over time: Secondary data analysis of five waves of the Australian Longitudinal Study on Women's Health. *Australian and New Zealand Journal of Public Health*. (accepted for publication).

William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal out-of-hospital cost risk factors. *Annals of Actuarial Science*, 2018; 1-35, doi; 10.1017/S1748499518000015.

William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal hospital cost risk factors for public patients. *Annals of Actuarial Science*, 2018; 12(1), 106-129.

Wilson L, Pandeya N, Byles J & Mishra G. Hysterectomy and perceived physical function in middle-aged Australian women: A 20-year population-based prospective cohort study. *Quality of Life Research*, 2018; 27(6), 1501-1511.

Wilson LF, Pandeya N, Byles J & Mishra GD. **Hysterectomy status and all-cause mortality in a 21 year Australian population-based cohort study.** *American Journal Obstetrics and Gynecology.* (accepted for publication).

Zhu D, Chung HF, Pandeya N, Dobson A, Cade J, Greenwood D, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods NF, Anderson D, Brown DE, Sievert LL, Brunner EJ, Kuh D, Hardy R, Hayashi K, Lee JS, Mizunuma H, Giles GG, Bruinsma F, Tillin T, Simonsen MK, Adami H-O, Weiderpass E, Canonico M, Ancelin M-L, Demakakos P & Mishra G. **Relationships between intensity, duration, cumulative dose, and timing of smoking with age at menopause: A pooled analysis of individual data from 17 observational studies.** *PLOS Medicine,* 2018; e1002704.

Zhu D, Chung HS, Pandeya N, Dobson AJ, Kuh D, Crawford SL, Gold EB, Avis NE, Giles GG, Bruinsma F, Adami HO, Weiderpass E, Greenwood DC, Cade JE, Mitchell ES, Woods NF, Brunner EJ, Simonsen MK & Mishra GD. **Body mass index and age at natural menopause: an international pooled analysis of 11 prospective studies.** *European Journal of Epidemiology*, 2018; 33(8), 699-710.
Weight, Nutrition, and Physical Activity (19 Publications)

Adane A, Dobson A, Tooth L & Mishra G. Maternal preconception weight trajectories are associated with offsprings' childhood obesity. *International Journal of Obesity*, 2018; 42, 1265-1274.

Adane A, Mishra G & Tooth L. **Maternal preconception weight trajectories, pregnancy complications and offspring's childhood physical and cognitive development.** *Journal of Developmental Origins of Health and Disease,* 2018; doi: 10.1017/S2040174418000570

Adane AA, Tooth L & Mishra G. The role of offspring's birthweight on the association between pre-pregnancy obesity and offspring's childhood anthropometrics: A mediation analysis. *Journal of Developmental Origins of Health and Disease*. (accepted for publication).

Brady SRE, Hussain SM, Brown WJ, Heritier, S, Wang Y, Teede H, Urquhart DM, Cicuttini FM. Course and contributors to back pain in middle-aged women over 9 years: Data from the Australian Longitudinal Study on Women's Health. *Spine*, 2018; 43(23), 1648-1656.

Davis D, Brown WJ, Foureur M, Nohr EA & Xu F. Long-term weight gain and risk of overweight in parous and nulliparous women. *Obesity*, 2018; 26(6), 1072-1077.

Ekelund U, Brown WJ, Steene-Johannessen J, Wang Fangerland M, Owen N, Powell KE, Bauman A & Lee I-M. Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850,060 participants. *British Journal* of Sports Medicine, 2018; doi: 10.1136/bjsports-2017-098963.

Jackson J, Patterson AJ, MacDonald-Wicks LK, Bondonno CP, Blekkenhorst LC, Ward NC, Hodgson JM, Byles JE & McEvoy MA. Dietary nitrate and diet quality: An examination of changing dietary intakes within a representative sample of Australian women. *Nutrients,* 2018; 10(8), 1005.

Kanesarajah J, Waller M, Whitty JA & Mishra GD. **Physical activity and body mass shape quality of life trajectories in mid- age women.** *Australian and New Zealand Journal of Public Health,* 2018; 42(4), 403-409

Lauche R, Fuller N, Cramer H, Wardle J, Sibbritt D, Adams J. Associations between complementary medicine, satisfaction with body weight and shape, and the use of methods to lose or control weight: Results of a national survey of 8,009 Australian Women. *Complementary Therapies in Medicine*, 2018: 36(1): 100-106.

Looman M, Schoenaker D, Soedamah-Muthu SS, Geelen A, Feskens EJM & Mishra GD. **Pre-pregnancy dietary carbohydrate quantity and quality, and risk of developing gestational diabetes: the Australian Longitudinal Study on Women's Health.** *British Journal of Nutrition,* 2018; 120(4), 435-444.

Looman M, Schoenaker D, Soedamah-Muthu SS, Mishra GD, Geelen A, & Feskens EJM.

Pre-pregnancy dietary micronutrient adequacy is associated with lower risk of developing gestational diabetes in Australian women. *Nutrition Research.* (accepted for publication).

Patterson A, Hure A, Burrows T, Jackson J & Collins C. **Diet quality and 10-year** healthcare costs by BMI categories in the mid-age cohort of the Australian Longitudinal Study on Women's Health. *Journal of Human Nutrition and Dietetics*, 2018; 31(4), 463-472.

Peeters GMEE, Gardiner PA, Dobson AJ & Brown WJ. **Associations between physical activity, medical costs and hospitalisations in older Australian women: Results from the Australian Longitudinal Study on Women's Health.** *Journal of Science and Medicine in Sport;* 2018; 21(6), 604-608.

Quatela A, Callister R, Patterson A, McEvoy M & MacDonald-Wicks L. **The protective** effect of muesli consumption on diabetes risk: Results from 12 years of follow-up in the Australian Longitudinal Study on Women's Health. *Nutrition Research*, 2018; 51, 12-20.

Stephenson J, Heslehurst N, Hall J, Schoenaker DAJM, Hutchinson J, Cade J, Poston L, Barrett G, Crozier SR, Barker M, Kumaran K, Yajnik CS, Baird J & Mishra GD. **Before the beginning: Nutrition and lifestyle in the preconception period and its importance for future health.** *Lancet,* 2018; 391(10132), 1830–1841.

Susanto M, Hubbard RE & Gardiner PA. **Association of 12-year trajectories of sitting time with frailty in middle-aged women.** *American Journal of Epidemiology,* 2018; 187(11), 2387–239.

Vajdic CM, MacInnis R, Canfell K, Hull P, Arriaga ME, Hirani V, Cumming RG, Mitchell P, Byles JE, Giles GG, Banks E, Taylor AW, Shaw JE, Magliano DJ, Marker J, Adelstein B-A, Gill TK & Laaksonen MA. The future colorectal cancer burden attributable to modifiable behaviors: A pooled cohort study. *JNCI Cancer Spectrum*, 2018; 2(3), doi: 10.1093/jncics/pky033.

Xu X, Mishra G, Dobson A & Jones M. **Short-term weight gain is associated with accumulation of multimorbidity in mid-aged women: A 20-year cohort study**. International Journal of Obesity, 2018; <u>https://doi.org/10.1038/s41366-018-0250-7</u>

Zhu D, Chung HS, Pandeya N, Dobson AJ, Kuh D, Crawford SL, Gold EB, Avis NE, Giles GG, Bruinsma F, Adami HO, Weiderpass E, Greenwood DC, Cade JE, Mitchell ES, Woods NF, Brunner EJ, Simonsen MK & Mishra GD. **Body mass index and age at natural menopause: an international pooled analysis of 11 prospective studies.** *European Journal of Epidemiology*, 2018; 33(8), 699-710.

Ageing (17 Publications)

Byles J, Curryer C, Vo K, Forder P, Loxton D & McLaughlin D. **Changes in housing among older women: Latent class analysis of housing patterns in older Australian women.** *Urban Studies,* 2018; 55(4), 917-34.

Chojenta C, Byles J & Nair BK. **Rehabilitation and convalescent hospital stay in New South Wales: An analysis of 3,979 women aged 75+.** *Australian and New Zealand Journal of Public Health,* 2018; 42(2), 195-199.

Cordier R, Chen Y, Clemson L, Byles J & Mahoney N. **Subjective memory complaints and difficulty performing activities of daily living among older women in Australia.** *Australian Occupational Therapy Journal.* (accepted for publication).

Curryer C, Gray M & Byles JE. Back to my old self and life starting: Biographies of ageing in Beck's risk society. *Journal of Sociology*, 2018; 52(2), 249-263.

Curryer C, Gray M and Byles JE. Older women's expectations of care, reciprocity, and government support in Australia. 'Am I not worthy? *Ethics & Social Welfare,* 2018; 12(3), 259-271.

de Luca K, Hunter S, Byles J & Parkinson L. **Qualitative insights into the experience of pain in older Australian women with arthritis.** *Australasian Journal on Ageing,* 2018; 37(3), 210-216.

Majeed T, Dolja-Gore X, Tavener M, Nair BR, Chojenta C & Byles JE. **Patterns of geriatric** health assessment use among community dwelling older Australian women over a 14-year period. *Journal of Health Services Research and Policy*. (accepted for publication).

Peeters GMEE, Gardiner PA, Dobson AJ & Brown WJ. **Associations between physical** activity, medical costs and hospitalisations in older Australian women: Results from the Australian Longitudinal Study on Women's Health. *Journal of Science and Medicine in Sport;* 2018; 21(6), 604-608.

Peeters GMEE, Waller M & Dobson AJ. **SF-36 normative values according to level of functioning in older women.** *Quality of Life Research,* 2018; doi: 10.1007/s11136-018-2077-z.

Peeters G, van Schoor NM, Cooper R, Tooth L, Kenny RA. **Should prevention of falls** start earlier? Co-ordinated analyses of harmonised data on falls in middle-aged adults across four population-based cohort studies. *PLoS ONE*, 2018; 13(8): e0201989.

Peeters GMEE, Beard JR, Deeg DJH, Tooth LR, Brown WJ & Dobson AJ. Longitudinal associations between lifestyle, socio-economic position and physical functioning in women at different life stages. *European Journal of Ageing*. (accepted for publication).

Rahman M, Efird T, Kendig H & Byles JE. Factors associated with patterns of home and community care among older Australian women. *European Journal on Ageing.* (accepted for publication).

Rahman M, Efird T & Byles JE. **Patterns of aged care use among older Australian women: A prospective cohort study using linked data**. *Archives of Gerontology and Geriatrics*. (accepted for publication).

Rich JL, Wright SL & Loxton D. **Older rural women living with drought.** *Local Environment,* 2018, doi: 10.1080/13549839.2018.1532986.

Susanto M, Hubbard RE & Gardiner PA. **Association of 12-year trajectories of sitting time with frailty in middle-aged women.** *American Journal of Epidemiology,* 2018; 187(11), 2387–239.

Susanto M, Hubbard RE & Gardiner PA. Validity and responsiveness of the FRAIL scale in middle-aged women. *Journal of the American Medical Directors Association*, 2018; 19(1), 65-69.

Tran T, Hammarberg K, Ryan J, Lowthian J, Freak-Poli R, Owen A, Kirkman M, Curtis A, Rowe H, Brown H, Ward S, Britt C & Fisher J. **Mental health trajectories among women in Australia as they age**. *Ageing and Mental Health*, 2018; doi: 10.1080/13607863.2018.

Chronic Conditions (16 Publications in total)

Diabetes (6 Publications)

Looman M, Schoenaker D, Soedamah-Muthu SS, Geelen A, Feskens EJM & Mishra GD. **Pre-pregnancy dietary carbohydrate quantity and quality, and risk of developing gestational diabetes: the Australian Longitudinal Study on Women's Health.** *British Journal of Nutrition,* 2018; 120(4), 435-444.

Looman M, Schoenaker D, Soedamah-Muthu SS, Mishra GD, Geelen A, & Feskens EJM. **Pre-pregnancy dietary micronutrient adequacy is associated with lower risk of developing gestational diabetes in Australian women.** *Nutrition Research*. (accepted for publication).

Pandeya N, Huxley RR, Chung HF, Dobson A, Kuh D, Hardy R, Cade JE, Greenwood DC, Giles GG, Bruinsma F, Demakakos P, Simonsen MK, Adami H-O, Weiderpass E & Mishra G. Female reproductive history and risk of type 2 diabetes: A prospective analysis of 126,721 women. *Diabetes, Obesity and Metabolism*, 2018; 20:2103-2112.

Quatela A, Callister R, Patterson A, McEvoy M & MacDonald-Wicks L. **The protective** effect of muesli consumption on diabetes risk: Results from 12 years of follow-up in the Australian Longitudinal Study on Women's Health. *Nutrition Research*, 2018; 51, 12-20.

Schoenaker DAJM, Vergouwe Y, Soedamah-Muthu SS, Callaway LK & Mishra GD. **Preconception risk of gestational diabetes: Development of a prediction model in nulliparous Australian women.** *Diabetes Research and Clinical Practice,* 2018; 146, 48-57.

Xu X, Mishra G, Dobson A, Jones M. **Progression of diabetes, heart disease, and stroke multimorbidity in middle-aged women: A 20-year cohort study.** *PLOS Medicine,* 2018; 15(3), e1002516.

Cancer (5 Publications)

Ekelund U, Brown WJ, Steene-Johannessen J, Wang Fangerland M, Owen N, Powell KE, Bauman A & Lee I-M. Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850,060 participants. *British Journal of Sports Medicine*, 2018; doi: 10.1136/bjsports-2017-098963.

Frawley J, McIntyre E, Sibbritt D, Wardle J Schloss J, Lauche R & Adams J. **Associations** between cancer screening behavior and complementary medicine use: Results of a national cross-sectional survey of 9151 Australian women. *Integrative Cancer Therapies*, 2018; 17(3), 979-985.

Laaksonen MA, Canfell K, MacInnis R, Arriaga ME, Banks E, Magliano DJ, Giles GG Cumming RG, Byles JE, Mitchell P, Gill TK, Hirani V, McCullough S, Shaw JE, Taylor AW, Adelstein B-A & Vajdic CM. **The future burden of lung cancer attributable to current modifiable behaviours: A pooled study of seven Australian cohorts.** *International Journal of Epidemiology*, 2018; 47(6), 1772-1783

Vajdic CM, MacInnis R, Canfell K, Hull P, Arriaga ME, Hirani V, Cumming RG, Mitchell P, Byles JE, Giles GG, Banks E, Taylor AW, Shaw JE, Magliano DJ, Marker J, Adelstein B-A, Gill TK & Laaksonen MA. **The future colorectal cancer burden attributable to modifiable behaviors: A pooled cohort study.** *JNCI Cancer Spectrum,* 2018; 2(3), doi: 10.1093/jncics/pky033.

Arriaga M, Vajdic CM, MacInnis RJ, Canfell K, Magliano DJ, Shaw JE, Byles JE, Giles FF, Taylor AW, Gill TK, Hirani , Cumming RG, Mitchell P, Banks E, Marker J Adelstein BA Laaksonen M. **The burden of pancreatic cancer in Australia attributable to smoking.** *Medical Journal of Australia*. (accepted for publication).

Musculoskeletal (2 Publications)

Brady SRE, Hussain SM, Brown WJ, Heritier, S, Wang Y, Teede H, Urquhart DM, Cicuttini FM. Course and contributors to back pain in middle-aged women over 9 years: Data from the Australian Longitudinal Study on Women's Health. *Spine*, 2018; 43(23), 1648-1656.

de Luca K, Hunter S, Byles J & Parkinson L. **Qualitative insights into the experience of pain in older Australian women with arthritis.** *Australasian Journal on Ageing,* 2018; 37(3), 210-216.

Cardiovascular Conditions (2 Publications)

Ekelund U, Brown WJ, Steene-Johannessen J, Wang Fangerland M, Owen N, Powell KE, Bauman A & Lee I-M. Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850,060 participants. *British Journal* of Sports Medicine, 2018; doi: 10.1136/bjsports-2017-098963.

Xu X, Mishra G, Dobson A, Jones M. **Progression of diabetes, heart disease, and stroke multimorbidity in middle-aged women: A 20-year cohort study.** *PLOS Medicine,* 2018; 15(3), e1002516.

General (1 Publication)

Xu X, Mishra G, Dobson A & Jones M. Short-term weight gain is associated with

accumulation of multimorbidity in mid-aged women: A 20-year cohort study. International Journal of Obesity, 2018; <u>https://doi.org/10.1038/s41366-018-0250-7</u>

Linked Data (13 Publications)

Byles J, Curryer C, Vo K, Forder P, Loxton D & McLaughlin D. **Changes in housing among older women: Latent class analysis of housing patterns in older Australian women.** *Urban Studies,* 2018; 55(4), 917-34.

Chojenta C, Byles J & Nair BK. Rehabilitation and convalescent hospital stay in New South Wales: An analysis of 3,979 women aged 75+. *Australian and New Zealand Journal of Public Health*, 2018; 42(2), 195-199.

Chojenta C, William J, Martin M, Byles J & Loxton D. **The impact of a history of poor mental health on health care costs in the perinatal period.** *Archives of Women's Mental Health,* 2018; doi: 10.1007/s00737-018-0912-4.

Laaksonen MA, Canfell K, MacInnis R, Arriaga ME, Banks E, Magliano DJ, Giles GG Cumming RG, Byles JE, Mitchell P, Gill TK, Hirani V, McCullough S, Shaw JE, Taylor AW, Adelstein B-A & Vajdic CM. **The future burden of lung cancer attributable to current modifiable behaviours: A pooled study of seven Australian cohorts.** *International Journal of Epidemiology*, 2018; 47(6), 1772-1783.

Majeed T, Dolja-Gore X, Tavener M, Nair BR, Chojenta C & Byles JE. **Patterns of geriatric** health assessment use among community dwelling older Australian women over a 14-year period. *Journal of Health Services Research and Policy*. (accepted for publication).

Patterson A, Hure A, Burrows T, Jackson J & Collins C. **Diet quality and 10-year** healthcare costs by BMI categories in the mid-age cohort of the Australian Longitudinal Study on Women's Health. *Journal of Human Nutrition and Dietetics,* 2018; 31(4), 463-472.

Peeters GMEE, Gardiner PA, Dobson AJ & Brown WJ. **Associations between physical** activity, medical costs and hospitalisations in older Australian women: Results from the Australian Longitudinal Study on Women's Health. *Journal of Science and Medicine in Sport;* 2018; 21(6), 604-608.

Peeters GMEE, Waller M & Dobson AJ. **SF-36 normative values according to level of functioning in older women.** *Quality of Life Research,* 2018; doi: 10.1007/s11136-018-2077-z.

Rahman M, Efird T, Kendig H & Byles JE. Factors associated with patterns of home and community care among older Australian women. *European Journal on Ageing.* (accepted for publication).

Rahman M, Efird T & Byles JE. **Patterns of aged care use among older Australian women: A prospective cohort study using linked data**. *Archives of Gerontology and Geriatrics*. (accepted for publication).

Torquati L, Peeters GM, Brown WJ, Kolbe-Alexander T & Skinner T. A daily cup of tea or coffee will keep you moving: Associations between tea and coffee consumption and physical activity. *International Journal of Environmental Research and Public Health*, 2018; 15(9), E1812.

William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal out-of-hospital cost risk factors. *Annals of Actuarial Science*, 2018; 1-35, doi; 10.1017/S1748499518000015.

William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal hospital cost risk factors for public patients. *Annals of Actuarial Science*, 2018; 12(1), 106-129.

Health Service Use (15 Publications)

Chojenta C, Byles J & Nair BK. **Rehabilitation and convalescent hospital stay in New South Wales: An analysis of 3,979 women aged 75+.** *Australian and New Zealand Journal of Public Health,* 2018; 42(2), 195-199.

Chojenta C, William J, Martin M, Byles J & Loxton D. **The impact of a history of poor mental health on health care costs in the perinatal period.** *Archives of Women's Mental Health,* 2018; doi: 10.1007/s00737-018-0912-4.

Frawley J, McIntyre E, Sibbritt D, Wardle J Schloss J, Lauche R & Adams J. **Associations** between cancer screening behavior and complementary medicine use: Results of a national cross-sectional survey of 9151 Australian women. *Integrative Cancer Therapies*, 2018; 17(3), 979-985.

Lauche R, Fuller N, Cramer H, Wardle J, Sibbritt D, Adams J. **Associations between** complementary medicine, satisfaction with body weight and shape, and the use of methods to lose or control weight: Results of a national survey of 8,009 Australian Women. *Complementary Therapies in Medicine*, 2018: 36(1): 100-106.

Majeed T, Dolja-Gore X, Tavener M, Nair BR, Chojenta C & Byles JE. **Patterns of geriatric** health assessment use among community dwelling older Australian women over a 14-year period. *Journal of Health Services Research and Policy*. (accepted for publication).

Patterson A, Hure A, Burrows T, Jackson J & Collins C. **Diet quality and 10-year healthcare costs by BMI categories in the mid-age cohort of the Australian Longitudinal Study on Women's Health.** *Journal of Human Nutrition and Dietetics,* 2018; 31(4), 463-472.

Peeters GMEE, Gardiner PA, Dobson AJ & Brown WJ. **Associations between physical activity, medical costs and hospitalisations in older Australian women: Results from the Australian Longitudinal Study on Women's Health.** *Journal of Science and Medicine in Sport;* 2018; 21(6), 604-608.

Peeters GMEE, Waller M & Dobson AJ. **SF-36 normative values according to level of functioning in older women.** *Quality of Life Research,* 2018; doi: 10.1007/s11136-018-2077-z.

Peng W, Lauche R, Frawley J, Sibbritt D, Adams J. **Utilization of complementary and alternative medicine and conventional medicine for headache or migraine during pregnancy: A cross-sectional survey of 1,835 pregnant women.** *Complementary Therapies in Medicine*, 2018: 41: 192-195.

Rahman M, Efird T, Kendig H & Byles JE. Factors associated with patterns of home and community care among older Australian women. *European Journal on Ageing.* (accepted for publication).

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William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal out-of-hospital cost risk factors. *Annals of Actuarial Science*, 2018; 1-35, doi; 10.1017/S1748499518000015.

William J, Chojenta C, Martin MA & Loxton D. An actuarial investigation into maternal hospital cost risk factors for public patients. *Annals of Actuarial Science*, 2018; 12(1), 106-129.

Mental Health (6 Publications)

Chojenta C, William J, Martin M, Byles J & Loxton D. **The impact of a history of poor mental health on health care costs in the perinatal period.** *Archives of Women's Mental Health,* 2018; doi: 10.1007/s00737-018-0912-4.

Chung HF, Pandeya N, Dobson AJ, Kuh D, Brunner E, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods N, Bromburger JT, Thurston RC, Joffe H, Yoshizawa T, Anderson D & Mishra G. The role of sleep difficulties in the vasomotor menopausal symptoms and depressed mood relationships: An international pooled analysis of eight studies in the InterLACE consortium. *Psychological Medicine*, 2018; 48(15):2250-61.

Damone AL, Joham AE, Loxton D, Earnest A, Teede HJ & Moran LJ. **Depression, anxiety** and perceived stress in women with and without PCOS: A community-based study. *Psychological Medicine,* 2018, 1-11, doi: 10.1017/S0033291718002076

Holden L, Harris M, Hockey R, Ferrari A, Lee YY, Dobson A & Lee C. **Predictors of change in depressive symptoms over time: Results from the Australian Longitudinal Study on Women's Health.** *Journal of Affective Disorders.* (accepted for publication). Holden L, Hockey R, Ware RS & Lee C. Mental health-related quality of life and the timing of motherhood: A 16-year longitudinal study of a national cohort of young Australian women. *Quality of Life Research,* 2018; 27(4), 923-935

Tran T, Hammarberg K, Ryan J, Lowthian J, Freak-Poli R, Owen A, Kirkman M, Curtis A, Rowe H, Brown H, Ward S, Britt C & Fisher J. **Mental health trajectories among women in Australia as they age**. *Ageing and Mental Health,* 2018; doi: 10.1080/13607863.2018.

Tobacco, Alcohol, and other Drugs (6 Publications)

Arriaga M, Vajdic CM, MacInnis RJ, Canfell K, Magliano DJ, Shaw JE, Byles JE, Giles FF, Taylor AW, Gill TK, Hirani , Cumming RG, Mitchell P, Banks E, Marker J Adelstein BA Laaksonen M. **The burden of pancreatic cancer in Australia attributable to smoking.** *Medical Journal of Australia*. (accepted for publication).

Laaksonen MA, Canfell K, MacInnis R, Arriaga ME, Banks E, Magliano DJ, Giles GG Cumming RG, Byles JE, Mitchell P, Gill TK, Hirani V, McCullough S, Shaw JE, Taylor AW, Adelstein B-A & Vajdic CM. **The future burden of lung cancer attributable to current modifiable behaviours: A pooled study of seven Australian cohorts.** *International Journal of Epidemiology*, 2018; 47(6), 1772-1783.

Melka AS, Chojenta C, Holliday L & Loxton D. **Predictors of e-cigarette use among young Australian women.** *American Journal of Preventive Medicine*. (accepted for publication).

Mishra GD, Chung HF, Gelaw YA & Loxton D. The role of smoking in the relationship between intimate partner violence and age at natural menopause: A mediation analysis. *Women's Midlife Health*, 2018; 4(1), 1-10.

Vajdic CM, MacInnis R, Canfell K, Hull P, Arriaga ME, Hirani V, Cumming RG, Mitchell P, Byles JE, Giles GG, Banks E, Taylor AW, Shaw JE, Magliano DJ, Marker J, Adelstein B-A, Gill TK & Laaksonen MA. **The future colorectal cancer burden attributable to modifiable behaviors: A pooled cohort study.** *JNCI Cancer Spectrum,* 2018; 2(3), doi: 10.1093/jncics/pky033.

Zhu D, Chung HF, Pandeya N, Dobson A, Cade J, Greenwood D, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods NF, Anderson D, Brown DE, Sievert LL, Brunner EJ, Kuh D, Hardy R, Hayashi K, Lee JS, Mizunuma H, Giles GG, Bruinsma F, Tillin T, Simonsen MK, Adami H-O, Weiderpass E, Canonico M, Ancelin M-L, Demakakos P & Mishra G. **Relationships between intensity, duration, cumulative dose, and timing of smoking with age at menopause: A pooled analysis of individual data from 17 observational studies.** *PLOS Medicine,* 2018; e1002704.

Methodology (4 Publications)

Cordier R, Brown T, Clemson L & Byles J. **Evaluating the longitudinal item and category stability of the SF-36 full and summary scales using Rasch analysis**. *BioMed Research International*, 2018: doi: 10.1155/2018/1013453.

Fitzgerald D, Hockey R, Jones M, Mishra G, Waller M & Dobson A. Use of on-line or paper

surveys by Australian women: A longitudinal study of users, devices and cohort retention. *Journal of Medical Internet Research*. (accepted for publication).

Loxton D, Tooth L, Harris M, Forder P, Dobson A, Powers J, Brown W, Byles & Mishra G. Cohort Profile: Australian Longitudinal Study on Women's Health (ALSWH) 1989-95 cohort. International Journal of Epidemiology, 2018; 47(2): 391–392e.

Mishra GD, Moss K, Loos C, Dobson AJ, Davies PSW, Loxton D, Hesketh KD, Koupil I, Bower C, Sly P, & Tooth L. **MatCH (Mothers and their Children's Health) Profile: Offspring of the 1973-78 cohort of the Australian Longitudinal Study on Women's Health**. *Longitudinal and Life Course Studies*, 2018; 9(3), 351-375.

Social Factors in Health and Wellbeing (4 Publications)

Curryer C, Gray M & Byles JE. Back to my old self and life starting: Biographies of ageing in Beck's risk society. *Journal of Sociology*, 2018; 52(2), 249-263.

Holowko N, Jones M, Tooth L, Koupil G & Mishra D. **Socioeconomic position and reproduction: Findings from the Australian Longitudinal Study on Women's Health.** *Maternal and Child Health Journal*, 2018; 22(12), 1713-1724.

Kanesarajah J, Waller M, Whitty JA & Mishra GD. **Physical activity and body mass shape quality of life trajectories in mid- age women.** *Australian and New Zealand Journal of Public Health,* 2018; 42(4), 403-409

Peeters GMEE, Beard JR, Deeg DJH, Tooth LR, Brown WJ & Dobson AJ. Longitudinal associations between lifestyle, socio-economic position and physical functioning in women at different life stages. *European Journal of Ageing*. (accepted for publication).

Abuse (1 Publication)

Mishra GD, Chung HF, Gelaw YA & Loxton D. The role of smoking in the relationship between intimate partner violence and age at natural menopause: A mediation analysis. *Women's Midlife Health*, 2018; 4(1), 1-10.

Caring (2 Publications)

Curryer C, Gray M & Byles JE. Older women's expectations of care, reciprocity, and government support in Australia. 'Am I not worthy? *Ethics & Social Welfare,* 2018; 12(3), 259-271.

Curryer C, Gray M & Byles JE. Back to my old self and life restarting: Biographies of ageing in Beck's risk society. *Journal of Sociology*, 2018; 54(2), 249-263.

Rural and Remote Health (1 Publication)

Rich JL, Wright SL & Loxton D. **Older rural women living with drought.** *Local Environment,* 2018, doi: 10.1080/13549839.2018.1532986.

Published Papers

Adane A, Dobson A, Tooth L & Mishra G. Maternal preconception weight trajectories are associated with offsprings' childhood obesity. International Journal of Obesity, 2018; 42, 1265-1274.

Objectives: This study aimed to examine the associations between (1) mothers' preconception body mass index (BMI) trajectories over 6–7 years and offspring childhood BMI, and (2) mothers' BMI changes between first and second pregnancy and the second-born child's BMI.

Methods: We used data (1606 mothers with 2733 children with mean age 7.7 years, SD 2.9) from the Australian Longitudinal Study on Women's Health and the Mothers and their Children's Health study. Preconception BMI trajectories were identified using latent class growth modeling. Children were categorized as underweight, normal, overweight or obese based on age and sex-specific BMI cut-off points for children. Multinomial and binary logistic regression were used for analyses.

Results: We identified three preconception BMI trajectories, named as 'normative' (61.2%), 'chronically overweight' (30.7%), and 'chronically obese' (8.1%). Children born to 'chronically overweight' and 'chronically obese' mothers were more likely to be overweight than normal weight relative to children born to women with a 'normative' BMI trajectory. The corresponding adjusted relative risk ratios (RRRs) (95% confidence interval [CI]) of childhood overweight were 1.75 (1.33, 2.31) for chronically overweight mothers and 2.48 (1.65, 3.73) for chronically obese mothers. Similarly, we found a much stronger association between 'chronically overweight' and 'chronically obese' BMI trajectories and childhood risk of obesity; RRR (95% CI), 2.49 (1.41, 4.40) and 6.65 (3.40, 13.01), respectively. Secondborn children of mothers with high interpregnancy weight gain (\geq 4 BMI units) were also at higher risk of being overweight or obese (OR = 2.20, 95% CI: 1.02, 4.75) compared with children of mothers with stable interpregnancy weight (gain or loss of 1 BMI unit or less).

Conclusions: In this population-based prospective cohort study we found strong doseresponse associations between preconception BMI trajectories and offsprings' childhood BMI.

Adane A, Mishra G & Tooth L. **Maternal preconception weight trajectories**, **pregnancy complications and offspring's childhood physical and cognitive development.** Journal of Developmental Origins of Health and Disease, 2018; doi: 10.1017/S2040174418000570.

There is limited evidence on the association between maternal preconception body mass index (BMI) trajectories and pregnancy complications and child development. This study examined the relationships of maternal BMI trajectories, diabetes and hypertensive disorders during pregnancy and offspring's childhood physical and cognitive development. Data were from the Australian Longitudinal Study on Women's Health and the Mothers and their Children's Health study (n=771). Women's preconception BMI trajectories were identified using group-based trajectory modelling. Children's physical and cognitive development (up to the average age of 5 years) were obtained from the Ages and Stages Questionnaire (suspected gross motor delay) and the Australian Early Development Census (AEDC). Generalized estimating equation models, adjusted for maternal sociodemographic and lifestyle factors, were used for analyses. Three distinct BMI trajectories were identified (normative, chronically overweight and chronically obese). Children born to chronically obese women were more likely to be classified as developmentally vulnerable/at-risk on AEDC domains; gross and fine motor skills [risk ratio (RR)=1.64, 95% confidence interval (CI): 1.04, 2.61] and communication skills and general knowledge (RR=1.71, 95% CI: 1.09, 2.68). They also had an elevated risk of suspected gross motor delay (RR=2.62, 95% CI: 1.26, 5.44) compared with children born to women with a normative BMI trajectory. Maternal diabetes or hypertensive disorders during pregnancy were not associated with child outcomes. Maternal preconception BMI trajectories were associated with poorer childhood development. This study finding underscores the importance of excessive weight gain prevention throughout the reproductive stage of life.

Brady SRE, Hussain SM, Brown WJ, Heritier, S, Wang Y, Teede H, Urquhart DM & Cicuttini FM. Course and contributors to back pain in middle-aged women over 9 years: Data from the Australian Longitudinal Study on Women's Health. *Spine*, 2018; 43(23), 1648-1656.

Study Design: Community-based, cohort study.

Objective: Our aim was to determine the course of back pain in middle-aged women over a 9-year period, and assess whether obesity and physical inactivity are associated with more frequent back pain.

Summary of Background Data: Back pain is the leading cause of disability worldwide. With minimal effective therapies and rising financial burden, identifying modifiable risk factors remains a key priority.

Methods: The Australian Longitudinal Study on Women's Health is a cohort study of community-based, middle-aged women who completed questionnaires every 3 years between 2004 and 2013. Approximately, 10,530 women completed the survey in 2004 (mean age 55.5 yrs), and 9020 completed follow-up 9 years later. Self-reported data on back pain in the last 12 months and other sociodemographic factors were collected at all four surveys. 'Frequent back pain' was defined as back pain reported at _ three surveys.

Results: Back pain was common and persistent, with 48% having back pain in _ three out of four surveys. Baseline obesity (relative risk [RR] 1.18, 95% confidence interval [CI] 1.12– 1.25), lack of vigorous physical activity (RR 1.17, 95% CI 1.10–1.25), depressive symptoms (RR 1.40, 95% CI 1.33–1.47), and low-education status (RR 1.17, 95% CI 1.12–1.24), were independently associated with an increased risk of frequent back pain (all P<0.001). Overall, 28% of the risk of frequent back pain could be attributed to these factors, equating to one extra case of frequent back pain for every five women with depressive symptoms, for every 11 obese women, for every 12 women with low-education status, and for every 13 women who do not do vigorous physical activity, at baseline.

Conclusion: Obesity, depressive symptoms, low-education status, and lack of vigorous physical activity are associated with higher risk of frequent back pain over the following 9 years among women in their mid-50 s. Targeting these risk factors may lessen the burden of back pain.

Byles J, Curryer C, Vo K, Forder P, Loxton D & McLaughlin D. **Changes in** housing among older women: Latent class analysis of housing patterns in older Australian women. *Urban Studies*, 2018; 55(4), 917-934.

Scant research exists on the patterns of changes in older women's housing, and whether and when women transition into residential aged care (RAC). This study aimed to identify groups of women with different housing patterns (latent classes) over time, with a secondary aim to describe socio-demographic and health characteristics of women in each class. We analysed linked data for 9575 women born 1921–1926 from the Australian Longitudinal Study of Women's Health (ALSWH), Australian National Death Index, and Residential Aged Care (RAC) administrative records for the years 1999 through to 2011. Seven distinct housing patterns (classes) were identified over time. Four classes showed a stable pattern: living in a house for most surveys (47.0%), living in a house but with earlier death (13.7%), living in an apartment (12.8%), living in a retirement village (5.8%). One class showed a pattern of downsizing: moving from a house to retirement village (6.6%). Two patterns showed transition: from an apartment or retirement village, to RAC and death (7.8%), and from house to RAC (6.4%). This study provides new evidence about socio-demographic and health influences on housing patterns and entry into residential care in later life. These findings can inform policy and aged care planning for women in later life, by identifying patterns of transition into residential aged care, or alternatively, remaining in the community.

Chojenta C, Byles J & Nair BK. **Rehabilitation and convalescent hospital stay in New South Wales: An analysis of 3,979 women aged 75+.** Australian and New Zealand Journal of Public Health, 2018; 42(2), 195-199.

Objectives: With a rapidly ageing population, it is imperative to examine health service costs and plan appropriately for the future. This paper determines the factors related to extended hospital stay for 'Rehabilitation' or 'Convalescence', as defined by ICD-10 coding, in acute hospital settings for older women in New South Wales, Australia.

Methods: Participants were from the 1921–26 cohort of the Australian Longitudinal Study on Women's Health. For this analysis, self-reported survey data were linked to the NSW Admitted Patient Data Collection and the National Death Index.

Results: Of the 3,979 participants, 88% had a hospitalisation in the 13-year observation period, and 37% had either a rehabilitation or convalescence admission in an acute hospital setting. In the multivariate model, living in a regional or remote area was the only variable positively associated with having a rehabilitation or convalescence hospitalisation (AOR=1.58 [1.33, 1.87]).

Conclusions: Area of residence is the determining factor for rehabilitation or convalescence hospital admissions. These long stay admissions are not necessarily inappropriate, but due to a lack of other non-acute care options.

Implications for public health: Increased availability of rehabilitation and respite care in non-acute settings will not only improve older patient care, but will also reduce the burden on acute hospitals.

Chojenta C, William J, Martin M, Byles J & Loxton D. **The impact of a history of poor mental health on health care costs in the perinatal period.** Archives of Women's Mental Health, 2018; doi: 10.1007/s00737-018-0912-4.

The perinatal period is a critical time for mental health and is also associated with high health care expenditure. Our previous work has identified a history of poor mental health as the strongest predictor of poor perinatal mental health. This study aims to examine the impact of a history of poor mental health on health care costs during the perinatal period. Data from the 1973-1978 cohort of the Australian Longitudinal Study on Women's Health (ALSWH) were linked with a number of administrative datasets including the NSW Admitted Patient Data Collection and Perinatal Data Collection, the Medicare Benefits Scheme and

the Pharmaceuticals Benefits Scheme between 2002 and 2011. Even when taking birth type and private health insurance status into account, a history of poor mental health resulted in an average increase of over 11% per birth across the perinatal period. These findings indicate that an investment in prevention and early treatment of poor mental health prior to child bearing may result in a cost saving in the perinatal period and a reduction of the incidence of women experiencing poor perinatal mental health.

Chung HF, Pandeya N, Dobson AJ, Kuh D, Brunner E, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods N, Bromburger JT, Thurston RC, Joffe H, Yoshizawa T, Anderson D & Mishra G. The role of sleep difficulties in the vasomotor menopausal symptoms and depressed mood relationships: An international pooled analysis of eight studies in the InterLACE consortium. *Psychological Medicine*, 2018; 48(15):2250-2261.

Background: Many women experience both vasomotor menopausal symptoms (VMS) and depressed mood at midlife, but little is known regarding the prospective bi-directional relationships between VMS and depressed mood and the role of sleep difficulties in both directions.

Methods: A pooled analysis was conducted using data from 21 312 women (median: 50 years, interquartile range 49–51) in eight studies from the InterLACE consortium. The degree of VMS, sleep difficulties, and depressed mood was self-reported and categorised as never, rarely, sometimes, and often (if reporting frequency) or never, mild, moderate, and severe (if reporting severity). Multivariable logistic regression models were used to examine the bi-directional associations adjusted for within-study correlation.

Results: At baseline, the prevalence of VMS (40%, range 13–62%) and depressed mood (26%, 8–41%) varied substantially across studies, and a strong dose-dependent association between VMS and likelihood of depressed mood was found. Over 3 years of follow-up, women with often/severe VMS at baseline were more likely to have subsequent depressed mood compared with those without VMS (odds ratios (OR) 1.56, 1.27–1.92). Women with often/severe depressed mood at baseline were also more likely to have subsequent VMS than those without depressed mood (OR 1.89, 1.47–2.44). With further adjustment for the degree of sleep difficulties at baseline, the OR of having a subsequent depressed mood associated with often/severe depressed mood remained significant (OR 1.13, 0.90– 1.40). Conversely, often/severe depressed mood remained significantly associated with subsequent VMS (OR 1.80, 1.38–2.34).

Conclusions: Difficulty in sleeping largely explained the relationship between VMS and subsequent depressed mood, but it had little impact on the relationship between depressed mood and subsequent VMS.

Cordier R, Brown T, Clemson L & Byles J. **Evaluating the longitudinal item and category stability of the SF-36 full and summary scales using Rasch analysis**. *BioMed Research International,* 2018: doi: 10.1155/2018/1013453.

Purpose: The Medical Outcome Study Short Form 36 (SF-36) is widely used for measuring Health-Related Quality of Life (HRQoL) and has undergone rigorous psychometric evaluation using Classic Test Theory (CTT). However, Item Response Theory based evaluation of the SF-36 has been limited with an overwhelming focus on individual scales and cross-sectional data. This study aimed to examine the longitudinal item and category stability of the SF-36 using Rasch analysis.

Method: Using data from the 1921-1926 cohort of the Australian Longitudinal Study on Women's Health, responses of the SF-36 from six waves of data collection were analysed. Rasch analysis using Winsteps version 3.92.0 was performed on all 36 items of the SF-36 and items that constitute the physical health and mental health scales.

Results: Rasch analysis revealed issues with the SF-36 not detected using classical methods. Redundancy was seen for items on the total measure and both scales across all waves of data. Person separation indexes indicate that the measure lacks sensitivity to discriminate between high and low performances in this sample. The presence of Differential Item Functioning suggests that responses to items were influenced by locality and marital status.

Conclusion: Previous evaluations of the SF-36 have relied on cross-sectional data; however, the findings of the current study demonstrate the longitudinal efficacy of the measure. Application of the Rasch Measurement Model indicated issues with internal consistency, generalisability, and sensitivity when the measure was evaluated as a whole and as both physical and mental health summary scales. Implications for future research are discussed.

Curryer C, Gray M & Byles JE. **Back to my old self and life starting: Biographies** of ageing in **Beck's risk society**. *Journal of Sociology*, 2018; 52(2), 249-263.

Drawing on free-text survey comments from the Australian Longitudinal Study of Women's Health (ALSWH), this article explores themes of transition and change in the lives of 150 women baby boomers (born between 1946 and 1951) in relation to Beck's theories of the risk society, reflexive modernisation and individualisation. Few studies have explicitly

explored ageing through Beck's theoretical lenses. However, Beck's emphasis on interactional processes of social, individual and structural change has much to offer for sociological studies of ageing. A key premise is that of complex adaptation and change as people age, with focus on the socio-political contexts in which the post-Second World War baby boomer generation will live out their later years.

Curryer C, Gray M & Byles JE. Older women's expectations of care, reciprocity, and government support in Australia. 'Am I not worthy? Ethics & Social Welfare, 2018; 12(3), 259-271.

This paper considers the lived experience and meaning of care for women born between 1946 and 1951, who are living alone, and are participants in the Australian Longitudinal Study of Women's Health (ALSWH). The discussion is based on free-text survey comments (n = 150 women) and in-depth interview data (n = 15 women) exploring women's experiences of ageing and their future expectations of care. It delves into tensions within relevant themes relating to care (unpaid informal care, volunteer work, and reciprocity), and the caring ethos, as described by women who are ageing in Australian communities. It highlights dilemmas faced by women who have grown old with the expectation of government support and care in later life, but who are facing the possibility this might not eventuate. These dilemmas are discussed with reference to governmental ethical-moral responsibilities for care within the context of user-pays welfare systems and profiteering within marketised aged-care services.

Damone AL, Joham AE, Loxton D, Earnest A, Teede HJ & Moran LJ. Depression, anxiety and perceived stress in women with and without PCOS: A community-based study. *Psychological Medicine*, 2018, 1-11, doi: 10.1017/S0033291718002076.

Background: Polycystic ovary syndrome (PCOS) is associated with increased psychological distress in clinical populations. We aimed to assess depression, anxiety and perceived stress in women with and without PCOS in a large community-based sample and investigate the role of stress in contributing to and mediating the relationship between PCOS, depression and anxiety.

Methods: A cross-sectional analysis was performed from the Australian Longitudinal Study of Women's Health (ALWSH) comparing women with (n = 478) or without (n = 8134) a self-reported diagnosis of PCOS. Main outcome measures were depression, anxiety and perceived stress measured using validated scales. The χ 2 and t tests were used to assess differences between groups. Univariable and multivariable regression were performed to determine factors contributing to each outcome.

Results: Women reporting PCOS, compared with women not reporting PCOS, reported higher prevalence of depression (27.3% v. 18.8%), anxiety symptoms (50% v. 39.2%) and greater score for perceived stress ($1.01 \pm 0.03 v. 0.88 \pm 0.01$). After adjusting for body mass index, infertility and socio-demographic factors, women with PCOS were still more likely to be depressed, anxious and to have a higher level of perceived stress. There was a high-level mediation effect of stress between PCOS and both depression and anxiety.

Conclusion: Compared with women not reporting PCOS, women reporting PCOS have increased depression, anxiety and perceived stress. Stress may play a role in the association between PCOS, depression and anxiety. Further studies should consider assessment and management of stress in PCOS as it may be relevant for understanding the aetiology and treatment of psychological distress.

Davis D, Brown WJ, Foureur M, Nohr EA & Xu F. Long-term weight gain and risk of overweight in parous and nulliparous women. *Obesity*, 2018; 26(6), 1072-1077.

Objective: In longitudinal studies, women gain significant amounts of weight during young adulthood, pointing to pregnancy as an important trigger for weight gain. Studies examining the effect of parity vary in their findings and are complicated by multiple potential confounders. This study examines the association between parity and long-term weight gain in a cohort of young women (born 1973-78) participating in the Australian Longitudinal Study on Women's Health (ALSWH).

Methods: A sample of 8,009 parous and nulliparous women was drawn from this cohort and allocated to one of six parity groups (0-5+). Weight gain and factors associated with BMI \geq 25 over a 16-year period were identified by using generalized linear equations.

Results: Median BMI increased by between 2.95 and 4.9 units over 16 years, with women of parity 5+ showing the biggest gain. Associations between several variables and a BMI \geq 25 (controlling for multiple demographic and behavioral factors) demonstrated no effect for parity but significant effects for survey year, no paid job, and depression. University education and high levels of physical activity were protective.

Conclusions: In this sample, parity was not associated with a BMI \ge 25 over a 16-year period.

de Luca K, Hunter S, Byles J & Parkinson L. **Qualitative insights into the experience of pain in older Australian women with arthritis.** Australasian Journal on Ageing, 2018; 37(3), 210-216.

Objective: To explore qualitative insights into the pain experience of older women with quantitatively derived pain profiles.

Methods: The sequential mixed methods design involved applying quantitative pain profiles, derived from an earlier latent class analysis, to qualitative comments by a sample of older Australian women with arthritis. Data from a substudy of the Australian Longitudinal Study on Women's Health, mid-aged cohort, born 1946–1951, were used. Inductive content analysis was conducted to explore qualitative insights into the experience of pain.

Results: The average age of women was 64.6 years (\pm 1.4). Within each derived pain profile, themes generated from the qualitative comments of women were concordant with the profile descriptors: 'I manage my pain' for the uni-dimensional, mild pain profile (comments from 56 women); 'I live with pain every day' and 'I rely on medication regularly' for the moderate multidimensional pain profile (comments from 39 women); and 'multiple pains', 'I suffer with pain' and 'I am unable and adjust' for the severe multidimensional pain profile (comments from 31 women).

Conclusion: Women with different pain profiles used different language and strategies in managing their pain experience, information which can guide clinicians to provide more tailored support for self-management and care of arthritis pain.

Ekelund U, Brown WJ, Steene-Johannessen J, Wang Fangerland M, Owen N, Powell KE, Bauman A & Lee I-M. **Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850,060 participants.** British Journal of Sports Medicine, 2018; doi: 10.1136/bjsports-2017-098963.

Objective: To examine whether the associations between sedentary behaviours (i.e., daily sitting/TV-viewing time) and mortality from cardiovascular disease (CVD) and cancer differ by different levels of physical activity (PA).

Design: Harmonised meta-analysis of prospective cohort studies. Data on exposure variables were harmonised according to a predefined protocol and categorised into four groups for sedentary behaviours and into quartiles of PA (MET-hour/week).

Data sources: PubMed, PsycINFO, Embase, Web of Science, Sport Discus and Scopus.

Eligibility criteria for selecting studies: Individual level data on both sedentary behaviours and PA and reported effect estimates for CVD or cancer mortality.

Results: Nine studies (n=850 060; deaths=25 730) and eight studies (n=777 696; deaths=30 851) provided data on sitting time and CVD and cancer mortality, respectively. Five studies had data on TV-viewing time and CVD (n=458 127; deaths=13 230) and cancer (n=458 091; deaths=16 430) mortality. A dose–response association between sitting time (9%–32% higher risk; p for trend <0.001) and TV time (3%–59% higher risk; p for trend <0.001) and TV time (3%–59% higher risk; p for trend <0.001) with CVD mortality was observed in the 'inactive', lowest quartile of PA. Associations were less consistent in the second and third quartiles of PA, and there was no increased risk for CVD mortality with increasing sedentary behaviours in the most active quartile. Associations between sedentary behaviours and cancer mortality were generally weaker; 6%–21% higher risk with longer sitting time observed only in the lowest quartile of PA.

Conclusion: PA modifies the associations between sedentary behaviours and CVD and cancer mortality. These findings emphasise the importance of higher volumes of moderate and vigorous activity to reduce, or even eliminate these risks, especially for those who sit a lot in their daily lives.

Fisher C, Hickman L, Adam J & Sibbritt D. **Cyclic perimenstrual pain and discomfort and Australian women's associated use of complementary and alternative medicine: A longitudinal study.** *Journal of Women's Health*, 2018; 27(1), 40-50.

Objective: To examine the longitudinal change in Australian women's prevalence of cyclic perimenstrual pain and discomfort and the association between their symptoms and use of complementary and alternative medicine (CAM).

Method: Data on endometriosis, premenstrual syndrome (PMS), irregular periods, heavy periods, and severe period pain were collected over a 7-year period from the Australian Longitudinal Study on Women's Health, for women aged 28 to 33 years in 2006, and at 3-year follow-ups. Changes in symptoms and patterns of CAM practitioner and therapy/product use associated with these symptoms were analyzed using longitudinal regression modeling.

Results: Over the 7-year period, prevalence rates of PMS and heavy periods increased, while prevalence rates of endometriosis, irregular periods, and severe period pain remained stable. The most common use of CAM longitudinally associated with the perimenstrual symptoms was use of vitamins/minerals, yoga/meditation, massage therapy, herbal medicine, and aromatherapy. Excluding consultation with a naturopath/herbalist, over the 7-

year survey women's use of all other CAM practitioners increased as did their use of vitamin/minerals, yoga/meditation, and Chinese medicines, while aromatherapy use declined.

Conclusion: Only the prevalence of PMS and heavy periods increased with aging in this sample of women. While overall use of CAM practitioner and self-prescribed products/therapies increased over time, CAM was chosen by women mainly to treat endometriosis and PMS. The extent to which this use reflects treatment efficacy is uncertain.

Forder P, Byles J, Vo K, Curryer C & Loxton D. **Cumulative incidence of** admission to permanent residential aged care for Australian women – A competing risk analysis. Australian and New Zealand Journal of Public Health, 2018; 42(2), 166-171.

Objective: To provide a direct estimate of the risk of admission to permanent residential aged care among older women while accounting for death, according to housing type and other variables.

Methods: A competing risk analysis from 8,867 Australian women born 1921-26, using linked data from the Australian Longitudinal Study on Women's Health (ALSWH), Residential Aged Care (RAC), and the Australian National Death Index.

Results: After accounting for deaths, around 35% of women will be admitted to RAC between ages 73 and 90. The conditional cumulative incidence of admission to RAC was 26.9% if living in a house, compared to 36.0% from an apartment, 43.6% within a retirement village, and 37.1% if living in a mobile home. Each one-year increase in age was associated with a relative 17% increased risk of RAC.

Conclusion: Around one-third of women will enter RAC between age 73 and 90. Living in a house had the lowest risk of entering residential aged care over time. Implications for public health: These findings have important implications for planning for aged care services, including the role of housing in delaying admission to residential aged care, and the need for residential care by a high proportion of women towards the end of life.

Frawley J, McIntyre E, Sibbritt D, Wardle J Schloss J, Lauche R & Adams J. Associations between cancer screening behavior and complementary medicine use: Results of a national cross-sectional survey of 9151 Australian women. Integrative Cancer Therapies, 2018; 17(3), 979-985. Introduction: Complementary medicine (CM) use has been found to influence the uptake of conventional cancer treatment. This study examines associations between CM use and cancer screening rates. **Methods:** Women aged 62 to 67 years from the Australian Longitudinal Study on Women's Health were surveyed regarding their use of cancer screening initiatives. Associations between cancer screening behavior and visits to CM practitioners were analyzed.

Results: Of the 9151 women, 9049 (98.9%) completed questions about cancer screening. A total of 65.1% of women had received a clinical skin examination, 54.3% colorectal cancer screening, 56.2% Pap test (within past 2 years), 83.3% mammogram (within past 2 years), 55.8% clinical breast examination, and 55.8% had conducted breast self-examination. Women who had consulted a massage therapist were more likely to undergo clinical skin examination (P =.002), clinical breast examination (P =.018), and mammogram (P =.001). Women who had consulted a chiropractor were more likely to undergo a clinical skin examination (P =.001), colorectal cancer screening (P =.020), and mammogram (P =.011). Women who had consulted an acupuncturist were more likely to undergo colorectal cancer screening (P =.019), and those who consulted with an osteopath were more liable to have a Pap test (P =.049).

Conclusion: Women who visit CM practitioners are more likely to participate in cancer screening initiatives. Research is required to understand the current and potential role that CM practitioners (can) have as public health advocates, recommending preventative health measures such as cancer screening. Such an examination will help ensure optimal screening utilization and effective, timely care for all cancer patients.

Holden L, Hockey R, Ware RS & Lee C. **Mental health-related quality of life** and the timing of motherhood: A 16-year longitudinal study of a national cohort of young Australian women. Quality of Life Research, 2018; 27(4), 923-935.

Purpose: We examine timing of motherhood in a longitudinal cohort of young Australian women, and its relationship with mental health-related quality of life (SF-36 MHI-5), and with sociodemographic, health behaviour and health-related variables.

Methods: We analysed longitudinal self-report data from a nationally representative cohort of 10,332 Australian women born 1973–1978, surveyed 6 times between 1996 (aged 18–23) and 2012 (aged 34–39).

Results: Group-based trajectory modelling identified four groups. Normative Mothers (46%, mean age at motherhood 30.5 years) made the transition to motherhood close to the Australian median age. Early Mothers (25%, 25.2 years) and Very Early Mothers (7%, 20.0 years) made this transition earlier; Not Mothers (22%) had not given birth. Generalised linear mixed models showed that all groups improved mean MHI-5 scores over time. Patterns of

group differences were complex: Normative and Early Mothers scored consistently highest; Very Early Mothers scored lowest at most surveys; Not Mothers' scores increased relative to others over time. Most effects disappeared after adjustment for confounders. Early and Very Early Mothers showed multiple indicators of social disadvantage, while Not Mothers had very low rates of marriage.

Conclusions: Timing of motherhood is embedded in sociodemographic and personal contexts. Women with socioeconomic advantages were characterised by higher mental health-related quality of life and later transition to motherhood, but adjustment for relative advantage attenuated differences in mental health-related quality of life. The overall findings suggest a pattern of positive adaptation to circumstances, with mental health-related quality of life improving through early adulthood regardless of timing of motherhood.

Holowko N, Jones M, Tooth L, Koupil G & Mishra D. **Socioeconomic position** and reproduction: Findings from the Australian Longitudinal Study on Women's Health. Maternal and Child Health Journal, 2018; 22(12), 1713-1724.

Objective: To investigate the association of socioeconomic position (SEP) with reproductive outcomes among Australian women.

Methods: Data from the Australian Longitudinal Study on Women's Health's (populationbased cohort study) 1973–1978 cohort were used (N = 6899, aged 37–42 years in 2015). The association of SEP (childhood and own, multiple indicators) with age at first birth, birthto-pregnancy (BTP) intervals and total number of children was analysed using multinomial logistic regression.

Results: 14% of women had their first birth aged < 24 years. 29% of multiparous women had a BTP interval within the WHO recommendation (18–27 months). Women with a low SEP had increased odds of a first birth < 24 years: low (OR 7.0: 95% C.I. 5.3, 9.3) or intermediate education (OR 3.8: 2.8, 5.1); living in rural (OR 1.8: 1.5, 2.2) or remote (OR 2.1: 1.7, 2.7) areas; who found it sometimes (OR 1.8: 1.5, 2.2) or always difficult (OR 2.0: 1.6, 2.7) to manage on their income; and did not know their parent's education (OR 4.5: 3.2, 6.4). Low SEP was associated with having a much longer than recommended BTP interval.

Conclusion: As the first Australian study describing social differences in reproductive characteristics, these findings provide a base for reducing social inequalities in reproduction. Assisting adequate BTP spacing is important, particularly for women with existing elevated risks due to social disadvantage; including having a first birth < 24 years of age and a longer than recommended BTP interval. This includes reviewing services/access to postnatal support, free family planning/contraception clinics, and improved family policies.

Jackson J, Patterson AJ, MacDonald-Wicks LK, Bondonno CP, Blekkenhorst LC, Ward NC, Hodgson JM, Byles JE & McEvoy MA. Dietary nitrate and diet quality: An examination of changing dietary intakes within a representative sample of Australian women. *Nutrients*, 2018; 10(8), 1005.

Dietary nitrate is increasingly linked to a variety of beneficial health outcomes. Our purpose was to estimate dietary nitrate consumption and identify key dietary changes which have occurred over time within a representative sample of Australian women. Women from the 1946–1951 cohort of the Australian Longitudinal Study on Women's Health with complete food frequency questionnaire data for both 2001 and 2013 were included for analysis. Dietary nitrate intakes were calculated using key published nitrate databases. Diet quality scores including the Australian Recommended Food Score, the Mediterranean Diet Score and the Nutrient Rich Foods Index were calculated along with food group serves as per the Australian Dietary Guidelines. Wilcoxon matched pairs tests were used to test for change in dietary intakes and Spearman's correlations were used to examine associations. In our sample of 8161 Australian women, dietary nitrate intakes were on average 65–70 mg/day, and we detected a significant increase in dietary nitrate consumption over time (+6.57 mg/day). Vegetables were the primary source of dietary nitrate (81-83%), in particular lettuce (26%), spinach (14-20%), beetroot (10-11%), and celery (7-8%) contributed primarily to vegetable nitrate intakes. Further, increased dietary nitrate intakes were associated with improved diet quality scores (r = 0.3, p < 0.0001). Although there is emerging evidence indicating that higher habitual dietary nitrate intakes are associated with reduced morbidity and mortality, future work in this area should consider how dietary nitrate within the context of overall diet quality can facilitate health to ensure consistent public health messages are conveyed.

Kanesarajah J, Waller M, Whitty JA & Mishra GD. **Physical activity and body mass shape quality of life trajectories in mid-age women.** Australian and New Zealand Journal of Public Health, 2018; 42(4), 403-409.

Objective: To determine the combined longitudinal effect of body mass index (BMI) and physical activity (PA) on health-related quality of life (HrQoL), using the SF-6D (SF-36) utility measure.

Methods: Five waves of self-reported data from the 1946–51 cohort (n=5,200; data collection, 2001–2013) of the Australian Longitudinal Study on Women's Health were used. Mixed effect models were employed to address the objective.

Results: Women with high PA experienced higher HrQoL regardless of BMI group, however, for those healthy or overweight, there was a very small decline in HrQoL over time. Women reporting no PA levels experienced the lowest baseline mean SF-6D score within

each BMI group, with decreasing trajectories over the follow-up period. The rate of decline was greatest in women with obesity. Within each BMI group, there was a large, increasing gap in HrQoL between those who reported no and low PA over time. Women with obesity and high PA experienced similar HrQoL trajectories to women with normal weight or overweight with low PA levels. Overweight women with moderate PA experienced similar HrQoL to those with low PA but normal weight.

Conclusions: PA may mitigate the adverse effect of overweight and obesity on HrQoL at mid-life, at higher activity levels.

Implications for public health: PA benefits HrQoL regardless of body mass, with larger gains for those currently not physically active. Moderate to high PA may mitigate the effect of overweight and obesity.

Laaksonen MA, Canfell K, MacInnis R, Arriaga ME, Banks E, Magliano DJ, Giles GG Cumming RG, Byles JE, Mitchell P, Gill TK, Hirani V, McCullough S, Shaw JE, Taylor AW, Adelstein B-A & Vajdic CM. **The future burden of lung cancer attributable to current modifiable behaviours: A pooled study of seven Australian cohorts.** International Journal of Epidemiology, 2018; 47(6), 1772-1783.

Background: Knowledge of preventable disease and differences in disease burden can inform public health action to improve health and health equity. We quantified the future lung cancer burden preventable by behavioural modifications across Australia.

Methods: We pooled seven Australian cohort studies (n = 367 058) and linked them to national registries to identify lung cancers and deaths. We estimated population attributable fractions and their 95% confidence intervals (CIs) for modifiable risk factors, using risk estimates from the cohort data and risk factor exposure distribution from contemporary national health surveys.

Results: During the first 10-year follow-up, there were 2025 incident lung cancers and 20 349 deaths. Stopping current smoking could prevent 53.7% (95% CI, 50.0–57.2%) of lung cancers over 40 years and 18.3% (11.0–25.1%) in 10 years. The smoking-attributable burden is highest in males, those who smoke <20 cigarettes per day, are <75 years of age, unmarried, of lower educational attainment, live in remote areas or are healthy weight. Increasing physical activity and fruit consumption, if causal, could prevent 15.6% (6.9–23.4%) and 7.5% (1.3–13.3%) of the lung cancer burden, respectively. Jointly, the three behaviour modifications could prevent up to 63.0% (58.0–67.5%) of lung cancers in

40 years, and 31.2% (20.9–40.1%) or 43 300 cancers in 10 years. The preventable burden is highest among those with multiple risk factors.

Conclusions: Smoking remains responsible for the highest burden of lung cancer in Australia. The uneven burden distribution distinguishes subgroups that could benefit the most from activities to control the world's deadliest cancer.

Lauche R, Fuller N, Cramer H, Wardle J, Sibbritt D & Adams J. Associations between complementary medicine, satisfaction with body weight and shape, and the use of methods to lose or control weight: Results of a national survey of 8,009 Australian Women. Complementary Therapies in Medicine, 2018; 36(1), 100-106.

Objective: This study aimed to determine whether the use of complementary medicine (CM) is associated with body satisfaction and weight management methods in Australian women.

Methods: Women aged 34–39 years from the Australian Longitudinal Study on Women's Health were surveyed regarding satisfaction with their body weight and shape, and the use of weight management methods. Associations with CM use were analysed using logistic regression modelling.

Results: Women using CM less likely wanted to lose weight; and were more likely to cut down on fats and/or sugars, use low glycaemic diets, diet books and 'other' methods (OR: 1.33–2.83) compared to CM non-users. Women using herbal medicine products 'sometimes' were more likely to use meal replacements/slimming products (OR: 1.50–1.67) compared to non-users.

Discussion: Australian women using CM are more likely to be satisfied with their body weight and shape, and to use a range of weight management approaches compared to CM non-users.

Liu H, Hall J, Xu X, Mishra G & Byles J. Differences in food and nutrient intakes between Australian- and Asian-born women living in Australia: Results from the Australian Longitudinal Study on Women's Health. Public Health Nutrition, 2018; 75(2), 142-150.

Aim: To determine differences in food and nutrient intakes between Australian- and Asianborn women living in Australia.

Methods: Data were obtained from the Australian Longitudinal Study on Women's Health, including 6461 women born in Australia or Asia who completed food frequency questionnaires in 2001 and 2013. Diet was assessed using the Dietary Questionnaire for Epidemiological Studies version 2. Longitudinal generalised estimating-equation modelling

was performed to determine the effect of country of birth and survey year on fruit and vegetable intake.

Results: Asian-born women ate more cereals, soybeans and fish but less vegetables, legumes, dairy, meat and meat products than Australian-born women both in 2001 and in 2013. Asian-born women ate less cereals, rice and noodles, meat and its products (P < 0.05) in 2013 than in 2001. The earlier people came to Australia, the less their rice and noodle intake per day. However, the reverse was demonstrated regarding vegetable intake. Asian-born women had a lower daily intake of fat, calcium, zinc, thiamin, riboflavin, folate and retinol compared with those born in Australia.

Conclusions: Asian-born women living in Australia show different food and nutrient intakes from Australian-born women, although their diets tend to deviate from typical Asian characteristics and approach a Western diet.

Looman M, Schoenaker D, Soedamah-Muthu SS, Geelen A, Feskens EJM & Mishra GD. **Pre-pregnancy dietary carbohydrate quantity and quality, and risk of developing gestational diabetes: The Australian Longitudinal Study on Women's Health**. *British Journal of Nutrition*, 2018; 120(4), 435-444.

Carbohydrate quantity and quality affect postprandial glucose response, glucose metabolism and risk of type 2 diabetes. The aim of this study was to examine the association of prepregnancy dietary carbohydrate quantity and quality with the risk of developing gestational diabetes mellitus (GDM). We used data from the Australian Longitudinal Study on Women's Health that included 3607 women aged 25-30 years without diabetes who were followed up between 2003 and 2015. We examined carbohydrate quantity (total carbohydrate intake and a low-carbohydrate diet (LCD) score) and carbohydrate subtypes indicating quality (fibre, total sugar intake, glycaemic index, glycaemic load and intake of carbohydrate-rich food groups). Relative risks (RR) for development of GDM were estimated using multivariable regression models with generalised estimating equations. During 12 years of follow-up, 285 cases of GDM were documented in 6263 pregnancies (4.6 %). The LCD score, reflecting relatively high fat and protein intake and low carbohydrate intake, was positively associated with GDM risk (RR 1.54; 95 % CI 1.10, 2.15), highest quartile v. lowest quartile). Women in the guartile with highest fibre intake had a 33 % lower risk of GDM (RR 0.67; 95 % CI 0.45, 0.96)). Higher intakes of fruit (0.95 per 50 g/d; 95 % CI 0.90, 0.99) and fruit juice (0.89 per 100 g/d; 95 % CI 0.80, 1.00)) were inversely associated with GDM, whereas cereal intake was associated with a higher risk of GDM (RR 1.05 per 20 g/d; 95 % CI 1.01, 1.07)). Thus, a relatively low carbohydrate and high fat and protein intake may increase the risk of GDM,

whereas higher fibre intake could decrease the risk of GDM. It is especially important to take the source of carbohydrates into account.

Loxton D, Tooth L, Harris M, Forder P, Dobson A, Powers J, Brown W, Byles & Mishra G. Cohort Profile: Australian Longitudinal Study on Women's Health (ALSWH) 1989-95 cohort. International Journal of Epidemiology, 2018; 47(2), 391–392e.

In 2010, the lack of contemporary health information about women in early adulthood led the Australian Government Department of Health to provide funding for the establishment of a cohort of women who would be aged 18–23 years in 2012–13. This would be the fourth cohort of the Australian Longitudinal Study on Women's Health (ALSWH). Since 1996, the Australian Government Department of Health has funded the ALSWH to obtain data on health and health service use from three cohorts of women, born in 1973–78, 1946–51 and 1921–26. The study is based at the University of Newcastle and the University of Queensland. The purpose of the ALSWH is to provide evidence for development of policy and practice in women's health and health services.

The need for an additional cohort was driven by recognition that this generation have markedly different experiences and backgrounds from those of the existing ALSWH cohorts. In particular this new cohort, born in 1989–95, has grown up with rapid technological advancement and high levels of interpersonal connectivity via mobile phones and social media, as well as high levels of information availability through the internet. In a reflection of these generational differences, the establishment of the new cohort required the use of distinctly different recruitment and survey methods from those that were used with the original cohorts.

The 1989–95 cohort was established to identify the determinants of good health, illness and health service use throughout adult life, including the demographic, economic, health behaviour, social, environmental and personal factors that influence physical and mental health. The information obtained from all ALSWH cohorts is used by the Australian Government Department of Health as evidence for policy and planning.

Madigan CD, Pavey T, Daley AJ, Jolly K & Brown W. **Is weight cycling associated with adverse health outcomes? A cohort study.** *Preventive Medicine*, 2018; 108, 47-52.

Evidence about the health effects of weight cycling is not consistent, with some studies suggesting it is harmful for health. Here we investigated whether weight cycling was associated with weight change and mental health outcomes in 10,428 participants in the mid-age cohort of The Australian Longitudinal Study of Women's Health (ALSWH) over 12

years. In 1998 the women were asked how many times they had ever intentionally lost at least 5 kg and how many times had they regained this amount. Women were categorised into four weight pattern groups: frequent weight cyclers (FWC, three or more weight cycles), low frequency weight cyclers (LFWC, one or two weight cycles), non-weight cyclers (NWC), and weight loss only (WL). We used generalised linear modelling to investigate relationships between weight pattern group, weight change and mental health outcomes. In 1998, 15% of the women were FWC, 24% LFWC, 46% NWC and 15% were WL. Weight change was similar across weight pattern groups in women with obesity, however healthy weight and overweight FWC gained more weight than women who did not weight cycle. We found no difference in overall mental health scores between groups, but both LFWC and FWC had higher odds of depressive symptoms (adjusted OR 1.5, 95%CI: 1.1 to 1.9 and 1.7, 95%CI: 1.1 to 2.4, respectively) than NWC. Our results suggest that, although weight cycling is not associated with greater weight gain in women with obesity, it may increase depressive symptoms.

Milton AH, Vashum KP, McEvoy M, Byles J & Attia A. **Prospective study of dietary zinc intake and risk of cardiovascular disease in women.** *Nutrients,* 2018; 10(1), doi: 10.3390/nu10010038.

Several animal and human studies have shown that zinc is associated with cellular damage and cardiac dysfunction. This study aims to investigate dietary zinc and the zinc-iron ratio, as predictors of incident cardiovascular disease (CVD) in a large longitudinal study of mid-age Australian women (aged 50–61 years). Data was self-reported and validated food frequency questionnaires were used to assess dietary intake. Energy-adjusted zinc was ranked using quintiles and predictors of incident CVD were examined using stepwise logistic regression. After six years of follow-up, 320 incident CVD cases were established. A positive association between dietary zinc intake, zinc-iron ratio and risk of CVD was observed even after adjusting for potential dietary and non-dietary confounders. Compared to those with the lowest quintile of zinc, those in the highest quintile (Odds Ratio (OR) = 1.67, 95% Confidence Interval (CI) = 1.08-2.62) and zinc-iron ratio (OR = 1.72, 95% CI = 1.05-2.81) had almost twice the odds of developing CVD (p trend = 0.007). This study shows that high dietary zinc intake and zinc-iron ratio is associated with a greater incidence of CVD in women. Further studies are required detailing the source of zinc and iron in diet and their precise roles when compared to other essential nutrients.

Mishra GD, Chung HF, Gelaw YA & Loxton D. **The role of smoking in the** relationship between intimate partner violence and age at natural menopause: A mediation analysis. *Women's Midlife Health*, 2018; 4(1), 1-10.

Background: Age at natural menopause (ANM) is considered as a biologic marker of health and ageing. The relationship between intimate partner violence (IPV) and ANM is currently unknown, and whether smoking plays a role in this relationship is unclear. The aim of this study was to examine the association between IPV and ANM and to quantify the effect mediated through smoking.

Methods: Data were drawn from the 1946–51 cohort of the Australian Longitudinal Study on Women's Health, a prospective cohort study first conducted in 1996. History of IPV (yes or no) was self-reported at baseline. ANM was confirmed by at least 12 months of cessation of menses where this was not a result of medical interventions such as bilateral oophorectomy or hysterectomy and categorised as <45 (early menopause), 45–49, 50–51, 52–53, and ≥54 years. Regression models and mediation analyses based on the counterfactual framework were performed to examine the relationship between IPV and ANM and to quantify the proportion mediated through smoking (never, past, current <10, 10–19 and ≥20 cigarettes/day).

Results: Of 6138 women in the study with natural menopause, 932 (15%) reported a history of IPV and 429 (7.0%) had an early ANM (before age 45 years). Women with IPV were more likely to smoke and be heavy smokers (Odds Ratio: 2.77, 95% CI 2.19–3.51). Women with IPV were also at increased risk of early menopause (ANM <45 years) (Relative Risk Ratio: 1.36, 95% CI 1.03–1.80) after accounting for education level, income difficulties, age at menarche, parity, body mass index, and perceived stress, compared to the reference group (women without IPV and ANM at 50–51 years). This relationship was attenuated after adjusting for smoking (Relative Risk Ratio: 1.20, 95% CI 0.90–1.59). Mediation analysis showed that cigarette smoking explained 36.7% of the association between IPV and early menopause (ANM <45 vs. ≥45 years).

Conclusion: Cigarette smoking substantially mediated the relationship between IPV and early menopause. Findings suggest that as part of addressing the impact of IPV, timely interventions that result in cessation of smoking will partly mitigate the increased risk of early menopause.

Mishra GD, Moss K, Loos C, Dobson AJ, Davies PSW, Loxton D, Hesketh KD, Koupil I, Bower C, Sly P, & Tooth L. **MatCH (Mothers and their Children's Health) Profile: Offspring of the 1973-78 cohort of the Australian Longitudinal Study on Women's Health.** Longitudinal and Life Course Studies, 2018; 9(3), 351-375.

MatCH (Mothers and their Children's Health) is a nationwide Australian study to investigate the links between the history of health, wellbeing and living conditions of mothers and the health and development of their children. MatCH builds on the Australian Longitudinal Study on Women's Health (ALSWH), which began in 1996 and has surveyed more than 58,000 women in four nationally representative age cohorts. MatCH focuses on the three youngest offspring of the cohort of ALSWH participants randomly sampled from all women in Australia born in 1973-78 (N=5780 children of N=3039 mothers). These women, who had completed up to seven postal or online surveys since 1996, were invited in 2016–17 to complete surveys about the health and development of their three youngest children aged under 13. The mothers reported on their children's health conditions and symptoms, diet, anthropometric measures, childcare, screen time, physical activity, temperament, behaviour, language development, motor development and health service utilisation, as well as household and environmental factors. These data are being linked with each child's records from official sources including the Australian Early Development Census (collected at age five to six), the National Assessment Program – Literacy and Numeracy (collected at age eight, 10, 12 and 14) and other external datasets. MatCH will combine 20 years of maternal data with all the information on her children, taking into account the family setting. MatCH offers an unprecedented opportunity to advance our understanding of the relationship between maternal health and wellbeing and child health and development.

Pandeya N, Huxley RR, Chung HF, Dobson A, Kuh D, Hardy R, Cade JE, Greenwood DC, Giles GG, Bruinsma F, Demakakos P, Simonsen MK, Adami H-O, Weiderpass E & Mishra G. Female reproductive history and risk of type 2 diabetes: A prospective analysis of 126,721 women. Diabetes, Obesity and Metabolism, 2018; 20, 2103-2112.

Aim: To examine the prospective associations between aspects of a woman's reproductive history and incident diabetes.

Methods: We pooled individual data from 126 721 middle-aged women from eight cohort studies contributing to the International Collaboration for a Life Course Approach to Reproductive Health and Chronic Disease Events (InterLACE). Associations between age at menarche, age at first birth, parity and menopausal status with incident diabetes were examined using generalized linear mixed models, with binomial distribution and robust variance. We stratified by body mass index (BMI) when there was evidence of a statistical interaction with BMI.

Results: Over a median follow-up of 9 years, 4073 cases of diabetes were reported. Nonlinear associations with diabetes were observed for age at menarche, parity and age at first birth. Compared with menarche at age 13 years, menarche at \leq 10 years was associated with an 18% increased risk of diabetes (relative risk [RR] 1.18, 95% confidence interval [CI] 1.02-1.37) after adjusting for BMI. After stratifying by BMI, the increased risk was only observed in women with a BMI \geq 25 kg/m2. A U-shaped relationship was observed between parity and risk of diabetes. Compared with pre-/peri-menopausal women, women with a hysterectomy/oophorectomy had an increased risk of diabetes (RR 1.17, 95% CI 1.07-1.29).

Conclusions: Several markers of a woman's reproductive history appear to be modestly associated with future risk of diabetes. Maintaining a normal weight in adult life may ameliorate any increase in risk conferred by early onset of menarche.

Patterson A, Hure A, Burrows T, Jackson J & Collins C. **Diet quality and 10-year** healthcare costs by BMI categories in the mid-age cohort of the Australian Longitudinal Study on Women's Health. Journal of Human Nutrition and Dietetics, 2018; 31(4), 463-472.

Background: Better diets, as evaluated by diet quality indices, are associated with lower rates of morbidity and mortality. Although governments and researchers alike recognise the burden that obesity incurs for increased healthcare spending, there is insufficient evidence for the role of diet quality on healthcare costs.

Methods: Diet quality was assessed by the Australian Recommended Food Score (ARFS) for 6328 women aged 50-55 years from the Australian Longitudinal Study on Women's Health. The ARFS was ranked by quintile, and 10-year cumulative data on healthcare costs from Medicare (Australia's Universal healthcare cover) were reported by body mass index category, using generalised linear modelling.

Results: Healthy weight women with the highest diet quality were found to make significantly fewer Medicare claims (P = 0.012) compared to those with the lowest diet quality. In healthy weight and overweight women, the number of healthcare claims and charges was inversely associated with consuming a greater variety of vegetables. For every 1 point increase in the ARFS vegetable component score, healthy weight women made 1.9 fewer healthcare claims and were charged \$139 less, whereas overweight women made 2.3 fewer claims and were charged \$176 less for healthcare over 10 years.

Conclusions: The results of the present study support the need to prioritise an improved diet quality with the aim of reducing healthcare claims and overall costs in a population-based sample of Australian females. As the burden of overweight and obesity on the

healthcare system increases, strategies to improve diet quality may be of particular importance; however, more research is required to further establish this relationship.

Peeters GMEE, Gardiner PA, Dobson AJ & Brown WJ. **Associations between** physical activity, medical costs and hospitalisations in older Australian women: Results from the Australian Longitudinal Study on Women's Health. Journal of Science and Medicine in Sport; 2018; 21(6), 604-608.

Objectives: The aim was to examine the associations between level of physical activity (PA) and non-hospital medical costs, and between physical activity and hospitalisations in older women from 1999 to 2013.

Design: Longitudinal observational study.

Methods: Data were collected from participants in the Australian Longitudinal Study on Women's Health, who completed surveys in 1999 (aged 73-78 years), 2002, 2005, 2008 and 2011. Annual cost data (from the Medicare Benefits Schedule) were available for 1999 to 2013 and hospital admissions data were available for 2002 to 2010. Costs were expressed in 2013 Australian dollars (AUD). Prospective associations between self-reported physical activity (categorised as inactive, low, moderate or high) and costs/admissions were examined using quantile regression (for costs) and logistic regression fitted with generalised estimating equations (for hospitalisation).

Results: Median annual costs were AUD122 (95% confidence interval [CI]=199, 45), AUD284 (CI=363, 204) and AUD316 (CI=385, 247) lower in low, moderate and highly active women, respectively, than in those who were inactive [AUD1890 (interquartile range=1107-3296)]. Odds of hospitalisation were also lower in the low (odds ratio [OR]=0.88, CI=0.80-0.96), moderate (OR=0.77, CI=0.70-0.85) and highly active (OR=0.78, CI=0.71-0.85) women, than in the inactive group.

Conclusions: In inactive older Australian women, a small increase in physical activity may be sufficient to obtain substantial cost savings for the health system and to reduce hospital admissions.

Peeters GMEE, Waller M & Dobson AJ. **SF-36 normative values according to level of functioning in older women.** *Quality of Life Research, 2018; doi:* 10.1007/s11136-018-2077-z.

Purpose: The 36-item Medical Outcome Study Short Form (SF-36) survey measures healthrelated quality of life. Age and disease-specific normative values have been published, but a focus on level of functioning may be more meaningful in case of multimorbidity. We estimated normative values for Australian women aged 79–90 years according to levels of functioning.

Methods: Data were from 6127 (aged 79–84 in 2005) and 3424 (aged 85–90 in 2011) participants in the Australian Longitudinal Study on Women's Health. Surveys included the SF-36 and information on housing. Record linkage to assessment data for access to the national program for aged care support was used to obtain information on participants' need for assistance with 10 activities. Normative values were calculated for physical component (PCS), mental component (MCS), and subscale scores for subsamples defined by types of assistance needed.

Results: At the ages of 79–84, the mean (95% confidence interval) PCS and MCS values for women not any needing assistance were 37.5 (37.2–37.9) and 53.0 (52.8–53.3) compared to 29.0 (27.8–30.2) and 45.9 (44.4–47.4) for women needing any assistance. At ages 85–90, the corresponding PCS values were 34.9 (34.5–35.4) vs. 28.2 (27.4–29.0) and the corresponding MCS values were 53.2 (52.8–53.6) vs. 48.7 (47.8–49.6). Values were higher for participants living in the community or retirement village vs. nursing homes/hostels. The PCS, MCS and 8 subscale values decreased as the need for assistance with more basic activities increased.

Conclusions: These normative values facilitate meaningful interpretation of SF-36 scores from the perspective of level of functioning.

Peeters G, van Schoor NM, Cooper R, Tooth L& Kenny RA. **Should prevention** of falls start earlier? Co-ordinated analyses of harmonised data on falls in middle-aged adults across four population-based cohort studies. *PLoS ONE*, 2018; 13(8), e0201989.

The prevalence of risk factors for falls increases during middle-age, but the prevalence of falls in this age-range is often overlooked and understudied. The aim was to calculate the prevalence of falls in middle-aged adults (aged 40±64 years) from four countries. Data were from four population-based cohort studies from Australia (Australian Longitudinal Study on Women's Health, n = 10556, 100% women, 51±58 years in 2004), Ireland (The Irish Longitudinal Study on Ageing, n = 4968, 57.5% women, 40±64 years in 2010), the Netherlands (Longitudinal Aging Study Amsterdam, n = 862, 51.6% women, 55±64 years in 2012±13) and Great Britain (MRC National Survey of Health and Development, n = 2821, 50.9% women, 53 years in 1999). In each study, falls assessment was based on recall of any falls in the past year. The prevalence of falls was calculated for the total group, for each country, for men and women separately, and for 5-year age-bands. The prevalence was higher in Australia (27.8%, women only) and the Netherlands (25.1%) than in Ireland

(17.6%) and Great Britain (17.8%, p<0.001). Women (27.0%) had higher prevalences than men (15.2%, p<0.001). The prevalence increased from 8.7% in 40±44 year olds to 29.9% in 60±64 year olds in women, and from 14.7% in 45±49 year olds to 15.7% in 60±64 year olds in men. Even within 5-year age-bands, there was substantial variation in prevalence between the four cohorts. Weighting for age, sex and education changed the prevalence estimates by less than 2 percentage points. The sharp increase in prevalence of falls in middle-age, particularly among women supports the notion that falls are not just a problem of old age, and that middle-age may be a critical life stage for preventive interventions.

Peng W, Lauche R, Frawley J, Sibbritt D & Adams J. **Utilization of** complementary and alternative medicine and conventional medicine for headache or migraine during pregnancy: A cross-sectional survey of 1,835 pregnant women. Complementary Therapies in Medicine, 2018; 41, 192-195. Objectives: Little is known about women's use of health services affected by headache or migraine during pregnancy. This paper directly addresses the research gap reporting on the healthcare utilization among Australian pregnant women experiencing headache or

migraine.

Design and setting: In this retrospective observational study, data on 1,835 Australian pregnant women were obtained from the nationally-representative Australian Longitudinal Study on Women's Health. Information on quality of life and health seeking behaviors regarding conventional medicine and complementary and alternative medicine providers was identified among these participants. Factors associated with healthcare use were analyzed using regression analyses.

Results: A total of 16% of the pregnant women surveyed experienced headache or migraine, and over 20% sought help from more than two types of healthcare practitioners for their headache or migraine. General practitioners (37.8%) were the most commonly consulted providers of pregnant women for their headache or migraine. Women with headache or migraine during pregnancy had worse health-related quality of life than those without. Education level and private health insurance status of pregnant women are the predictors of the use of healthcare practitioners for their management of headache or migraine (both p < 0.05).

Conclusions: Headache or migraine during pregnancy significantly impacts upon pregnant women's quality of life. The use of multiple healthcare practitioners, including conventional medicine and complementary and alternative medicine practitioners, highlights the need for further research investigating health services utilization of pregnant women with headache or migraine in different severity and frequency to help inform effective and safe treatment.

Quatela A, Callister R, Patterson A, McEvoy M & MacDonald-Wicks L. **The** protective effect of muesli consumption on diabetes risk: Results from 12 years of follow-up in the Australian Longitudinal Study on Women's Health. *Nutrition Research*, 2018; 51, 12-20.

Diabetes affects 9.8% of Australian women. Breakfast cereal consumption is potentially protective against diabetes. This study investigated the effects of breakfast cereal consumption on the 12-year risk of developing diabetes among mid-aged participants of the Australian Longitudinal Study of Women's Health (ALSWH). It was hypothesized that any breakfast cereal and higher-fiber breakfast cereals would be protective against the risk of developing diabetes. Data from Survey 3 (S3) to Survey 7 (S7) inclusive, from the 1946-51 ALSWH cohort were analyzed. Dietary data were obtained at S3 and the outcome was incident diabetes between S4-S7. Women were excluded if: they reported existing diabetes or impaired glucose tolerance at S3; dietary data were incomplete; or daily energy intake was <4,500 or >20,000kJ. Logistic regression with discrete time survival analyses investigated the association between breakfast cereal intake and incident diabetes. Models were adjusted for income, BMI, smoking, physical activity, education, and dietary intakes and included a measure of time. There were 637 incident cases of diabetes. Breakfast cereal intake per se was not associated with incident diabetes (OR: 1.00; p=0.98). Muesli consumption on its own (OR: 0.74; p=0.00) or as a part of oats-based cereal (OR: 0.84; p=0.047) was significantly associated with a decrease in the odds of developing diabetes. No other breakfast cereals were significantly associated with diabetes risk. Among mid-aged Australian women, muesli consumption was associated with a reduction in diabetes risk. This effect may be due to a particular profile of muesli eaters, but the relationship warrants further investigation.

Rich JL, Wright SL & Loxton D. **Older rural women living with drought.** Local Environment, 2018; doi: 10.1080/13549839.2018.1532986.

Women's experiences of drought are often made invisible particularly in terms of their longterm effects. Drought differs from other "natural disasters" in that droughts are, by definition, experienced over an extended time. This means those experiencing drought do so as they age, with elderly cohorts particularly vulnerable. As such, there is a need to better understand the longitudinal needs and experiences of women living with drought. This study investigates the experiences of drought for 15 Australian women aged over 70, over a period of 12 years. Longitudinal qualitative free-text comments written by the oldest cohort of women in the Australian Longitudinal Study on Women's Health were subject to a thematic analysis. Findings indicate that experiences of drought have a relationship to women's ability to age in ways they may have hoped. Themes of Work and Physical activity, Connection to place, and, Service access were prominent in women's comments. These results
demonstrate that place is an important aspect in the experience of ageing, that work and physical activity often intensify during drought for elderly people who might otherwise be expecting to retire, and that drought presents particular challenges for older women in terms of access to services. This study highlights the complex interactions of living and ageing in drought for Australian women.

Schoenaker DAJM, Vergouwe Y, Soedamah-Muthu SS, Callaway LK & Mishra GD. **Preconception risk of gestational diabetes: Development of a prediction model in nulliparous Australian women.** Diabetes Research and Clinical Practice, 2018; 146, 48-57.

Aim: To develop a prediction model for preconception identification of women at risk of gestational diabetes mellitus (GDM).

Methods: Data from a prospective cohort, the Australian Longitudinal Study on Women's Health, were used. Nulliparous women aged 18–23 who reported a pregnancy up to age 37–42 were included. Preconception predictors of GDM during a first pregnancy were selected using logistic regression. Regression coefficients were multiplied by a shrinkage factor estimated with bootstrapping to improve prediction in external populations.

Results: Among 6504 women, 314 (4.8%) developed GDM during their first pregnancy. The final prediction model included age at menarche, proposed age at future first pregnancy, ethnicity, body mass index, diet, physical activity, polycystic ovary syndrome, and family histories of type 1 or 2 diabetes and GDM. The model showed good discriminative ability with a C-statistic of 0.79 (95% CI 0.76, 0.83) after internal validation. More than half of the women (58%) were classified to be at risk of GDM (>2% predicted risk), with corresponding sensitivity and specificity values of 91% and 43%.

Conclusions: Nulliparous women at risk of GDM in a future first pregnancy can be accurately identified based on preconception lifestyle and health-related characteristics. Further studies are needed to test our model in other populations.

Stephenson J, Heslehurst N, Hall J, Schoenaker DAJM, Hutchinson J, Cade J, Poston L, Barrett G, Crozier SR, Barker M, Kumaran K, Yajnik CS, Baird J & Mishra GD. **Before the beginning: Nutrition and lifestyle in the preconception period and its importance for future health.** *Lancet,* 2018; 391(10132), 1830– 1841.

A woman who is healthy at the time of conception is more likely to have a successful pregnancy and a healthy child. We reviewed published evidence and present new data from low-income, middle-income, and high-income countries on the timing and importance of preconception health for subsequent maternal and child health. We describe the extent to

which pregnancy is planned, and whether planning is linked to preconception health behaviours. Observational studies show strong links between health before pregnancy and maternal and child health outcomes, with consequences that can extend across generations, but awareness of these links is not widespread. Poor nutrition and obesity are rife among women of reproductive age, and differences between high-income and low-income countries have become less distinct, with typical diets falling far short of nutritional recommendations in both settings and especially among adolescents. Several studies show that micronutrient supplementation starting in pregnancy can correct important maternal nutrient deficiencies, but effects on child health outcomes are disappointing. Other interventions to improve diet during pregnancy have had little effect on maternal and newborn health outcomes. Comparatively few interventions have been made for preconception diet and lifestyle. Improvements in the measurement of pregnancy planning have quantified the degree of pregnancy planning and suggest that it is more common than previously recognised. Planning for pregnancy is associated with a mixed pattern of health behaviours before conception. We propose novel definitions of the preconception period relating to embryo development and actions at individual or population level. A sharper focus on intervention before conception is needed to improve maternal and child health and reduce the growing burden of non-communicable diseases. Alongside continued efforts to reduce smoking, alcohol consumption, and obesity in the population, we call for heightened awareness of preconception health, particularly regarding diet and nutrition. Importantly, health professionals should be alerted to ways of identifying women who are planning a pregnancy.

Steel A, Wardle J, Frawley J, Adams J, Sibbritt D & Lauche R. **Associations** between complementary medicine utilisation and the use of contraceptive methods: Results of a national cross-sectional survey of 8009 Australian Women. Complementary Therapies in Clinical Practice, 2018; 33, 100-106.

Background and purpose: This study examines the relationship between the use of complementary medicine (CM) interventions or consultations with CM practitioners and women's choice of contraceptive method.

Materials and methods: A secondary analysis of a cross-sectional survey of Australian Women aged 34-39 years from the Australian Longitudinal Study on Women's Health (ALSWH) was conducted. Associations between use of CM and contraception were analysed using Chi-squared tests and multivariate logistic regression.

Results: Based on the responses from the included women (n = 7299), women who consulted a naturopath/herbalist were less likely to use implant contraceptives (OR 0.56; 95% confidence interval (CI) 0.33; 0.95). Those consulting a chiropractor (OR 1.54; 95%CI

1.05; 2.25) or an osteopath (OR 2.16; 95% CI 1.32; 3.54) were more likely to use natural contraception.

Conclusion: There may be a link between women's choice of contraceptive method and their use of CM, in particular, with CM practitioner consultations.

Susanto M, Hubbard RE & Gardiner PA. **Association of 12-year trajectories of sitting time with frailty in middle-aged women.** American Journal of Epidemiology, 2018; 187(11), 2387–2389.

Prolonged sitting time is associated with several health outcomes; limited evidence indicates associations with frailty. Our aims in this study were to identify patterns of sitting time over 12 years in middle-aged (ages 50–55 years) women and examine associations of these patterns with frailty in older age. We examined 5,462 women born in 1946–1951 from the Australian Longitudinal Study on Women's Health who provided information on sociodemographic attributes, daily sitting time, and frailty in 2001 and then again every 3 years until 2013. Frailty was assessed using the FRAIL (fatigue, resistance, ambulation, illness, loss of weight) scale (0 = healthy; 1-2 = prefrail; 3-5 = frail), and group-based trajectory analyses identified trajectories of sitting time. We identified 5 sitting-time trajectories: low (26.9%), medium (43.1%; referent), increasing (6.9%), decreasing (18.1%), and high (4.8%). In adjusted models, the likelihoods of being frail were statistically higher for women in the increasing (odds ratio (OR) = 1.29, 95% confidence interval (CI): 1.03, 1.61) and high (OR = 1.42, 95% CI: 1.10, 1.84) trajectories. In contrast, women in the low trajectory group were less likely to be frail (OR = 0.86, 95% CI: 0.75, 0.98), and there was no difference in the likelihood of frailty in the decreasing trajectory group. Our study suggests that patterns of sitting time over 12 years in middle-aged women predict frailty in older age.

Susanto M, Hubbard RE & Gardiner PA. Validity and responsiveness of the FRAIL scale in middle-aged women. Journal of the American Medical Directors Association, 2018; 19(1), 65-69.

Objective: To assess the validity and responsiveness of the FRAIL scale in middle-aged women, who are a group at high risk of developing frailty.

Design: Longitudinal cohort study from 1998 to 2013.

Setting: Australia.

Participants: 10,412 women born in 1946-1951 from the Australian Longitudinal Study on Women's Health (ALSWH).

Measurements: Frailty was measured by the 5-item FRAIL scale and assessed every 3 years from 1998 to 2013. Face validity was examined by assessing relationships with age. Spearman correlation quantified the relation of each item of the FRAIL scale with the scale's total score. Adjusted logistic regression models assessed the construct validity of frailty in 1998 predicting depression (10-item Center for Epidemiologic Studies Depression Scale Short Form) and disability (needing help with daily tasks) in 2013. Mortality was recorded from 1998 up to December 31, 2014. Survival analysis was done using Cox proportional hazards models. Finally, responsiveness was examined by measuring the relationship between changes in self-rated health and changes in FRAIL score between 2 subsequent surveys.

Results: Frailty increased with age such that 5.8% of women were frail at age 50 and 11.3% at age 66. Each component of the FRAIL scale was correlated with the total FRAIL score (rho = 0.13-0.82, all P < .001). Compared to being healthy, women who were frail in 1998 had an increased likelihood [odds ratio (95% confidence interval [CI])] of being depressed [2.77 (2.12, 3.63)] or disabled [6.87 (4.84, 9.77)] in 2013 with a hazard ratio (95% CI) for death of 2.01 (1.40, 2.87). Having a deficit in each of the 5 items in 1998 also increased the likelihood of being depressed or disabled in 2013. Changes in self-rated health were associated with total FRAIL score changes.

Conclusion: The FRAIL scale is valid for use in longitudinal studies of middle-aged women. Studying trajectories of frailty from the middle-age to older-age population may yield insights into risk factors for poorer health in this population.

Torquati L, Peeters GM, Brown WJ, Kolbe-Alexander T & Skinner T. **A daily cup** of tea or coffee will keep you moving: Associations between tea and coffee consumption and physical activity. International Journal of Environmental Research and Public Health, 2018; 15(9), E1812.

Physical activity (PA) is an independent predictor of mortality and frailty in middle-aged women, but fatigue remains a major barrier in this group. While caffeine intake has been associated with reduced exertion and perceived fatigue, it is not well understood whether consumption of naturally caffeinated drinks is associated with physical activity. The aim of this study was to determine whether habitual consumption of coffee and tea is associated with participation in physical activity. Women (n = 7580) from the Australian Longitudinal Study on Women's Health were included in this investigation. Participants reported average tea and coffee intake over the last 12 months and usual PA. Logistic regression models were adjusted for relevant health and lifestyle confounders, and Sobel test was used for mediation analysis. Participants who consumed 1-2 cups of coffee/day were 17% more likely to meet

the recommended 500 metabolic equivalent (MET).min/week than women who had <1 cup/day (odds ratio (OR) 1.17, 95% confidence interval (CI) 1.04–1.32). Participants who reported drinking either 1–2 cups or >3 cups/day of tea were 13–26% more likely to meet 500 MET.min/week than those who had <1 cup/day (OR 1.26, 95% CI 1.08–1.46 and OR 1.13, 95% CI 1.01–1.26, respectively). Tiredness and energy mediated associations between intake of coffee (fully) and tea (partially) and PA. Middle-aged women who drink 1–2 cups of coffee or >1 cup of tea/day are more likely to meet the moderate-to-vigorous PA guidelines than those who drink <1 cup/day. Future research is warranted to investigate causality and effects of specific coffee and tea amounts.

Tran T, Hammarberg K, Ryan J, Lowthian J, Freak-Poli R, Owen A, Kirkman M, Curtis A, Rowe H, Brown H, Ward S, Britt C & Fisher J. **Mental health trajectories among women in Australia as they age**. Ageing and Mental Health, 2018; doi: 10.1080/13607863.2018.

Objectives: To ascertain the trajectories of mental health among women in Australia assessed in repeat waves from their early 70 s to the end of their lives or their mid 80 s.

Method: Secondary analysis of data contributed by the 1921–26 cohort of the Australian Longitudinal Study of Women's Health Waves 1–6. Primary outcome was the 4-item SF-36 Vitality Subscale, which assesses mental health as life satisfaction, social participation, energy and enthusiasm. Structural, individual and intermediary factors were assessed using study-specific and standardised measures. Trajectories were identified using Growth Mixture Modelling and associations with baseline characteristics with Structural Equation Modelling.

Results: 12,432 women completed Survey One. Three mental health trajectories: stable high (77%); stable low (18.2%) and declining from high to low (4.8%) were identified. Compared to the stable high group, women in the stable low group were significantly less physically active, had more nutritional risks, more recent adverse life events, fewer social interactions and less social support, reported more stress and were more likely to have a serious illness or disability at Survey One. The declining group had similar characteristics to the stable high group, but were significantly more likely to report at baseline that they had experienced recent financial, physical and emotional elder abuse. These interact, but not directly with socioeconomic position and marital status.

Conclusion: Mental health among older women is related to social relationships, general health, access to physical activity and healthy nutrition, coincidental adverse life events and experiences of interpersonal violence, in particular elder abuse.

Vajdic CM, MacInnis R, Canfell K, Hull P, Arriaga ME, Hirani V, Cumming RG, Mitchell P, Byles JE, Giles GG, Banks E, Taylor AW, Shaw JE, Magliano DJ, Marker J, Adelstein B-A, Gill TK & Laaksonen MA. **The future colorectal cancer burden attributable to modifiable behaviors: A pooled cohort study.** JNCI Cancer Spectrum, 2018; 2(3), doi: 10.1093/jncics/pky033.

Background: Previous estimates of the colorectal cancer (CRC) burden attributed to behaviors have not considered joint effects, competing risk, or population subgroup differences.

Methods: We pooled data from seven prospective Australian cohort studies (n = 367 058) and linked them to national registries to identify CRCs and deaths. We estimated the strength of the associations between behaviors and CRC risk using a parametric piecewise constant hazards model, adjusting for age, sex, study, and other behaviors. Exposure prevalence was estimated from contemporary National Health Surveys. We calculated population attributable fractions for CRC preventable by changes to current behaviors, accounting for competing risk of death and risk factor interdependence. Statistical tests were two-sided.

Results: During the first 10 years of follow-up, there were 3471 incident CRCs. Overweight or obesity explained 11.1%, ever smoking explained 10.7% (current smoking 3.9%), and drinking more than two compared with two or fewer alcoholic drinks per day explained 5.8% of the CRC burden. Jointly, these factors were responsible for 24.9% (95% confidence interval [CI] = 19.7% to 29.9%) of the burden, higher for men (36.7%) than women (13.2%, Pdifference < .001). The burden attributed to these factors was also higher for those born in Australia (28.7%) than elsewhere (16.8%, Pdifference = .047). We observed modification of the smoking-attributable burden by alcohol consumption and educational attainment, and modification of the obesity-attributable burden by age group and birthplace.

Conclusions: We produced up-to-date estimates of the future CRC burden attributed to modifiable behaviors. We revealed novel differences between men and women, and other high–CRC burden subgroups that could potentially benefit most from programs that support behavioral change and early detection.

William J, Chojenta C, Martin MA & Loxton D. **An actuarial investigation into maternal out-of-hospital cost risk factors.** Annals of Actuarial Science, 2018; 1-35, doi; 10.1017/S1748499518000015.

This paper adopts an actuarial approach to identify the risk factors of government-funded maternal out-of-hospital costs in Australia, with a focus on women who experience adverse birth outcomes. We use a two-phase modelling methodology incorporating both classification

and regression trees and generalised linear models on a data set that links administrative and longitudinal survey data from a large sample of women, to address maternal out-ofhospital costs. We find that adverse births are a statistically significant risk factor of out-ofhospital costs in both the delivery and postnatal periods. Furthermore, other significant cost risk factors are in-vitro fertilisation, specialist use, general practitioner use, area of residence and mental health factors (including anxiety, intense anxiety, postnatal depression and stress about own health) and the results vary by perinatal sub-period and the patient's private health insurance status. We highlight these differences and use the results as an evidence base to inform public policy. Mental health policy is identified as a priority area for further investigation due to the dominance of these factors in many of the fitted models.

William J, Chojenta C, Martin MA & Loxton D. **An actuarial investigation into maternal hospital cost risk factors for public patients.** Annals of Actuarial Science, 2018; 12(1), 106-129.

We investigate an actuarial approach to identifying the factors impacting government-funded maternal hospital costs in Australia, with a focus on women who experience adverse birth outcomes. We propose a two-phase modelling methodology that adopts actuarial methods from typical insurance claim cost modelling and extends to other statistical techniques to account for the large volume of covariates available for modelling. Specifically, Classification and Regression Trees and generalised linear mixed models are employed to analyse a data set that links longitudinal survey and administrative data from a large sample of women. The results show that adverse births are a statistically significant risk factor affecting maternal hospital costs in the antenatal and delivery periods. Other significant cost risk factors in the delivery period include mode of delivery, private health insurance status, diabetes, smoking status, area of residence and onset of labour. We demonstrate the efficacy of using actuarial techniques in non-traditional areas and highlight how the results can be used to inform public policy.

Wilson L, Pandeya N, Byles J & Mishra G. Hysterectomy and perceived physical function in middle-aged Australian women: A 20-year populationbased prospective cohort study. Quality of Life Research, 2018; 27(6), 1501-1511.

Purpose: Hysterectomy is one of the most common gynaecological procedures worldwide. Changes in endocrine function may impact age-associated decline in physical function and these changes may be accelerated by hysterectomy. The aim of this study was to investigate associations between hysterectomy status and self-reported physical function limitations. **Methods:** Our study sample (n =8624) came from the mid-cohort (born 1945–1950) of the Australian Longitudinal Study on Women's Health (ALSWH). Self-report of physical function was measured by the Physical Functioning (PF) subscale of the Medical Outcomes Study Short Form Health Survey (SF-36) over seven surveys (1998–2016), categorised into substantial, moderate and minimal PF-limitations. The associations between hysterectomy status and de novo substantial or moderate PF-limitations versus minimal PF-limitations were investigated using log-multinomial regression.

Results: By Survey 8 (2016), 20% of the study sample had a hysterectomy with ovarian conservation (hysterectomy only) and 9% had a hysterectomy and both ovaries removed (hysterectomy-bilateral oophorectomy). Women with a hysterectomy only had a small increase in risk of substantial PF-limitations (versus minimal PF-limitations) compared to women with no hysterectomy (relative risk [RR]: 1.13; 95% confidence interval [95% CI] 1.00–1.27); the point estimate was stronger for women with a hysterectomy-bilateral oophorectomy (RR: 1.26; 95% CI 1.09–1.46). In a supplementary analysis, the increased risk of substantial PF-limitations was seen only in women who had surgery before the age of 45 years.

Conclusions: Compared to women with no hysterectomy, women with hysterectomybilateral oophorectomy were at increased risk of substantial PF-limitations versus minimal PF-limitations over 18 years of follow-up.

Xu X, Mishra G, Dobson A, Jones M. **Progression of diabetes, heart disease,** and stroke multimorbidity in middle-aged women: A 20-year cohort study. *PLOS Medicine,* 2018; 15(3), e1002516.

Background: The prevalence of diabetes, heart disease, and stroke multimorbidity (cooccurrence of two or three of these conditions) has increased rapidly. Little is known about how the three conditions progress from one to another sequentially through the life course. We aimed to delineate this progression in middle-aged women and to determine the roles of common risk factors in the accumulation of diabetes, heart disease, and stroke multimorbidity.

Methods and findings: We used data from 13,714 women aged 45–50 years without a history of any of the three conditions. They were participants in the Australian Longitudinal Study on Women's Health (ALSWH), enrolled in 1996, and surveyed approximately every 3 years to 2016. We characterized the longitudinal progression of the three conditions and multimorbidity. We estimated the accumulation of multimorbidity over 20 years of follow-up

and investigated their association with both baseline and time-varying predictors (sociodemographic factors, lifestyle factors, and other chronic conditions).

Results: Over 20 years, 2,511 (18.3%) of the women progressed to at least one condition, of whom 1,420 (56.6%) had diabetes, 1,277 (50.9%) had heart disease, and 308 (12.3%) had stroke; 423 (16.8%) had two or three of these conditions. Over a 3-year period, the ageadjusted odds of two or more conditions was approximately twice that of developing one new condition compared to women who did not develop any new conditions. For example, the odds for developing one new condition between Surveys 7 and 8 were 2.29 (95% confidence interval [CI], 1.93–2.72), whereas the odds for developing two or more conditions was 6.51 (95% CI, 3.95–10.75). The onset of stroke was more strongly associated with the progression to the other conditions (i.e., 23.4% [95% CI, 16.3%-32.2%] of women after first onset of stroke progressed to other conditions, whereas the percentages for diabetes and heart disease were 9.9% [95% CI, 7.9%-12.4%] and 11.4% [95% CI, 9.1%-14.4%], respectively). Being separated, divorced, or widowed; being born outside Australia; having difficulty managing on their available income; being overweight or obese; having hypertension; being physically inactive; being a current smoker; and having prior chronic conditions (i.e., mental disorders, asthma, cancer, osteoporosis, and arthritis) were significantly associated with increased odds of accumulation of diabetes, heart disease, and stroke multimorbidity. The main limitations of this study were the use of self-reported data and the low number of events.

Conclusions: Stroke was associated with increased risk of progression to diabetes or heart disease. Social inequality, obesity, hypertension, physical inactivity, smoking, or having other chronic conditions were also significantly associated with increased odds of accumulating multimorbidity. Our findings highlight the importance of awareness of the role of diabetes, heart disease, and stroke multimorbidity among middle-aged women for clinicians and health-promotion agencies.

Xu X, Mishra G, Dobson A & Jones M. **Short-term weight gain is associated** with accumulation of multimorbidity in mid-aged women: A 20-year cohort study. International Journal of Obesity, 2018; <u>https://doi.org/10.1038/s41366-018-0250-7</u>

Background/objectives: Although weight change has been studied in relation to many individual chronic conditions, limited studies have focused on weight change and multimorbidity. This study examines the relationship between short-term weight change and the accumulation of multimorbidity in midlife.

Methods: We used data from 7357 women aged 45–50 years without a history of any chronic conditions. The women were surveyed approximately every 3 years from 1996 to 2016. Associations between short-term weight change and accumulation of multimorbidity (two or more of nine chronic conditions) over each 3-year period, adjusting for baseline body mass index (BMI) or time-varying BMI (3-year period), were examined using repeated measures models. Short-term weight change was categorised into seven groups of annual weight change from high weight loss ($\leq -5\%$) to high weight gain (> + 5%).

Results: Over 20 years, 60.4% (n = 4442) of women developed multimorbidity. Baseline BMI, time-varying BMI and short-term weight gain were all associated with the accumulation of multimorbidity. After controlling for sociodemographic, lifestyle factors and menopausal status, high weight gain was associated with a 25% increased odds of multimorbidity (odds ratio (OR) 1.25, 95% confidence interval (CI) 1.08–1.45) compared with maintaining a stable weight. The results were consistent among models adjusting for baseline BMI (OR 1.24, 95% CI 1.07–1.44) or time-varying BMI (OR 1.34, 95% CI 1.16–1.54). Weight loss was associated with increased odds of multimorbidity in women with normal BMI (baseline or time-varying).

Conclusions: Short-term weight gain is associated with significantly increased odds of multimorbidity in mid-aged women. This association is independent from baseline BMI (at 45–50 years) and time-varying BMI. These findings support a persistent weight management regime and prevention of weight gain throughout women's midlife.

Xu X, Mishra GD & Jones M. **Trajectories of mental health symptoms for women in their 20s predict the onset of chronic physical conditions in their 30s: Two decades of follow-up of young Australian women.** *Journal of Affective Disorders*, 2018; <u>https://doi.org/10.1016/j.jad.2018.12.106</u>

Background: Mental health symptoms are highly prevalent and dynamic among young people. Little is known about the trajectories of these symptoms and subsequent development of chronic conditions. This study examines whether (1) mental health trajectories can predict the onset of chronic conditions in young women and (2) trajectories are stronger predictors of the incidence of these conditions than mental health status measured at single time point.

Methods: 6013 young Australian women were followed every 3-years for 20 years. The mental health trajectories in their 20s and mental health status 3-years before the onset of chronic conditions were used to predict the incidence of six chronic conditions in their 30s. Mental health trajectories were identified using latent mixture modelling of five-item Mental Health Index.

Results: Five mental health trajectories were identified: maintaining a high score (highstable); starting low then steadily increasing (improving); moderately high score, declining, then increasing (declining-improving); starting high then steadily decreasing (declining), and maintaining a low score (low-stable). In their 30s, 1015 (16.9%) women developed one or more conditions. The low-stable and declining groups were associated with increased odds of developing one or more conditions by 45% (odds ratio [OR] 1.45, 95% confidence interval [CI] 1.09–1.94) and 48% (OR 1.48, 95% CI 1.10–1.98), respectively, compared with the high-stable group. These are not so clearly distinguished by only considering mental health status at single time.

Limitation: Self-reported chronic conditions.

Conclusion: Mental health symptom trajectories in women's 20s are associated with the onset of chronic physical conditions in their 30s.

Zhu D, Chung HF, Pandeya N, Dobson A, Cade J, Greenwood D, Crawford S, Avis NE, Gold EB, Mitchell ES, Woods NF, Anderson D, Brown DE, Sievert LL, Brunner EJ, Kuh D, Hardy R, Hayashi K, Lee JS, Mizunuma H, Giles GG, Bruinsma F, Tillin T, Simonsen MK, Adami H-O, Weiderpass E, Canonico M, Ancelin M-L, Demakakos P & Mishra G. **Relationships between intensity**, **duration, cumulative dose, and timing of smoking with age at menopause: A pooled analysis of individual data from 17 observational studies.** *PLOS Medicine*, 2018; e1002704.

Background: Cigarette smoking is associated with earlier menopause, but the impact of being a former smoker and any dose-response relationships on the degree of smoking and age at menopause have been less clear. If the toxic impact of cigarette smoking on ovarian function is irreversible, we hypothesized that even former smokers might experience earlier menopause, and variations in intensity, duration, cumulative dose, and age at start/quit of smoking might have varying impacts on the risk of experiencing earlier menopause.

Methods and findings: A total of 207,231 and 27,580 postmenopausal women were included in the cross-sectional and prospective analyses, respectively. They were from 17 studies in 7 countries (Australia, Denmark, France, Japan, Sweden, United Kingdom, United States) that contributed data to the International collaboration for a Life course Approach to reproductive health and Chronic disease Events (InterLACE). Information on smoking status, cigarettes smoked per day (intensity), smoking duration, pack-years (cumulative dose), age started, and years since quitting smoking was collected at baseline. We used multinomial logistic regression models to estimate multivariable relative risk ratios (RRRs) and 95% confidence intervals (CIs) for the associations between each smoking measure and categorised age at menopause (<40 (premature), 40–44 (early), 45–49, 50–51 (reference),

and ≥52 years). The association with current and former smokers was analysed separately. Sensitivity analyses and two-step meta-analyses were also conducted to test the results. The Bayesian information criterion (BIC) was used to compare the fit of the models of smoking measures.

Overall, 1.9% and 7.3% of women experienced premature and early menopause, respectively. Compared with never smokers, current smokers had around twice the risk of experiencing premature (RRR 2.05; 95% CI 1.73–2.44) (p < 0.001) and early menopause (1.80; 1.66–1.95) (p < 0.001). The corresponding RRRs in former smokers were attenuated to 1.13 (1.04–1.23; p = 0.006) and 1.15 (1.05–1.27; p = 0.005). In both current and former smokers, dose-response relationships were observed, i.e., higher intensity, longer duration, higher cumulative dose, earlier age at start smoking, and shorter time since guitting smoking were significantly associated with higher risk of premature and early menopause, as well as earlier menopause at 45-49 years. Duration of smoking was a strong predictor of age at natural menopause. Among current smokers with duration of 15-20 years, the risk was markedly higher for premature (15.58; 11.29–19.86; p < 0.001) and early (6.55; 5.04–8.52; p < 0.001) menopause. Also, current smokers with 11–15 pack-years had over 4-fold (4.35; 2.78–5.92; p < 0.001) and 3-fold (3.01; 2.15–4.21; p < 0.001) risk of premature and early menopause, respectively. Smokers who had guit smoking for more than 10 years had similar risk as never smokers (1.04; 0.98–1.10; p = 0.176). A limitation of the study is the measurement errors that may have arisen due to recall bias.

Conclusions: The probability of earlier menopause is positively associated with intensity, duration, cumulative dose, and earlier initiation of smoking. Smoking duration is a much stronger predictor of premature and early menopause than others. Our findings highlight the clear benefits for women of early smoking cessation to lower their excess risk of earlier menopause.

Zhu D, Chung HS, Pandeya N, Dobson AJ, Kuh D, Crawford SL, Gold EB, Avis NE, Giles GG, Bruinsma F, Adami HO, Weiderpass E, Greenwood DC, Cade JE, Mitchell ES, Woods NF, Brunner EJ, Simonsen MK & Mishra GD. **Body mass index and age at natural menopause: an international pooled analysis of 11 prospective studies.** *European Journal of Epidemiology*, 2018; 33(8), 699-710. Current evidence on the association between body mass index (BMI) and age at menopause

remains unclear. We investigated the relationship between BMI and age at menopause using data from 11 prospective studies. A total of 24,196 women who experienced menopause after recruitment was included. Baseline BMI was categorised according to the WHO criteria. Age at menopause, confirmed by natural cessation of menses for \geq 12 months, was categorised as < 45 years (early menopause), 45–49, 50–51 (reference category), 52–53, 54–55, and \geq 56 years (late age at menopause). We used multinomial logistic regression models to estimate multivariable relative risk ratios (RRRs) and 95% confidence intervals (CI) for the associations between BMI and age at menopause. The mean (standard deviation) age at menopause was 51.4 (3.3) years, with 2.5% of the women having early and 8.1% late menopause. Compared with those with normal BMI (18.5–24.9 kg/m2), underweight women were at a higher risk of early menopause (RRR 2.15, 95% CI 1.50–3.06), while overweight (1.52, 1.31–1.77) and obese women (1.54, 1.18–2.01) were at increased risk of late menopause. Overweight and obesity were also significantly associated with around 20% increased risk of menopause at ages 52–53 and 54–55 years. We observed no association between underweight and late menopause. The risk of early menopause was higher among obese women albeit not significant (1.23, 0.89–1.71). Underweight women had over twice the risk of experiencing early menopause, while overweight and obese women had over 50% higher risk of experiencing late menopause.

Accepted Papers

Adane AA, Tooth L & Mishra G.

The role of offspring's birthweight on the association between pre-pregnancy obesity and offspring's childhood anthropometrics: A mediation analysis. *Journal of Developmental Origins of Health and Disease.*

Arriaga M, Vajdic C, MacInnis RJ, Canfell K, Magliano D, Shaw J, Byles J, Giles G, Taylor AW, Gill TK, Hirani V, Cumming RG, Mitchell P, Banks E, Marker J, Adelstein BA & Laaksonen M.

The burden of pancreatic cancer in Australia attributable to smoking. Medical Journal of Australia.

Arriaga M, Vajdic C, Canfell K, MacInnis R, Banks E, Byles J, Magliano D, Taylor A, Mitchell P, Giles G, Shaw J, Gill T, Klaes E, Velentzis L, Cumming R, Hirani V & Laaksonen M. **The preventable burden of breast cancers for premenopausal and postmenopausal women in Australia: A pooled study.** *International Journal of Cancer*

Cordier R, Chen Y, Clemson L, Byles J & Mahoney N.

Subjective memory complaints and difficulty performing activities of daily living among older women in Australia.

Australian Occupational Therapy Journal.

Fitzgerald D, Hockey R, Jones M, Mishra G, Waller M & Dobson A. Use of on-line or paper surveys by Australian women: A longitudinal study of users, devices and cohort retention.

Journal of Medical Internet Research.

Holden L, Harris M, Hockey R, Ferrari A, Lee YY, Dobson A & Lee C.

Predictors of change in depressive symptoms over time: Results from the Australian Longitudinal Study on Women's Health.

Journal of Affective Disorders.

Looman M, Schoenaker D, Soedamah-Muthu SS, Mishra GD, Geelen A, & Feskens EJM.

Pre-pregnancy dietary micronutrient adequacy is associated with lower risk of

developing gestational diabetes in Australian women.

Nutrition Research

Majeed T, Dolja-Gore X, Tavener M, Nair BR, Chojenta C & Byles JE.**Patterns of geriatric health assessment use among community dwelling older Australian women over a 14-year period.** *Journal of Health Services Research and Policy*

Melka AS, Chojenta C, Holliday L & Loxton D. **Predictors of e-cigarette use among young Australian women.***American Journal of Preventive Medicine*

Mo L, Teede H, Joham A, Cain S, Bennett C, Blumfield M, Loxton D, Mansfield D & Moran L. Sleep disturbances in women with and without polycystic ovary syndrome in an Australian national cohort.

Clinical Endocrinology

Peeters GMEE, Beard JR, Deeg DJH, Tooth LR, Brown WJ & Dobson AJ. Longitudinal associations between lifestyle, socio-economic position and physical functioning in women at different life stages.

European Journal of Ageing

Rahman M, Efird T, Kendig H & Byles JE. **Factors associated with patterns of home and community care among older Australian women.** *European Journal on Ageing*

Rahman M, Efird T & Byles JE. Patterns of aged care use among older Australian women: A prospective cohort study using linked data.

Archives of Gerontology and Geriatrics

Taft A, Powell R, Watson L, Lucke J, Mazza D & McNamee K. **Factors associated with psychosocial induced abortion over time: Secondary data analysis of five waves of the Australian Longitudinal Study on Women's Health.** *Australian and New Zealand Journal of Public Health*

Wilson LF, Pandeya N, Byles J & Mishra GD.

Hysterectomy status and all-cause mortality in a 21 year Australian population-based cohort study.

American Journal Obstetrics and Gynecology

Reports

From child care to elder care: Findings from the Australian Longitudinal Study on Women's Health. Tooth L, Loxton D, Chan H, Coombe J, Dobson A, Hockey R, Townsend N, Byles J & Mishra G. Report prepared for the Australian Government Department of Health, May 2018.

Health service use at the end of life by older Australian women with chronic conditions. Dobson A, Waller M, Forder P, Dolja-Gore X, Hockey R, Byles J, Mishra G. Report prepared for the Australian Government Department of Health, May 2018.

Senate Submissions

Senate Inquiry into Sleep Health Awareness in Australia

Submitted: October 2018

The study's submission to the inquiry took a longitudinal approach to provide insight into the prevalence, determinants, and consequences of sleep difficulties in Australian women. ALSWH data has shown that sleep difficulties are often persistent, with significant consequences for women's wellbeing and are associated with poor mental health, disease, falls, and accidents. Women's life stage plays a large part in sleep health, and women report issues with sleep during pregnancy and motherhood, the menopause transition and old age.

Senate Inquiry into the Obesity Epidemic in Australia

Submitted: July 2018

For over 20 years, the study has tracked rising prevalence of overweight and obesity in Australian women and the adverse consequences to their health. Study data shows that despite an awareness of public health messages, Australian women are not meeting guidelines for exercise and nutrition and their weight loss attempts are largely unsuccessful. The study's submission discusses the causes of obesity in Australian women and the impact of mothers' pre-conception health on childhood obesity. It also highlights concerns about women's understanding of public health messages and the need for support to make lifestyle changes.

Senate Inquiry on the Future of Stillbirth Research and Education in Australia Submitted: June 2018

The study's submission to the Senate Inquiry on the Future of Stillbirth Research and Education in Australia highlighted the availability of the study's longitudinal data on stillbirth, the current issues in accessing timely and consistent administrative datasets from the different states, and the study's role in communicating the results of its research into stillbirth.

Full details of each submission are available <u>here</u> on the Study website.

Conference Presentations

In 2018, ALSWH data were used in 57 conference presentations.

Brown WJ. Weight gain and physical activity across the adult life span. Perceptions and paradox in Australian women. (Keynote presentation). *35th International Federation of Sports Medicine (FIMS) World Congress of Sports Medicine.* Rio de Janeiro, Brazil, 12-15 September 2018.

Brown WJ. Sitting less or moving more. What is the best buy for public health? (Keynote presentation). Science on the Swan 2018: Science Health and Community, from mechanisms to models of care. Fremantle, WA, 1–3 May 2018.

Byles J & Dobson A. Linking longitudinal and administrative data for women's health. *Australian Academy of Health and Medical Sciences Annual General and Scientific Meeting 2018.* Melbourne, Vic, 10-12 October 2018.

Byles J. **Successful ageing and longevity among Australian women.** 2nd International Living to 100 Conference. Darling Harbour, NSW, 7-8 September 2018.

Byles J. **Prospects for healthy ageing and longevity for future generations of Australian women.** *2018 International Centenarian Consortium (ICC) Meeting.* Blue Mountains, NSW, 5-6 September 2018.

Byles J. **A lifelong view on women's health** (Opening lecture). *2018 Taipei Medical University-University of Newcastle Joint Symposium of Recent Advances in Women's Health*. Taipei, Taiwan, 13-14 April 2018.

Byles J. **Providing and needing care: Insights from older Australian women**. *51st Australian Association of Gerontology Conference*. Melbourne, Vic, 21-23 November, 2018.

Campbell A, Perales F & Baxter J. Leveraging large-scale panel data to study sexual orientation: Two case studies. *Society for Longitudinal and Life Course Studies Conference.* Milan, Italy, 9-11 July 2018.

Cao S. The effect of premenstrual syndrome on postpartum depression: A systematic review and meta-analysis. 2018 Clinical and Public Health Postgraduate Symposium.

Herston, Qld 22-23 November 2018.

Chojenta C. The impact of a history of poor mental health on health care costs in the perinatal period. 2018 Taipei Medical University-University of Newcastle Joint Symposium of Recent Advances in Women's Health. Taipei, Taiwan, 13-14 April 2018.

Chung H-F. **Female reproductive history and risk of type 2 diabetes.** *Australasian Epidemiological Association (AEA) Annual Scientific Meeting 2018.* Fremantle, WA, 22-24 October 2018.

Cordier R, Chen Y_W, Chung D & Loxton D. **The influence of intimate partner violence on young women's ability to work.** *World Federation of Occupational Therapy Congress.* Cape Town, South Africa, 21-25 May 2018.

Dobson A, Waller M, Hockey R, Forder P, Dolja-Gore X & Byles J. **Use of health and aged care service in their last two years of life by women with dementia.** (Poster presentation). *NHMRC National Institute for Dementia Research (NNIDR) Australian Dementia Forum.* Sydney, NSW, 4-5 June 2018.

Gardiner P & Brown WJ. **The impact of physical activity and sitting time on mobility disability-free life expectancy**. 7th International Society for Physical Activity and Health Congress. London, UK, 15-17 October 2018.

Gardiner P. **Risk behaviours and frailty health expectancy in older women.** (Poster presentation). *51st Australian Association of Gerontology Conference.* Melbourne, Vic, 21-23November, 2018.

Gardiner P. The impact of health behaviors and educational attainment on dementiafree life expectancy in older women. (Poster presentation). *Alzheimer's Association International Conference*. Chicago, USA, 20-26 July, 2018.

Gardiner P. The impact of physical activity and sitting time on dementia-free life expectancy. (Poster presentation). *NHMRC National Institute for Dementia Research (NNIDR) Australian Dementia Forum.* Sydney, NSW, 4-5 June 2018.

Harris MA. **A look into women's health and ageing.** *Ausmed Newcastle Nurses Conference.* Newcastle, NSW, 13 December 2018.

Hendryx M, Chojenta C & Byles J. Psychosocial variables and risk of low birth weight: Findings from the Australian Longitudinal Study on Women's Health. *American Public* Health Association Annual Meeting and Expo. San Diego, USA, 10 November 2018.

Jackson J, Patterson A, MacDonald-Wicks L, Bondonno C, Blekkenhorst L, Ward N, Hodgson J, Byles J & McEvoy M. **Dietary nitrate intakes within a representative sample of Australian women.** *Dietitians Association of Australia 35th National Conference.* Sydney, NSW, 17-19 May 2018.

Jackson J, MacDonald–Wicks L, McEvoy M, Byles J & Patterson A. **Diet quality changes over 12-years of follow-up in a representative sample of Australian mid-aged women.** *Nutrition Society of Australia, 42nd Annual Scientific Meeting.* Canberra, ACT, 27-30 November 2018.

Jackson J, Patterson A, MacDonald-Wicks L, Forder P, Blekkenhorst L, Bondonno C, Hodgson J, Ward N, Holder C, Oldmeadow C, Byles J & McEvoy M. **Is dietary nitrate associated with a lower risk of CVD related complications among middle aged Australian women.** *Nutrition Society of Australia, 42nd Annual Scientific Meeting.* Canberra, ACT, 27-30 November 2018.

Kakoly NS, Earnest A, Teede HJ, Moran LJ, Joham AE. **The impact of obesity on the incidence of type 2 diabetes mellitus among women with polycystic ovary syndrome.** *American Diabetes Association.* Orlando, Florida, USA, 22-26 June 2018.

Kocanda L, Brown L, Schumacher T, Rae K & Chojenta C. **Breastfeeding duration and reasons for cessation in an Australian longitudinal cohort.** *Dietitians Association of Australia 35th National Conference.* Sydney, NSW, 17 - 19 May 2018.

Koczwara B, Kaambwa B & Miller M. External validation of a screening instrument to identify cardiometabolic predictors of mortality in individuals with cancer. 2018 ASCO *Quality Care Symposium.* Phoenix, USA, 28-29 September 2018.

Laaksonen MA, Arriaga ME, Canfell K, MacInnis R, Hull P, Banks E, Giles G, Mitchell P, Cumming R, Byles J, Magliano DJ, Shaw J, Taylor A, Gill TK, Hirani V, Marker J, McCullough S, Velentzis LS, Adelstein B-A & Vajdic CM. **A large linked study to evaluate the burden of cancer in Australia attributable to current modifiable behaviours.** *International Population Data Linkage Conference.* Banff, Alberta, Canada, 12-14 September 2018.

Laaksonen MA, Arriaga ME, Canfell K, MacInnis R, Hull P, Banks E, Giles G, Mitchell P, Cumming R, Byles J, Magliano DJ, Shaw J, Taylor A, Gill TK, Hirani V, Marker J, McCullough S, Velentzis LS, Adelstein B-A & Vajdic CM. **Future burden of cancer** attributable to current modifiable behaviours: A pooled study of seven Australian cohorts. *World Cancer Congress.* Kuala Lumpur, Malaysia, 1-4 October 2018.

Laaksonen MA, Arriaga ME, Canfell K, MacInnis R, Hull P, Banks E, Giles G, Mitchell P, Cumming R, Byles J, Magliano DJ, Shaw J, Taylor A, Gill TK, Hirani V, Marker J, McCullough S, Klaes E, Velentzis LS, Adelstein B-A & Vajdic CM. **Future burden of cancer attributable to current modifiable behaviours.** *Sydney Cancer Conference.* Sydney, NSW, 11-12 October 2018.

Lauche R, Anheyer D, Sibbritt D, Adams J & Cramer H. **How do yoga and meditation influence the relationship between negative life events and depression? A cross sectional analysis of 8009 women.** *Meeting of the European Health Psychology Society.* Galway, Ireland, 21-25 August 2018.

Lauche R, Anheyer D, Sibbritt D, Adams J & Cramer H. **Do yoga and meditation moderate the association between negative life events and depression? A cross sectional analysis of 8009 women.** *International Conference on Integrative Medicine and Health.* Baltimore, USA, 8-12 May 2018.

Lewis J & Mackenzie L. Workforce participation patterns of women with breast cancer in Australia. 2nd Victorian Comprehensive Cancer Centre (VCCC) Psycho-Oncology Conference. Melbourne, Vic, 8-9 February 2018.

Lewis, J & Mackenzie L. Workforce participation patterns of women with breast cancer in Australia. *World Federation of Occupational Therapy Congress.* Cape Town, South Africa, 21-25 May 2018.

Lewis, J & Mackenzie L. Workforce participation patterns of women with breast cancer in Australia. *Centrelink Allied Health Conference for Assessors.* Sydney, NSW, June 2018.

Looman M, Schoenaker DAJM, Soedamah-Muthu SS, Mishra GD, Geelen A & Feskens EJM. **Pre-pregnancy dietary micronutrient adequacy and risk of developing gestational diabetes in an Australian population-based cohort.** *Dutch Epidemiology Congress 2018.* Bilthoven, The Netherlands, 7-8 June 2018.

Mishra G. Insights from the Australian Longitudinal Study on Women's Health. (Keynote presentation). *National Fertility Conference: Towards the Complete Person.* Brisbane, Qld, 19-21 October 2018.

Mishra G. Smoking and Women's Health across the life course. (Keynote presentation).

83rd Conference of the Japanese Society of Health and Human Ecology. Gunma, Japan, 20-25 November 2018.

Patterson A. Diet Quality and 10 years of healthcare costs by BMI categories: Data from the Australian Longitudinal Study on Women's Health. *Dietitians Association of Australia 35th National Conference*. Sydney, NSW, 17- 19 May 2018.

Rahman M, Efird JT & Byles J. **Trajectories to aged care service use among older Australian women: A repeated measure latent class analysis.** 47th Annual Conference of *British Society for Gerontology.* Manchester, United Kingdom, 4–6 July 2018.

Rahman M, Efird JT & Byles JE. **Predicting transition of older women into and through the aged care system over time: A multi-state modelling approach using aged care linked data.** 37th International conference of the International Society for Clinical *Biostatistics.* Melbourne, VIC, 26-30 August 2018.

Rahman M, Forder P & Byles JE. **Capitalising on longitudinal data to evaluate aged care.** *Emerging Health Policy Research Conference.* Menzies Centre for Health Policy, Sydney, NSW, 26 July 2018.

Gresham E. Carbohydrate restriction in midlife is associated with higher incidence of type 2 diabetes among Australian women with and without previous gestational diabetes: A cohort study. *Nutrition Society of Australia (NSA) 42nd Annual Scientific Meeting.* Canberra, ACT, 27-30 November 2018.

Reilly N & Loxton D. **Prevention and early intervention programmes for maternal mental health.** *Emerging Health Policy Research Conference.* Menzies Centre for Health Policy, Sydney, NSW, 26 July 2018.

Schoenaker D, Mishra G & Callaway L. **Women with childhood trauma who develop depression prior to pregnancy are at increased risk of developing gestational diabetes.** *Australasian Diabetes in Pregnancy Society (ADIPS) Annual Scientific Meeting.* Adelaide, SA, 24-26 August 2018.

Thapaliya K. Antipsychotics use status among women with Dementia in Australia. Poster presentation. *51st Australian Association of Gerontology Conference*. Melbourne, Vic, 21 - 23 November 2018.

Thong E, Milat F, Joham AE, Ranasinha S, Mishra G & Teede HJ. Contemporary risk of menstrual and reproductive dysfunction in women with Type 1 diabetes: A

population-based study. 2018 Annual Scientific Meetings – Endocrine Society of Australia and the Society for Reproductive Biology. Adelaide, SA, 19-22 August 2018.

Van Uffelen JGZ, Heesch KC, van Gellecum Y, Burton NW, Pachana NA & Brown WJ. Social interaction and physical activity in 6,401 older women: Concurrent and 9-year prospective associations. 7th International Society for Physical Activity and Health Congress (ISPAH), London, UK, 15-17 October 2018.

Webb P, Bryant L & Spencer E. **Computerised analysis of written language in healthy ageing women.** *Speech Pathology Australia 2018 National Conference.* Adelaide, South Australia, 27-30 May 2018.

Wilson L. Hysterectomy and perceived physical function in mid-life. 2018 Clinical and Public Health Postgraduate Symposium. Herston, Qld 22-23 November 2018.

Wright M, Hall J, Haas M, van Gool K & Yu S. **The association between continuity of care and cancer screening: Australian longitudinal study.** *Society of Academic Primary Care Annual Scientific Meeting.* London, England, 11 July 2018.

Wright M, Hall J, Haas M, van Gool K & Yu S. **The relationship between continuity of care and cervical cancer screening.** *Australian Health Economics Society Conference.* Hobart, Tasmania, 25 September 2018.

Wright M. Personal and site continuity of care in Australian general practice. *GP18, RACGP National Scientific Conference.* Gold Coast, Qld, 11 October 2018.

Xu X, Mishra G & Jones M. Longitudinal progression of chronic conditions and multimorbidity before and after cancer diagnosis in mid-aged women: A nationwide cohort study in Australia. *Australasian Epidemiological Association (AEA) Annual Scientific Meeting 2018*. Fremantle, WA, 22-24 October 2018.

Xu X, Mishra G, Dobson A & Jones M. Accumulation of chronic conditions in overweight and obese women across the adult lifespan: A national cohort study of Australia. *Australasian Epidemiological Association (AEA) Annual Scientific Meeting 2018.* Fremantle, WA, 22-24 October 2018.

Xu X, Mishra GD, Dobson AJ & Jones M. **Short-term weight change is associated with the accumulation of multimorbidity: A 20-year cohort study in Australia**. *2018 International Alliance of Research Universities (IARU) Ageing Longevity and Health Scientific and Graduate Student Conference.* Singapore, 17-19 October 2018. Xu X. Social relationships satisfaction and accumulation of chronic conditions in midaged women. 2018 Clinical and Public Health Postgraduate Symposium. Herston, Qld 22-23 November 2018.

Zhu D. Body mass and menopause: Pooled analyses of 11 prospective studies. Australasian Epidemiological Association (AEA) Annual Scientific Meeting 2018. Fremantle, WA, 22-24 October 2018.

Zhu D. **Smoking and menopause age: Pooled analysis of over 200,000 women.** *Australasian Epidemiological Association (AEA) Annual Scientific Meeting 2018.* Fremantle, WA, 22-24 October 2018.

Zhu D. Smoking and age at natural menopause: Pooled analysis of over 200,000 women. 2018 Clinical and Public Health Postgraduate Symposium. Herston, Qld 22-23 November 2018.

Seminars and Workshops

Abbas S. Every decision counts.

Faculty of Medicine and Health 3 Minute Thesis (3MT) Competition, Newcastle, NSW, 4 July 2018.

Byles J. An ecological model of housing in later life: From personal to policy. Singapore University of Technology and Design Lee Kuan Yew Centre for Innovative Cities. Singapore 10 May 2018.

Byles J. Women's health across the life-course and across the generations – Lessons from Australia.

International Longevity Centre-UK lecture and debate, London, UK, 8 May 2018.

Byles J. Social determinants of health: Significance for aged care policies and services for older people in Australia.

Commonwealth Department of Health Executive Roundtable, Canberra, ACT, 6 June 2018.

Byles J & Loxton D. Seniors Rights Service Symposium: Women, ageing and disadvantage.

NSW Teachers Federation, Sydney, NSW, 28 November 2018.

Gao N, Ryan M, Krucien N, Norman R & Robinson S. **Paid work, voluntary work,** caregiving or physical leisure activity? Time allocation pathways following a cancer diagnosis.

Health Economic Research Unit (HERU) Seminar, University of Aberdeen, UK, 5 September 2018

Laaksonen M. Lifestyle and cancer incidence in Australia.

Translational Cancer Research Network (TCRN), Obesity and Cancer GP workshop, Sydney, NSW, 3 November 2018.

Mishra G. Invited presentation.

Event co-hosted by the World Health Organisation: Advancing Women's Health and Well-Being Using Information and Communication Technologies: Focus on Non-Communicable Diseases (NCDs), UN Headquarters, New York, USA, 14 March 2018. Mishra G. Invited presentation.

Senate Select Committee on Stillbirth Research and Education public hearing. Queensland Parliament, Brisbane, Qld, 6 September, 2018.

Mishra G. Invited presentation.

Event hosted by the Communications Coordination Committee for the United Nations: Implementing the Outcome of the 2018 High Level Meeting on NCDs: Focus on Women's & Children's Health and Well-Being, UN Headquarters, New York, USA, 8 November 2018.

Mishra G. Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health.

Grand Round sessions for Medical Education, Redcliffe, Qld, 6 December 2018.

Reilly N. Prescribing patterns for sodium valproate among Australian women of childbearing age: 2003-2015.

St John of God Burwood Hospital Grand Rounds, Sydney, NSW, 20 July 2018.

Stulz V. Finding a life without domestic violence: Analysis of free text responses from the ALSWH.

Translational Health Research Institute, Campbelltown, NSW, 25 October 2018.

William J. An actuarial journey in maternal health. Women's Healthcare Australasia Webinar, Acton, ACT, 22 November 2018.

Completed Student Projects

Trajectories of health in the 1921-26 cohort of the Australian Longitudinal Study on Women's Health

PhD candidate: Lucy Leigh

Supervisor: Professor Julie Byles

The University of Newcastle

The world's population is ageing, and the oldest age group is the fastest growing segment of the population in developed countries. This thesis aimed to investigate whether the last years of life, which for more and more people are occurring at a greater age, are spent in good or poor health. Specifically, the work investigated heterogeneity in the ageing experience of older Australian women, by estimating trajectories of physical functioning, mental health, and sleep, in late life. Baseline predictors for the maintenance of good health, and change in health, were explored.

We found that the ageing experience is highly varied, with some older women experiencing excellent physical health, mental health, and sleep. However, we also found sub-groups of women who did not age well. Factors associated with ageing well included entering old age in good health, at a healthy weight, participating in regular physical activity, fewer chronic diseases, higher education, and having no financial difficulty.

These findings regarding the diversity of the ageing experience have implications for public policy. Public policy largely focuses on the physical care needs of older persons, and lacks programs tailored towards preventing poor health and maintaining good health. This reactive approach, dealing largely with the needs of older people who are already in poor health, misses a valuable opportunity to maximise the potential of others to remain in good health, and to capitalise upon them as a valuable resource. While current policy providing care and support for those in poor health should be maintained, also required are a greater number of preventative policies to ensure more people reach old age in good health, as well as policies aimed at maintaining good health throughout later life..

Traditional Chinese Medicine Use amongst Women with Arthritis: a Health Services Research Study

PhD Candidate: Lu Yang

Supervisors: Professor David Sibbritt and Professor Jon Adams

University Technology Sydney

Background: The use of traditional Chinese medicine (TCM) has attracted increasing attention for physical and mental health studies over recent years. To date, there have been few nationally representative studies examining TCM treatments as well as consultations with TCM practitioners, for women with arthritis.

Methods: This thesis comprised four related but separate sections of research:

• A critical review was conducted focusing on TCM and other complementary and alternative medicine (CAM) use amongst patients with arthritis via a search of the key medicine and health science databases for international peer reviewed articles published in the previous eight years (2008-2015).

The study also conducted secondary and primary analyses of data from large samples (including both patients and practitioners) obtained by drawing upon three distinct, large-scale, established studies in Australia:

- Australian Longitudinal Study on Women's Health (ALSWH)
- 45 and Up Study (sub-study)
- Practitioner Research and Collaborate Initiative (PRACI) study.

Statistical analyses involved chi-square tests, multiple logistic regression, two proportions Z tests, Student's t-tests, etc. to examine associations between the use of TCM (i.e. Chinese herbal medicine and acupuncture) and arthritis-related symptoms. Chi-square tests or Fishers Exact tests were employed for categorical variables, and Student's t-tests were employed for continuous variables, to examine TCM practitioners' perceptions and the role of TCM practitioners in Australia regarding arthritis care.

Results:

Critical review: Findings show a high prevalence of TCM/CAM use amongst people with arthritis in a number of countries and many people with arthritis use TCM/CAM concurrently with their conventional medicine.

ALSWH study: Results show women with arthritis are more likely to use TCM than women without arthritis, with 6.2-9.5%, and 4.0-5.7% of Australian women reported to be using acupuncture and Chinese herbal medicine, respectively, in the previous 12 months.

45 and Up Study sub-study: Analyses show that acupuncture use is positively associated with women experiencing a longer duration of time since initial diagnosis of osteoarthritis (OR=1.04), undertaking more exercise (OR=5.41), living in a rural area (OR=3.62), having consulted a psychologist (OR=12.21), and having consulted another CAM practitioner (OR=4.18).

PRACI study: The majority of the TCM practitioners (82.2%) noticed that their patients with arthritis used other treatments alongside TCM and a large number of TCM practitioners who participated in the study believe TCM to be effective for treating arthritis.

Conclusions: TCM use is popular amongst women with arthritis and the TCM profession represents a significant part of Australian CAM healthcare sector in treating arthritis. This thesis highlights a need for future research to examine the potential benefits of TCM for arthritis and to help inform the efficient and safe use of this treatment alongside conventional care. Moreover, all health professionals offering care for those with arthritis need to be aware of the concurrent use of both TCM and conventional medications amongst their patients.

Mapping the K10 to the MHI-5 in young Australian women and investigating intra- and inter-cohort trends

Master of Epidemiology candidate: Jacob Egwunye

Supervisors: Professor Annette Dobson and David Fitzgerald

The University of Queensland

Introduction: The Kessler Psychological Distress Scale (K10) has become a popular measure of mental health status in Australian primary care settings and research due to its simplicity and validity. It was selected for use in a new young cohort (born 1989-95) of Australian women added to the Australian Longitudinal Study of Women's Health (ALSWH) instead of the mental health inventory scale (MHI-5) already used in the existing cohorts. A calibration of the MHI-5 and K10 is sought to facilitate future, comparative analyses involving mental health status between the NY cohort and other ALSWH cohorts.

Objectives of this project were:

- Develop an algorithm for mapping K10 scores onto the MHI-5
- Investigate intra- and inter-cohort trends of mental health in young Australian women

Methods: MHI-5 and K10 data for producing the mapping algorithm model was obtained from the fourth wave of the 1989-95 cohort (n = 8,591). Inter-rater reliability statistics were calculated as a preliminary to assess the compatibility of the health measures for mapping analysis. Two model types, ordinary least squares (OLS) and response mapping, combined with K10 variable specification as either overall score or component question scores, were used to construct candidate mapping algorithm models. Selection of the best mapping algorithm model was based on goodness of fit, as well as predictive performance on a validation subsample.

Intra-cohort trends of mental health were identified by group-based trajectory modelling (GBTM) of the 1989-95 cohort across four surveys. A follow-up multinomial logistic regression was performed to identify associations between certain biopsychosocial variables and likelihood of following a particular mental health trend. Inter-cohort trends of mental health were assessed between the 1989-95 cohort and the next youngest ALSWH cohort, women born 1973-78, partially adjusting for age via comparison across time periods, and adjusting for other biopsychosocial variables via multiple regression modelling.

Results: MHI-5 and K10 measures exhibited an uncertain degree of agreement but excellent consistency (kappa estimate: 0.599, 95% CI: (0.579, 0.619); ICC agreement: 0.758, 95% CI: (0.273, 0.891); ICC consistency: 0.853, (0.847, 0.859)) validating a regression-based approach to calibrating the two. An OLS model with K10 specified as component question score variables was the best mapping algorithm model for estimating MHI-5 (R2 = 76.89%; BIC = 31792.39; MAE = 7.60; RMSE = 9.68).

GBTM identified 5 distinct mental health trajectory groups in the 1989-95 cohort: no psychological distress (PD), constant (38.80%); mild PD, constant (33.24%); severe PD, constant (11.74%); moderate PD, worsening (9.46%); and severe PD, improving (6.76%). Smoking, stress and domestic violence all distinguished an increased likelihood of a trajectory other than constantly healthy; alcohol consumption, non-violent relationships and university-level education all had a decreased likelihood of the same phenomenon. Comparison of the 1989-95 and 1973-78 cohorts partially adjusted for age found the 1989-95 cohort to experience poorer mental health on average (difference in means: -5.39, 95% CI: (-5.93, -4.84)). After further adjustment via multiple regression analysis with numerous biopsychosocial variables, the difference in means increased (difference in means: -15.38, 95% CI: (-23.18, -7.57)), suggesting a cohort effect impacting on the younger generation's mental health that was mostly obscured (on the surface) by healthier living.

Conclusion: It is possible to predict MHI-5 scores in young Australian women using K10 component question scores. Further research will be useful to:

- validate this algorithm outside of the youngest adult demographic
- extrapolate on mental health trajectories as more longitudinal data becomes available
- investigate factors behind the cohort effects between the current generation of young Australian women and previous generations.

Excess mortality in underweight women: Results from the Australian Longitudinal Study

Master of Biostatistics candidate: Alison Griffin

Supervisors: Professor Annette Dobson and Dr Mark Jones

The University of Queensland

Underweight body mass index (< 18.5kg/m²) is associated with increased mortality in adults. The objective of this study was to examine causes of death and factors associated with mortality in middle-aged and older women with long term follow-up, in order to better understand the association between underweight body mass index and mortality.

Data from 12,432 women aged 70-75 years and 13,716 women aged 45-50 years, recruited in Australia in 1996, and followed for up to 20 years were utilized. Cox proportional hazards regression and competing risks regression were used to model the risk of all-cause and cause-specific (older cohort only) mortality respectively. With normal weight as reference, underweight older women had 72% higher mortality (hazard ratio 1.72, 95% confidence interval: 1.52, 1.95) and underweight middle-aged women had 53% higher mortality (hazard ratio 1.53, 95% confidence interval: 1.01, 2.34) in the model adjusted for age, smoking status, alcohol consumption and level of physical activity.

Mortality due to respiratory disease was considerably higher in underweight older women (hazard ratio 2.02, 95% confidence interval: 1.43, 2.85), and this finding was consistent regardless of smoking status. Excess deaths from respiratory conditions may explain increased mortality among underweight older women, beyond the effects of smoking.

Availability of active toys and sport equipment in the home and child physical activity

Master of Science (Sport and Exercise Medicine) candidate: YungTing Chang

Supervisors: Dr Kim Edwards and Professor Gita Mishra

The University of Nottingham

Physical inactivity has been a serious epidemiological issue among young children and numerous reports suggest that more and more Australian children do not meet the recommended physical activity guidelines. There are several benefits of being physically active and physical activity influences children's development in their early years. According to the ecological model, activity behavior can be impacted by aspects of the intrapersonal, interpersonal, social and physical environment, as well as community and policy. This study focused on home physical environment and aimed to examine the association and interaction between maternal and environmental factors and physical activity of children.

Methods: Mothers from the Australian Longitudinal Study on Women's Health (ALSWH) 1973-78 cohort were invited to participate in the cross-sectional Mother's and their Children's Health (MatCH) study. Total participants were 3,039 mothers and 5,647 children aged 1-12 years from across the nation. Maternal factors (family composition, number of children, maternal education level and level of difficulty managing income) and environmental factors (yard size and street type) were analysed to predict equipment variety at the household level, and to predict children's physical activity. All the data were obtained from parent-report surveys, using linear and logistic regression models with adjustment for children's sex and age.

Results: Families with only boys, a number of children in the household, higher maternal education level, bigger yard size and closed type street (e.g., cul-de-sac) were significantly and positively associated with equipment variety in the home. Boys were more likely to own balls, hitting equipment (e.g., bats/racquets/golf clubs), climbing equipment, and skateboards/RipStiks while girls were more likely to have skipping ropes and slides or swings. Children with higher educated mothers were less likely to have skipping ropes, trampolines, skateboards/RipStiks, and electronic games in the house. Children's physical activity level was associated with equipment variety in the home and maternal education level. With the presence of hitting equipment, climbing equipment or skateboards/RipStiks, children had higher activity levels. Electronic games were negatively associated with children's physical activity levels.

Conclusion: Equipment variety and children's physical activity are associated with several maternal and environmental factors. Thus, the provision of equipment seems to be an efficient strategy to stimulate children to be active at home. However, some equipment that seems to actively promote children's physical activity may have the opposite effect.

Data Archiving

ALSWH data are annually archived at the Australian Data Archive (ADA) at the Australian National University. To date, data have been archived for

- Surveys 1 to 7 of the 1946-1951 cohort
- Surveys 1 to 7 of the 1973-1978 cohort
- Surveys 1 to 4 of the 1989-1995 cohort
- Surveys 1 to 6 of the 1921-1926 cohort, along with the incomplete data from the sixmonth follow up survey of the 1921-1926 cohort.

This year, data from Survey 8 of the 1946-1951 cohort, Survey 5 of the 1989-1995 cohort and recent data from the six-month follow up survey of the 1921-1926 cohort have been archived.

Enquiries

University of Newcastle:

Professor Deborah Loxton Deputy Director, Australian Longitudinal Study on Women's Health Research Centre for Generational Health and Ageing University of Newcastle, Callaghan NSW 2308, AUSTRALIA Telephone: 02 4042 0690 Fax: 02 4042 0044 Email: info@alswh.org.au

University of Queensland:

A/ Professor Leigh Tooth Deputy Director, Australian Longitudinal Study on Women's Health School of Public Health University of Queensland, Herston QLD 4006 AUSTRALIA Telephone: 07 3346 4691 Fax: 07 3365 5540 Email: <u>sph-wha@sph.uq.edu.au</u>

www.alswh.org.au

A detailed description of the background, aims, themes, methods, and representativeness of the sample and progress of the study is given on the project website. Copies of surveys are also available on the website, along with contact details for the research team, abstracts of all papers published, papers accepted for publication, and conference presentations.