women's health australia

australian longitudinal study on women's health

Annual Report 2015

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CONTENTS

Director's report	2
Steering Committee	4
Collaborators and investigators	6
Current students	10
Project staff	11
Major Report:	
Chronic conditions, physical function and health service use: Findings from the Australian Longitudinal Study on Women's Health	13
Cohort summaries	18
Publications	20
Conference presentations	45
Seminars and workshops	48
Completed student projects	49
Enquiries	53

DIRECTORS REPORT

The Australian Longitudinal Study on Women's Health (ALSWH) is a long-running survey funded by the Australian Government Department of Health. The Study now involves more than 58,000 women in four cohorts, selected from the Australian population.

ALSWH covers the adult lifespan, and comprises four age cohorts – young women born 1989-95 (aged 20-26 in 2015), women born 1973-78 (now aged 37 – 42), women born 1946-51 (now aged 64-69), and the oldest cohort, women born 1921-26 (now aged 90-95).

This report outlines progress and achievements during 2015. A highlight of the year was receiving the Council of Academic Public Health Institutions Australia (CAPHIA) 2015 Team Award for excellence in public health research. This award recognises the Study as an exceptional public health resource that provides an evidence base for government and other decision-makers to formulate public health policy.

During the year, a major report examining major chronic conditions, as well as physical function and health care use, across all of the Study cohorts was prepared for the Australian Government Department of Health. The report covered mortality, obesity and other common risk factors, arthritis and musculoskeletal conditions, asthma, breast cancer, cardiovascular conditions, diabetes, mental health, and comorbidities. A brief summary of the report is presented here. In addition, summary reports were also prepared on the 1946-51 and 1989-95 cohorts, outlining the health trajectories and key issues for each cohort. Highlights from each summary are presented later in this report.

Survey activity during the year focused on the Study's oldest and youngest cohorts. The women in the oldest cohort are now surveyed at six-monthly intervals, and received surveys in May and November. The youngest cohort completed their third survey this year. Our commitment to integrating and promoting new technology also continued throughout the year, with more and more participants completing surveys online.

In addition to the main survey work, we have continued to conduct sub-studies and in 2015, a major sub-study focus has been the preparation of the pilot survey for the 'Mothers and Their Children's Health (MatCH)' project, which is funded by the National Health and Medical Research Council. For this project, mothers from the 1973-78 cohort will be invited to include their children in our research. Data from the children will then be combined with data from the 1973-78 cohort to paint a picture of family health and health service use that can be used to support an integrated and targeted approach to delivery of preventative and primary health care for all Australian families.

ALSWH is a national research resource, and since 1996 data from the Study have been provided to collaborators for use in over 650 research projects. During 2015 we supplied data to collaborators for 63 new projects across Australia and internationally. Throughout the year, we further developed linkage of de-identified ALSWH data with Aged Care data and other health datasets (such as state-based hospital, perinatal and cancer data), and continued to conduct subsidiary analyses, enhance data quality and documentation, and produce scientific papers and conference presentations on all aspects of women's health.

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

Professor Gita Mishra and Professor Julie Byles

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Feature A: Chronic conditions, physical function and health service use: Findings from the Australian Longitudinal Study on Women's Health

The ALSWH major report for 2015 comprised a summary of common and important chronic conditions including arthritis, asthma, diabetes, and cardiovascular conditions, affecting women as they age. The report presented data on the increasing prevalence of the chronic conditions and showed the relationship between chronic disease and decline in women's physical and mental health related quality of life, and their increased use of general practice consultations. The report also compared mean Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) costs between women with and without the chronic conditions, and considered the prevalence of comorbidities and the increased rate of death associated with some chronic conditions. Findings of the report are summarised here – the full report is available on the Study website: www.alswh.org.au

Arthritis

Arthritis is one of the most common conditions reported by women in ALSWH, affecting around 70% of women in the 1921-26 cohort by the time they were aged 85-90 years. When women in the 1946-51 cohort were aged 50-55 years, around 20% had arthritis, but this prevalence increased to around 51% by ages 62-67. Arthritis was also strongly associated with reduced physical function scores, and with poorer mental health. This rapid increase in the prevalence of arthritis as the women aged, and its effect on quality of life, emphasizes the importance of this chronic condition and its impact on women's health through mid-life and at older ages.

Arthritis is also associated with significant increases in health care use and costs. Women with arthritis have greater use of general practice services than women without arthritis (Figure 1), and higher overall MBS costs.

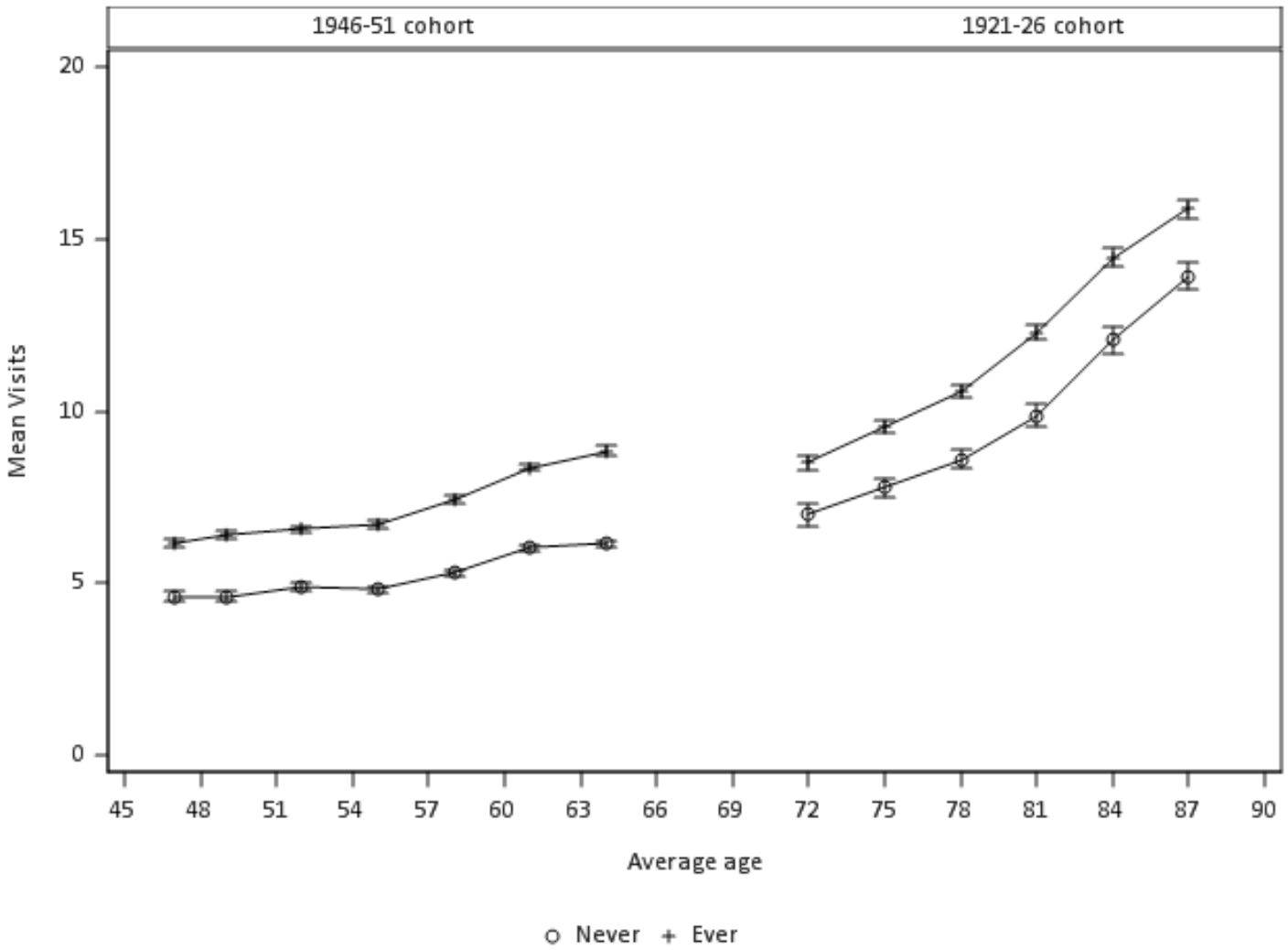

Figure 1: Mean number of general practice visits (95% confidence interval) at each survey for women who have ever reported arthritis (on any survey), and women who have never reported arthritis, Surveys 1-7 (1946-51 cohort) and Surveys 1-6 (1921-26 cohort).

For women from the 1946-51 cohort with arthritis, MBS costs were almost 50% higher and PBS costs were 60% higher than for women who did not have arthritis. Combined MBS/PBS costs were around $1000 per year higher among women with arthritis than those without. The difference in costs was smaller among women in the 1921-26 cohort who generally used more MBS and PBS services than the 1946-51 cohort, with combined MBS/PBS costs around $500 per year higher among women with arthritis than those without. A detailed analysis of the drivers of these costs among women with arthritis in the 1921-26 cohort indicated that costs are significantly higher among women in urban areas, women with Department of Veteran's Affairs (DVA) health insurance cover, or private hospital insurance. Costs also increased with each comorbid condition, and with poorer levels of physical function. Single women had lower health care costs than married or partnered women.

The prevalence and incidence of arthritis does not follow a strong socioeconomic gradient, except through its association with obesity. Arthritis is strongly associated with higher Body Mass Index (BMI), and BMI has increased dramatically across the cohorts. The higher BMI among younger cohorts suggests that the prevalence of arthritis, and its impact on quality of life and health care costs, will be even greater among these cohorts than among current cohorts of older people. The 1946-51 cohort, now aged in their 60s, already have a higher prevalence of arthritis than the 1921-26 cohort did when they were aged in their 70s.

Arthritis is also strongly associated with lower levels of physical activity, and women who report moderate levels of physical activity have a lower risk of developing arthritis. This effect appears to become stronger as women age, and particularly after menopause.

Stress and depression may also play a role in the development of arthritis. Stress has been found to be a strong risk factor for the later development of arthritis among women in the 1946-51 cohort. Depression also increased the risk of arthritis among these women, but anxiety did not. In turn, arthritis is associated with poorer mental health over time. These findings underscore the importance of psychological well-being as a factor in both the prevention and management of this chronic condition.

Arthritis is not a common cause of death. Causes of death for women with arthritis are similar to causes of death for the cohort overall, except these women are also more likely to die of cardiovascular disease.

Asthma

Asthma prevalence is higher in the younger cohorts, and increases with age in all cohorts. These changes reflect both age and cohort effects on asthma prevalence and secular trends in diagnosis. Women in ALSWH may have had asthma at younger ages, which has subsequently undergone remission, or they may have newly diagnosed asthma in adulthood. It is recognized that asthma is poorly diagnosed among older people.

Asthma is associated with difficulty managing on income, and may affect workforce participation. Asthma is also associated with overweight and obesity, and many women with asthma continue to smoke. These two risk factors also predispose women to the risk of developing comorbid chronic conditions as they age. Smoking cessation and weight loss programs that target women with asthma may provide an opportunity to improve quality of life and reduce morbidity and mortality risk among these women.

Asthma has a significant impact on survival among older women, particularly in association with comorbidity. Over 12 years of follow-up, women in the 1921-26 cohort who had asthma were 20% more likely to die than women without asthma even after other risk factors and comorbidities were taken into account. There is a particular need to improve survival and other health outcomes for older women with asthma. In the 1973-78 cohort, costs for women with asthma were an average of $191 (13%) higher on the MBS and $125 (55%) higher on the PBS than women without asthma. A similar pattern occurs in the 1946-51 and 1921-26 cohorts. Costs were $375 (22%) higher on the MBS and $356 (54%) on the PBS and $423 on the MBS (15%) and $390 (27%) on the PBS respectively.

Women with asthma are also likely to have higher use of complementary and alternative medicines.

Breast cancer

Breast cancer is the most common form of cancer reported by women in the study. It is a common cause of death among women in the 1946-51 cohort, and the most common cause of cancer death. Around 7% of women in the 1946-51 cohort had reported a diagnosis of breast cancer by Survey 7.

Breast cancer was more common among women with lower levels of education and those with more difficulty managing on income, and those who smoked. The relationship between breast cancer and BMI was more complex, with a higher incidence and prevalence of breast cancer up to Survey 6 among women in the 1946-51 cohort who were underweight at Survey 1 (when women were mostly premenopausal), but with higher incidence among overweight and obese women at Survey 7 (when women were postmenopausal).

The association between breast cancer and physical function and mental health-related quality of life is small. Differences in the number of general practice consultations by women with and without breast cancer are also small. However, examination of MBS costs highlights larger differences which may reflect greater use of specialist services, more investigative procedures, and may indicate a greater uptake of additional items, such as access to allied health practitioners by women with breast cancer. PBS costs are also much higher (approximately doubled) among women who have reported breast cancer.

Only a few women in the 1946-51 cohort who reported breast cancer have died (71 women). The majority of these women died of breast cancer rather than other comorbid causes.

Cardiovascular conditions

Heart and stroke conditions account for a significant burden of morbidity and mortality among Australian women. ALSWH provides important data on changes in key risk factors for these conditions, with reductions in smoking as the women age, but increasing prevalence of obesity among the younger cohorts.

Heart disease and stroke are also major determinants of the use of health services. ALSWH data show the higher number of general practitioner visits by women reporting these conditions. However further analyses of the data also suggest that women may not receive optimal treatment either in terms of access to specialists or appropriate preventative medications. There is also evidence of inequity in access to treatment for women in regional and remote areas.

MBS and PBS costs for women in the 1973-78 cohort with heart disease indicate that while there is little difference in MBS charges for women with and without the condition, PBS costs are almost five-fold greater (Table 1). Among the 1946-51 cohort, claims from women with heart disease for MBS items were 60% higher and for PBS items were almost double those of women with no heart disease. A similar pattern is evident for women in the 1921-26 cohort: MBS costs for women with heart disease were 20% higher and PBS costs were almost 30% higher than for women with no heart disease.

Table 1: Comparison of costs for MBS and PBS uptake in women who have never reported heart disease and those who have ever reported heart disease, mean cost ($) 2013 (the most recent year that data were available).

	1973-78 cohort		1946-51 cohort		1921-26 cohort	
	MBS	**PBS**	**MBS**	**PBS**	**MBS**	**PBS**
Never	1,561	253	1,661	676	2,592	1,347
Ever	1,628	1,258	2,627	1,319	3,109	1,720

In the 1946-51 cohort, MBS and PBS costs for women with stroke conditions were greater than for women who had never reported a stroke condition. In this cohort, mean MBS costs were almost 40% higher for women with a stroke condition and mean PBS costs were 60% higher than for women who had never reported a stroke. In the 1921-26 cohort, there was little difference between mean MBS and PBS costs for women with and without a stroke condition.

Women reporting heart disease had higher mortality rates than other women in both the 1946-51 and 1921-26 cohorts. In the 1921-26 cohort, coronary heart disease accounted for over 26% of deaths among women with this condition. In the 1946-51 cohort, almost 14% of deaths among women reporting heart disease were due to coronary heart disease, with breast cancer, lung cancer, cerebrovascular disease and chronic obstructive pulmonary disease also accounting for a large

proportion of deaths. These major causes of death are all smoking-related.

Women reporting stroke also had higher mortality rates than other women in the 1946-51 and 1921-26 cohorts. However, many of these women died of causes other than cerebrovascular disease.

Diabetes

Diabetes has a low prevalence among the younger cohorts but has a high incidence rate which increases with age. Consequently the prevalence of diabetes has increased rapidly in each cohort. While the highest overall prevalence of diabetes is in the oldest cohort (with over 15% of women in their late 80s reporting this condition), rates of diabetes in the 1946-51 and 1973-78 cohorts are likely to exceed this level when these cohorts reach older age. The prevalence of diabetes in the 1946-51 cohort (aged in their 60s) is more than double the prevalence observed for the 1921-26 cohort when they were aged 70-75 years. This difference may reflect better survival among women with diabetes, as well as earlier diagnosis, but also reflects increasing prevalence of overweight and obesity as major risk factors.

These effects are also apparent among women in the 1973-78 cohort who exhibit higher prevalence of diabetes in their mid 30s than the 1946-51 cohort did in their mid 40s. Likewise, while prevalence rates in the 1989-95 cohort are currently low, the very high levels of overweight and obesity in this cohort would suggest that the prevalence of diabetes in this cohort could also rapidly escalate.

Diabetes is strongly associated with BMI in all cohorts, and with corresponding associations with physical activity. Small changes in BMI and physical activity across the whole population could result in large reductions in the incidence of diabetes.

Prevalence and incidence of diabetes are higher in regional and remote areas, compared to major cities, and among women with lower levels of education and greater difficulty managing on income. Diabetes also has higher prevalence and incidence among current and ex-smokers in the 1973-78 and 1946-51 cohorts.

Poor diet quality is associated with risk of diabetes, including a higher risk with lower zinc intakes, as well as with higher intakes of monosaturated fatty acids, and lower intakes of dietary fibre. In contrast, women in the 1946-51 cohort with a Mediterranean style diet have a lower risk of developing diabetes.

An examination of mean MBS and PBS costs in 2013 indicated that these are higher for women with diabetes than for women without diabetes in all three cohorts (Table 2). MBS costs may include items under the annual cycle of care (ACC), however these items are not fully utilised. MBS costs for women with diabetes in each cohort were 12% (1973-78), 30% (1946-51) and 7% (1921-26) higher than for women without diabetes. Greater differences were seen in PBS costs which were tripled for women with diabetes in the 1973-78 cohort (compared to women with no diabetes), and doubled for women with diabetes in the 1946-51 cohort.

Table 2: Comparison of costs for MBS and PBS uptake in women who have never reported diabetes and those who have ever reported diabetes, mean cost ($) 2013 (the most recent year that data were available)

	1973-78 cohort		1946-51 cohort		1921-26 cohort	
	MBS	**PBS**	**MBS**	**PBS**	**MBS**	**PBS**
Never	1,553	249	1,715	675	2,786	1,445
Ever	1,744	795	2,243	1,305	2,890	1,760

Women reporting diabetes had increased mortality rates in both the 1946-51 and 1921-26 cohorts. In the 1921-26 cohort most of these deaths were due to diabetes or associated conditions including coronary and other heart disease. In the 1946-51 cohort, few deaths were associated with diabetes or heart disease, with cancer being a more common cause of death in this cohort and at these earlier ages.

Mental health

The prevalence of psychological distress, estimated using SF-36 Mental Health subscale scores of 52 or lower, was highest amongst young women at Survey 1 and gradually decreased with time in each cohort except at later surveys amongst older women. ALSWH data suggest that a variety of sociodemographic factors impact on the mental health of

women over time. For example, lower education and not managing on available income were associated with greater risk of psychological distress for all cohorts. A variety of lifestyle factors also impact on the mental health of women over time. For example, smoking was implicated in mental health issues: poor mental health was associated with subsequent smoking and smoking was associated with subsequent poor mental health.

Women in the 1973-78 and 1946-51 cohorts who were categorised as obese reported poorer mental health than women in the healthy weight range. Paradoxically, women in the 1921-26 cohort who were underweight were more likely to report poor mental health. There was a clear relationship between increasing physical activity and decreasing depressive symptoms in middle-aged women, independent of pre-existing physical and psychological wellbeing.

Mental and physical health interact and affect each other in reciprocal ways, as evidenced by the differences in mental health scores for women with and without chronic conditions in this report.

Women with psychological distress had more general practice visits than women with no psychological distress and MBS costs were higher for women with psychological distress. Women in the 1973-78 and 1946-51 cohorts who are psychologically distressed cost a fifth more on MBS than women who are not distressed. In the 1973-78 and 1946-51 cohorts, PBS costs for women with poor mental health are almost three times those of women who have never indicated that they are psychologically distressed.

Comorbidity

Many women had more than one index chronic health condition, particularly in the older two cohorts. In the 1946-51 cohort, only around one third of the women had no conditions, another third had one condition, and the remaining third had two or more conditions. Very few women in the 1921-26 cohort had no conditions, and around half the women had two or more conditions. In both cohorts managing on their income was more difficult for women who had multiple chronic conditions.

There was also a clear relationship between obesity and having multiple chronic conditions: women who were obese or overweight had more conditions than women who were normal weight. Correspondingly, moderate or high levels of physical activity were associated with fewer chronic conditions.

Women with more comorbid conditions were also more likely to have a claim for a Chronic Disease Management Plan in their MBS data. On average, women in the 1921-26 and 1946-51 cohorts with four or more conditions had at least one Chronic Disease Management Plan item for the years 2010-2013. This rate would indicate that the use of these items is less than optimal even among the women with the most complex comorbid conditions.

Summary

The report showed that while chronic conditions are not common in younger women, their prevalence increases with age. Since 1996, the prevalence of chronic conditions has increased rapidly in each ALSWH cohort as the women have aged, with women in the 1946-51 and 1921-26 cohorts experiencing a high burden of the main chronic diseases of arthritis, asthma, diabetes, and cardiovascular conditions. Many women have also reported cancer, with breast cancer being the most common.

The report also highlights the high burden of mental health conditions including depression and anxiety, with these conditions often comorbid with physical health problems. The issue of comorbidity is further highlighted by the one third of women in the 1946-51 cohort who have two or more chronic conditions, with obesity linked closely to the prevalence of comorbidities.

There are marked differences in the main causes of death between age cohorts. For the 1921-26 cohort the main causes of death are coronary heart disease, cerebrovascular disease, dementia, chronic obstructive pulmonary disease, and diabetes, but for the 1946-51 cohort they include the major cancers (breast, lung, colorectal, ovarian) and cerebrovascular disease.

The burden on the health system of chronic conditions is evidenced by the significantly higher MBS and PBS costs for women with these conditions. With the higher prevalence of obesity among women in the 1946-51 cohort than in the 1921-26 cohort, and the links between obesity and a range of chronic conditions, these cost differentials are likely to increase over the coming decades.

Feature B: Cohort Summaries

During 2015, summary reports outlining the health trajectories and key issues since the beginning of data collection for the 1946-51 and 1989-95 cohorts were completed. Summary reports for all cohorts have now been prepared (the 1921-26 cohort and 1973-78 cohort summaries were completed in 2014). These reports provide information on trends and changes in chronic disease and health risks over time, and are available on the Study website: www.alswh.org.au. A summary of notable trends is included here.

Arthritis has a very high prevalence and incidence, affecting:

- 20% of women in the 1946-51 cohort when they were aged 50-55 years, increasing to 51% when these women were aged 62-67.
- 41% of women in the 1921-26 cohort when they were aged 73-78 years, increasing to 70% when these women were aged 85-90.

Asthma increased in prevalence across all cohorts.

- The highest prevalence of asthma was among young women with around 25% of women aged 18-23 (1973-78 and 1989-95 cohorts) reporting they had ever had asthma.
- The prevalence of ever having asthma increased among women in the 1973-78 cohort, with over 30% of these women reporting having had asthma by age 34-39.
- Asthma increased from 15% (age 45-50) to 25% (age 62-67) among women in the 1946-51 cohort.
- Asthma increased from 12% (age 70-75) to 17% (age 85-90) among women in the 1921-26 cohort.

Diabetes had a low prevalence among younger cohorts but incidence rapidly increased with age.

- In the 1946-51 cohort, around 3% of women reported diabetes when aged 45-50, increasing to around 12% when these women were aged 62-67.
- In the 1921-26 cohort, around 5% of women had diabetes at age 70-75, and around 17% had diabetes at age 85-90.

Heart conditions were reported by less than 5% of the younger cohorts, but prevalence rapidly increased over time in the two oldest cohorts.

- In the 1921-26 cohort, over 40% of women aged 85-90 reported they had been told by a doctor that they have heart disease.
- In the 1946-51 cohort, around 10% of women aged 62-67 reported heart disease. Coronary heart disease accounted for 19% of deaths for women in this cohort.
- At age 62-67 around 12% of the women in the 1921-26 cohort reported they had a past stroke. Cerebrovascular disease accounted for 11% of deaths for women in this cohort.

Hypertension:

- The percentage of women in the 1973-78 cohort reporting high blood pressure doubled from 5% at age 22-23 to 10% at age 34-39.
- In the 1946-51 cohort, 20% of women reported high blood pressure at age 45-50, and this increased to 45% at age 62-67.
- In the 1921-26 cohort, 48% of the women reported having high blood pressure when aged 70-75, and this increased to over 70% by age 85-90.

Body Mass Index (BMI): There has been a marked increase in the percentage of women categorised as overweight or obese, with BMI increasing as women age, and with successively younger cohorts.

- At Survey 1 in 2013, 60% of the 1989-95 cohort (aged 22-23) were categorised as being of healthy weight, 19% were overweight, 13% were obese and 8% were underweight.
- Among women born 1973-78, obesity/overweight increased from 20% at age 22-23, to 45% at age 34-39.
- In the 1946-51 cohort, around 45% were overweight or obese at age 45-50, and this increased to 63% by age 62-67.
- In the 1921-26 cohort, 47% were overweight or obese at age 70-75, and this reduced slightly to 43% at age 85-90. The percentage of underweight women increased from 3% to 6%.

Smoking:

- At Survey 1, when they were aged 18-23, 63% of the 1989-95 cohort had never smoked, 18% were ex-smokers and 19% were current smokers.
- At Survey 1 (1996), 26.5% of the 1973-78 cohort (age 22-23) were current smokers, and this decreased to 13% at Survey 6 in 2012.
- The percentage of the 1946-51 cohort who were current smokers declined over time from 15% at age 45-50 to about 5% at age 62-67.
- Smoking rates were low among women in the 1921-26 cohort, and smokers were more likely to die over the course of the study.

Physical activity:

- *1989-95 cohort:* Almost half (48%) of women aged 18-23 at Survey 1 in 2013 reported a high level of physical activity, 21% reported a 'moderate' level, 25% reported a 'low' level, and 6 % were inactive.
- *1973-78 cohort:* 42% of women in this cohort were categorised as inactive or reported low activity when they were aged 22-27 at Survey 2, and this increased to 53% at Survey 6 (age 34-39).
- *1946-51 cohort:* The majority of the women were classified as moderately or highly physically active over all surveys. However, at least 40% of women recorded low levels of activity or were inactive at every survey.
- *1921-26 cohort:* The percentage of inactive women increased from 34% at age 73 to 78 years (Survey 2, 1999) to 59% by 85 to 90 years (Survey 6, 2011).

PUBLICATIONS

PUBLISHED PAPERS

Alsalami MO, Forder PM, Milton AH, McEvoy MA & Byles JE.

Associations between medication use and mental health in older women: A cross-sectional analysis of 5,502 women aged 76 to 81.

Journal of the American Geriatrics Society, 2015; 63(6), 1254-1255.

The association between use of medications in older people and poor mental health has been investigated in a limited number of studies, and results have been contradictory. Given possible associations between medications and mental health, there is potential for multiple medication use to contribute to age-associated declines in mental health, but the evidence concerning the association between mental health and medication use is scarce. The aim of this study was to examine the association between medication use and mental health in older women (aged 76–81) from the Australian Longitudinal Study on Women Health (ALSWH). Older women who use a small number of medications have better mental health, whereas use of 10 or more medications is associated with poorer mental health. The findings underscore risk of poor mental health in older women using multiple medications.

Beard J, Officer A, de Carvalho A, Sadana R, Pot A M, Michel J-P, Lloyd-Sherlock P, Epping-Jordan J, Peeters G, Mahanani W R, Thiyagarajan J A & Chatterji S.

The World report on ageing and health: A policy framework for healthy ageing.

The Lancet, 2015; doi.org/10.1016/S0140-6736(15)00516-4.

Although populations around the world are rapidly ageing, evidence that increasing longevity is being accompanied by an extended period of good health is scarce. A coherent and focused public health response that spans multiple sectors and stakeholders is urgently needed. To guide this global response, WHO has released the first World report on ageing and health, reviewing current knowledge and gaps and providing a public health framework for action. The report is built around a redefinition of healthy ageing that centres on the notion of functional ability: the combination of the intrinsic capacity of the individual, relevant environmental characteristics, and the interactions between the individual and these characteristics. This health policy highlights key findings and recommendations from the report.

Bowe S, Adams J, Lui C & Sibbritt D.

A longitudinal analysis of self-prescribed complementary and alternative medicine use by a nationally representative sample of 19,783 Australian women, 2006–2010.

Complementary Therapies in Medicine, 2015; 23(5), 699-704.

Background: Complementary and alternative medicine (CAM) use is increasingly popular amongst general populations around the world and women are substantial CAM users. However, self-prescribed CAM use does raise potential safety concerns and so it is important to identify risk factors associated with self-prescribed CAM use.

Methods: Data was obtained from the Australian Longitudinal Study on Women's Health (ALSWH). Longitudinal data analyses were conducted on questionnaire data from the 1973–78 cohort (n = 9,145) and the 1946–51 cohort (n = 10,638), collected over the period 2006–2010.

Results: In the 1973–78 cohort, use of self-prescribed CAM was 73.2% in 2006 and 75.3% in 2009. For the 1946–51 cohort, use of self-prescribed CAM was 73.9% in 2007 and 74.7% in 2010. There were similar levels of use of individual self-prescribed CAM, with the exception that the use of herbal medicine was much higher among the 1946–51 cohort (20% vs. 27%). There was a substantial increase over three years in the use of vitamins/minerals in both cohorts (21% and 19%, respectively). In contrast, there was a considerable decline over three years in use of aromatherapy oils in both cohorts (34% and 28%, respectively).

Conclusion: Self-prescribed CAM use is popular amongst women in Australia and it is important that conventional practitioners providing women's health care be cognizant of such use amongst their patients. In order to ensure effective practice, there is a need for further research to explore women's decision-making and experiences around self-prescribed CAM use.

Burns RA, Butterworth P, Browning C, Byles J, Luszcz M, Mitchell P, Shaw J & Anstey KJ.

Examination of the association between mental health, morbidity, and mortality in late life: Findings from longitudinal community surveys.

International Psychogeriatrics. 2015; 27(5): 739-746.

Background: Physical health has been demonstrated to mediate the mental health and mortality risk association. The current study examines an alternative hypothesis that

mental health mediates the effect of physical health on mortality risk.

Methods: Participants (N = 14,019; women = 91%), including eventual decedents (n = 3,752), were aged 70 years and older, and drawn from the Dynamic Analyses to Optimise Ageing (DYNOPTA) project. Participants were observed on two to four occasions, over a 10-year period. Mediation analysis compared the converse mediation of physical and mental health on mortality risk.

Results: For men, neither physical nor mental health was associated with mortality risk. For women, poor mental health reported only a small effect on mortality risk (Hazard Risk (HR) = 1.01; $p < 0.001$); more substantive was the risk of low physical health (HR = 1.04; $p < 0.001$). No mediation effects were observed.

Conclusions: Mental health effects on mortality were fully attenuated by physical health in men, and partially so in women. Neither mental nor physical health mediated the effect of each other on mortality risk for either gender. We conclude that physical health is a stronger predictor of mortality risk than mental health.

Burns RA, Byles J, Magliano DJ, Mitchell P & Anstey KJ.

The utility of estimating population-level trajectories of terminal wellbeing decline within a growth mixture modelling framework.

Social Psychiatry and Psychiatric Epidemiology. 2015; 50(3):479-487.

Purpose: Mortality-related decline has been identified across multiple domains of human functioning, including mental health and wellbeing. The current study utilised a growth mixture modelling framework to establish whether a single population-level trajectory best describes mortality-related changes in both wellbeing and mental health, or whether subpopulations report quite different mortality-related changes.

Methods: Participants were older-aged (M = 69.59 years; SD = 8.08 years) deceased females (N = 1,862) from the dynamic analyses to optimise ageing (DYNOPTA) project. Growth mixture models analysed participants' responses on measures of mental health and wellbeing for up to 16 years from death.

Results: Multi-level models confirmed overall terminal decline and terminal drop in both mental health and wellbeing. However, modelling data from the same participants within a latent class growth mixture framework indicated that most participants reported stability in mental health (90.3 %) and wellbeing (89.0 %) in the years preceding death.

Conclusions: Whilst confirming other population-level analyses which support terminal decline and drop hypotheses in both mental health and wellbeing, we subsequently identified that most of this effect is driven by a small but significant minority of the population. Instead, most individuals report stable levels of mental health and wellbeing in the years preceding death.

Byles J, Francis L, Chojenta C & Hubbard I.

Long-term survival of older Australian women with a history of stroke.

Journal of Stroke and Cerebrovascular Disease, 2015; 24(1), 53-60.

Background: While many people survive an initial stroke, little is known about long-term impacts of stroke on survival.

Methods: Data from the Australian Longitudinal Study on Women's Health (ALSWH) were used to compare 12-year survival rates in older women with prevalent stroke, incident stroke, and no stroke. Cox regression models were fitted to assess the effect of lifestyle and demographic characteristics on the relationship between stroke and all-cause mortality. The 'no stroke' group was used as the reference category in all statistical models.

Results: At baseline, 4% of the women reported a previous stroke (prevalent stroke). At Survey 2 in 1999, a further 3% reported having a stroke between 1996 and 1999 (incident stroke). Stroke was significantly associated with reduced long-term survival. Age-adjusted Hazards Ratios (HR) were: HR:1.64 (1.43,1.89) for the 'prevalent stroke' group, and HR:2.29 (1.97,2.66) for the 'incident stroke' group. Adjusting for comorbidities reduced the hazard ratios, but the risk of death was still significantly higher in the two stroke groups. Adjusting for demographic and lifestyle factors did not make any further difference to the relationship between stroke and survival. However, obesity and past smoking were also risk factors for mortality.

Conclusions: This study highlights the long-term impacts of stroke on life expectancy, and the importance of comorbidities and other lifestyle factors in affecting post-stroke survival.

Coles J, Lee A, Taft A, Mazza D & Loxton D.

General practice service use and satisfaction among female survivors of childhood sexual abuse.

Australian Family Physician, 2015; 44(1-2), 71-6.

Background: Because childhood sexual abuse (CSA) and adult violence are associated with poorer physical and mental health of women, our aim was to investigate the associations between CSA, adult violence experiences and general practice service use and satisfaction in a community sample of Australian women aged 28-33 years.

Methods: Data of 9058 women from the 1973-78 cohort who completed Survey 4 of the Australian Longitudinal Study on Women's Health were analysed.

Results: Logistic regressions conducted indicated that after controlling for demographic variables, women with experiences of lifetime violence were more likely to have higher general practice service use compared to those

without violence experiences. CSA was not associated with an increase in service use but was significantly associated with a decrease in service satisfaction. This finding remained significant even when they visited the general practice more frequently.

Discussion: Implementing trauma-informed care is suggested as a way to improve the satisfaction of this patient group with complex needs.

Coles J, Lee A, Taft A, Mazza D & Loxton D.
Childhood sexual abuse and its association with adult physical and mental health: results from a national cohort of young Australian women.
Journal of Interpersonal Violence, 2015; 30(11), 1929-44.

Childhood sexual abuse (CSA) occurs across the world, with a prevalence of 20% internationally. Our aim was to investigate the associations between CSA, CSA plus adult violence experiences, and selected self-reported physical and mental health in a community sample of women. Data from 7,700 women aged 28-33 years from the 1973-1978 cohort who completed Survey 4 of the Australian Longitudinal Study on Women's Health (ALSWH) were analyzed. Questions about prior abuse experience such as child sexual abuse, IPV, adult physical and sexual assaults, and physical and mental health. Women who experienced CSA were 1.4 times more likely to experience bodily pain (adjusted odds ratio [AOR] = 1.37, confidence interval [CI] = [1.19, 1.58]), 1.3 times more likely to have poorer general health (AOR = 1.33, CI = [1.15, 1.54]), and 1.4 times more likely to be depressed in the past 3 years (AOR = 1.44, CI = [1.22, 1.71]) compared with those without abuse. Women who experienced both CSA and adult violence were 2.4 to 3.1 times more likely to experience poor general (AOR = 2.35, CI = [1.76, 3.14]) and mental health (AOR = 2.69, CI = [1.98, 3.64]), and suffer from depression (AOR = 2.84, CI = [2.13, 3.78]) and anxiety (AOR = 3.10, CI = [2.12, 4.53]) compared with women with no abuse. This study demonstrates the importance of CSA in pain and poorer long-term mental and physical health. It emphasizes how prior CSA may amplify pain and poorer long-term mental and physical health among women who are again exposed to violence in adulthood.

Coles J Y, Anderson A & Loxton D.
Breastfeeding duration after childhood sexual abuse: An Australian Cohort Study.
Journal of Human Lactation, 2015; doi: 10.1177/0890334415590782.

Background: Childhood sexual abuse (CSA) is prevalent across the world. Childhood sexual abuse is associated with poorer health, but information on its impact on breastfeeding is limited. In this study, the authors investigated the link between CSA and duration of breastfeeding for 6 months or more.

Objective: The purpose of this study was to determine the association between CSA and breastfeeding duration for Australian women.

Methods: Data from 3778 women from the 1973-1978 cohort of the Australian Longitudinal Study on Women's Health were used. A stepped approach was used to assess the association between CSA and breastfeeding the first child for 6 months or more with logistic regression modeling, adjusting for significant sociodemographic characteristics, health behaviors, and adult violence.

Results: The 15.5% of women who had experienced CSA were less educated, younger, and more likely to be smokers and to have experienced adult violence. The CSA group was less likely to breastfeed for 6 months or more, even after adjusting for smoking and adult violence. There was no longer a significant association once sociodemographic factors were adjusted for, which remained true in the fully adjusted model.

Conclusion: Women who experienced CSA were successfully able to maintain breastfeeding at a level similar to those who had not experienced CSA after controlling for sociodemographic factors. Further testing of whether the effects of CSA are mediated through social variables is warranted to investigate whether addressing social factors in service provision may be key to improving breastfeeding duration.

Conrad S & Herber-Gast GC.
Vasomotor menopausal symptoms and risk of stroke among mid-aged women.
International Journal of Stroke, 2015; 10 (2), E13, doi: 10.1111/ijs.12415.

Although vasomotor menopausal symptoms (VMS) [i.e. hot flushes (HF) and night sweats (NS)] have been related to coronary heart disease, the relationship with stroke risk is less clear and under-researched. The Women's Health Initiative (WHI) Observational Study found that early-onset, but not late-onset, VMS were associated with lower risk of stroke. Data, however, were only available from two time-points and HF and NS were not delineated. We investigated whether HF and NS were associated with incident stroke. Self-reported data (collected in 1996 and every three-years from 1998 to 2010) were from 12 577 participants of the Australian Longitudinal Study on Women's Health born in 1946–51. Neither HF nor NS were associated with stroke (n = 249); adjusted odds ratios (95% CIs) were 1·09 (0·82–1·45) and 1·20 (0·90–1·62) respectively. Sample and data differences may explain contrasting findings of the WHI Study. Whereas our study included premenopausal mid-age (45 to 50 years at entry) Australian women, the WHI study studied a multi-ethnic cohort of older postmenopausal women (aged 50–79 years at entry), and used a priori grouping rather than our data-driven approach to define VMS. Our results suggest that in mid-aged women VMS do not appear to be associated with stroke incidence.

de Luca K, Parkinson L, Pollard H, Byles J & Blyth F

How is the experience of pain measured in older, community dwelling people with osteoarthritis? A systematic review of the literature.

Rheumatology International, 2015; doi:10.1007/s00296-015-3268-3.

The objective of the study was to perform a systematic review to identify and appraise outcome measures and measures of pain that are used to assess the experience of pain by older people with osteoarthritis, and to assess whether these measures are effective at capturing the multidimensional nature of the experience of this pain. A systematic review of five electronic databases from January 1996 to March 2013 was done. Inclusion criteria were cohort/observational and cross-sectional studies; specific diagnosis of OA; employed outcome measures of pain and/or health and/or quality of life which included questions about pain; and considered older adults. Articles were reviewed for methodological quality using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies. A total of 14 publications met the inclusion criteria, and 11 discrete studies were included in the review. The studies used 21 different outcome measures, utilizing 13 measures of pain. Sensory, affective and cognitive dimensions of pain were captured by the measures, albeit studies predominantly measured intensity or severity alone. Measures of pain used in epidemiological studies do not adequately capture the multidimensional nature of the experience of pain in osteoarthritis. There is a fraught complexity in the multidimensionality of the experience of pain in osteoarthritis, and studies exploring osteoarthritis pain in older people should attempt to capture this multidimensionality by employing multiple valid and reliable outcome measures that capture specific dimensions of the pain experience.

Dillon, G., Hussain, R. & Loxton, D.

Intimate partner violence in the young cohort of the Australian Longitudinal Study on Women's Health: Urban/rural comparison and demographic associations.

Advances in Mental Health Promotion: Prevention and Early Intervention, 2015; doi:10.1080/18374905.2015.1039752.

Intimate partner violence (IPV) is known to be linked to significant negative physical and mental health outcomes. This study addresses a gap in the Australian IPV literature by investigating lifetime IPV prevalence by rurality of residence, using data from a population based sample of young women. The overall lifetime IPV prevalence rate in the sample was 21.6%, but there were significant differences in IPV rates from major cities (19.6%), inner regional areas (24.4%) and other rural areas (26.1%). After adjusting for demographic variables, multivariable analysis revealed that there were still significantly raised odds of women from inner regional (OR 1.16, 95% CI 1.01–1.33) and other rural areas (OR 1.31, 95% CI 1.11–1.56) reporting lifetime IPV compared to women from major cities. Multivariable analysis also showed that a history of IPV was significantly associated with women being separated/divorced/widowed, having lower levels of education, income hardship and limited available social support.

Dobson A, Hockey R, Brown W, Byles J, Loxton D, McLaughlin D, Tooth L & Mishra G.

Cohort Profile Update: Australian Longitudinal Study on Women's Health.

International Journal of Epidemiology, 2015; doi: 10.1093/ije/dyv110.

In 1996 the Australian Longitudinal Study on Women's Health recruited a nationally representative sample of more than 40 000 women in three age cohorts, born in 1973–78, 1946–51 and 1921–26. At least six waves of 3-yearly surveys have been completed. Although the focus remains on factors affecting the health and well-being of women and their access to and use of health services across urban, rural and remote areas of Australia, the study has now been considerably expanded by linkage to other health data sets. For most women who have ever participated in the study, linked records are now available for: government subsidized non-hospital services (e.g. all general practitioner visits); pharmaceutical prescriptions filled; national death index, including codes for multiple causes of death; aged care assessments and services; cancer registries; and, for most states and territories, hospital admissions and perinatal data. Additionally, a large cohort of women born in 1989–95 have been recruited. The data are available to approved collaborators, with more than 780 researchers using the data so far. Full details of the study materials and data access procedures are available at http://www.alswh.org.au.

Fairweather-Schmidt K, Lee C & Wade T.

A longitudinal study of mid-age women with indicators of disordered eating.

Developmental Psychology, 2015; 51(5), 722-729.

This longitudinal study of mid-age women has two main aims: to examine the effect of disordered eating (DE) on quality of life (QoL) among women, including a comparison with a younger cohort; and to investigate the mediating roles of both depressive symptoms and social support on the longitudinal relationship between DE and QoL as potential mechanisms of action. We used self-reported data from six waves of the Australian Longitudinal Study on Women's Health over 14 years. A total of 12,338 women participating in the mid-age cohort (ageing from 45-50 to 59-64) provided self-report indications of DE at Surveys 1 and 2, and QoL (SF-36 component scales - mental [MCS] and physical [PCS]) at Surveys 2-6. DE was reported by 10.98% of the women; this group also reported significantly poorer mental and physical QoL than those without DE, and this effect was

sustained over time. Comparison with a parallel analysis of a younger cohort of women showed that the effect on mid-age women's physical QoL is greater than that of the younger women. The relationships between baseline DE and changes in QoL (both physical and mental) over time were mediated by levels of depressive symptoms and of social support over time. This study underscores the significant effect of DE on QoL in mid age, an effect which is partially or fully mediated by depressive symptoms or social support. Wellbeing of mid-age women with indicators of DE needs to be supported by tailoring prevention and interventions activities specifically for this group.

Frawley J, Adams J, Steel A, Broom A, Gallois C, & Sibbritt D.

Women's use and self-prescription of herbal medicine during pregnancy: An examination of 1835 pregnant women.

Women's Health Issues, 2015; 25(4), 396-402.

Background: Recent research points to high levels of herbal medicine use during pregnancy. The objectives of this study were to elucidate the prevalence and understand the determinants of both the use and self-prescription of herbal medicine during pregnancy.

Methods: The study sample was obtained via the Australian Longitudinal Study on Women's Health. Women who were pregnant or who had recently given birth were invited to complete a subsurvey in 2010 about pregnancy, and complementary and alternative medicine use.

Findings: A response rate of 79.2% (n=1,835) was attained and 34.4% (n=588 of 1,835) of the sample were utilizing herbal medicine during pregnancy, of which 77.9% (n=458 of 588) were self-prescribing these products. The women in our study (aged 33-38) were more likely to use herbal medicine if they had anxiety (odds ratio [OR],1.30; 95% CI, 1.02-1.64; p=.031), sleeping problems (OR,1.55; 95% CI, 1.15-2.11; p=.005), or fatigue (OR,1.32; 95% CI, 1.04-1.68; p=.025), but less likely to use herbal medicine if they had nausea (OR,0.71; 95% CI, 0.56-0.91; p=.007). Women were more likely to self-prescribe herbal medicine if they suffered from varicose veins (OR,2.46; 95% CI, 1.04-5.84; p=.041) and less likely to self-prescribe herbal medicine if they suffered from preeclampsia (OR,0.23; 95% CI, 0.81-0.63; p=.005). Women who self-prescribed herbal medicine during pregnancy were also more likely to live in a rural environment (OR,2.22; 95% CI, 1.32-3.73; p=.003).

Conclusions: Many Australian women are consuming herbal medicine during pregnancy. The self-prescription of herbal medicine by pregnant women is of particular concern owing to potential safety issues, and it is important that maternity health care providers have an open and nonjudgmental conversation with women about herbal medicine use during pregnancy.

Gardiner PA, Pachana NA, Mishra GD, Jones M, Byles JE & Dobson AJ.

Do factors that predict attrition change across waves in a longitudinal study of older women?

Journal of the American Geriatrics Society, 2015; 16(9): 781-783.

Cohort studies of older people face particular problems of attrition due to death, as well as other types of dropout that occur over the course of the study. Few studies report on multiple types of attrition, and most use baseline data to examine predictors of attrition. This study aims to examine whether the same factors consistently predict attrition over multiple waves of a longitudinal study of older women.

Gardiner PA, Mishra GD & Dobson AJ.

Validity and responsiveness of the FRAIL scale in a longitudinal cohort study of older Australian women.

Journal of the American Medical Directors Association, 2015; 16(9), 781-783.

Background: To assess the validity and responsiveness of the FRAIL scale and investigate whether validity is related to the number of points used on the scale.

Methods: Participants were 12,432 women born in 1921–1926 from the Australian Longitudinal Study on Women's Health, surveyed up to 6 times from 1996 to 2011. The FRAIL scale is a 5-item measure and scored as a 6-, 3-, or 2-point measure. Face validity was determined by assessing relationships with age, construct validity was determined by assessing relationships with measures of disability (activities of daily living and independent activities of daily living), and responsiveness was determined by assessing relationships with changes in self-rated health.

Results: The proportion of women who reported their frailty as high (4 or 5 on a scale of 0 to 5) increased with age from 5.6% at age 73–78 years to 16.2% at age 85–90 years. The FRAIL scale was moderately correlated with disability, Spearman's rho ≥0.4 for activities of daily living and ≥0.5 for independent activities of daily living; slightly stronger associations were observed when it was scored as a 6-point measure. Mean change (95% confidence interval) in FRAIL 6-point scores decreased for women who reported improvements in self-rated health between successive surveys; by at least 0.08 (0.01, 0.15) and increased in those women who reported declines in self-rated health by at least 0.64 (0.57, 0.70).

Conclusions: The FRAIL scale is valid and responsive and is suitable for use in longitudinal studies of women in their 70s and older.

Gresham E, Forder P, Chojenta C, Byles J, Loxton D & Hure A.

Agreement between self-reported perinatal outcomes and administrative data in New South Wales, Australia.

BMC Pregnancy and Childbirth, 2015; 15, 161.

Background: Many epidemiological studies that focus

on pregnancy rely on maternal self-report of perinatal outcomes. The aim of this study was to evaluate the agreement between self-reported perinatal outcomes (gestational hypertension with or without proteinuria, gestational diabetes, premature birth and low birth weight) in a longitudinal study and linked administrative data (medical records).

Methods: Self-reported survey data from the Australian Longitudinal Study on Women's Health was linked with the New South Wales Perinatal Data Collection. Agreement between the two sources was evaluated using percentage agreement and kappa statistics. Analyses were conducted at two levels by: i) the mother and ii) each individual child.

Results: Women reliably self-report their perinatal outcomes (≥87 % agreement). Gestational hypertension with or without proteinuria had the lowest level of agreement. Mothers' reports of perinatal outcomes were more reliable when evaluated by child. Restricting the analysis to complete and consistent reporting further strengthened the reliability of the child-specific data, increasing the agreement from >92 to >95 % for all outcomes.

Conclusions: The present study offers a high degree of confidence in the use of maternal self-reports of the perinatal outcomes gestational hypertension, gestational diabetes, preterm birth and low birth weight in epidemiological research, particularly when reported on a per child basis. Furthermore self-report offers a cost-effective and convenient method for gathering detailed maternal perinatal histories.

Harding J, Shaw, J, Anstey K, Adams R, Balkau B, Brennan-Olsen, et al.

Comparison of anthropometric measures as predictors of cancer incidence: A pooled collaborative analysis of 11 Australian cohorts.

International Journal of Cancer, 2015; doi: 10.1002/ijc.29529.

Obesity is a risk factor for cancer. However, it is not known if general adiposity, as measured by body mass index (BMI) or central adiposity [e.g., waist circumference (WC)] have stronger associations with cancer, or which anthropometric measure best predicts cancer risk. We included 79,458 men and women from the Australian and New Zealand Diabetes and Cancer Collaboration with complete data on anthropometry [BMI, WC, Hip Circumference (HC), WHR, waist to height ratio (WtHR), A Body Shape Index (ABSI)], linked to the Australian Cancer Database. Cox proportional hazards models assessed the association between each anthropometric marker, per standard deviation and the risk of overall, colorectal, post-menopausal (PM) breast, prostate and obesity-related cancers. We assessed the discriminative ability of models using Harrell's c-statistic. All anthropometric markers were associated with overall, colorectal and obesity-related cancers. BMI, WC and HC were associated with PM breast cancer. No significant associations were seen for prostate cancer. Strongest associations were observed for WC across all outcomes, excluding PM breast cancer for which HC was strongest. WC had greater discrimination compared to BMI for overall and colorectal cancer in men and women with c-statistics ranging from 0.70 to 0.71. We show all anthropometric measures are associated with the overall, colorectal, PM breast and obesity-related cancer in men and women, but not prostate cancer. WC discriminated marginally better than BMI. However, all anthropometric measures were similarly moderately predictive of cancer risk. We do not recommend one anthropometric marker over another for assessing an individuals' risk of cancer.

Harris M, Byles J, Sibbritt D & Loxton D.

"Just get on with it": Qualitative insights of coming to terms with a deteriorating body for women with osteoarthritis.

PLOS One, 2015; 10(3), e0120507.

Objective: To qualify the psychosocial burden of osteoarthritis for older women and identify factors perceived to assist with psychological adjustment to the disease.

Methods: Women who indicated being diagnosed/treated for osteoarthritis in the previous three years in the fifth survey of the Australian Longitudinal Study on Women's Health provided the sampling frame. Participants were randomly sampled until saturation was reached using a systematic process. Thematic content analysis was applied to the 19 semi-structured telephone interviews using a realist framework.

Results: The findings indicate that the emotional burden of osteoarthritis is considerable, and the process of psychological adjustment complex. Older women with osteoarthritis have psychological difficulties associated with increasing pain and functional impairment. Psychological adjustment over time was attributed primarily to cognitive and attitudinal factors (e.g. stoicism, making downward comparisons and possessing specific notions about the cause of arthritis). This was a dynamic 'day to day' process involving a constant struggle between grieving physical losses and increasing dependence amidst symptom management.

Conclusion: The findings of this study add to the current understanding of the complex processes involved in psychological adjustment over time. Targeted interventions are required focused on assisting women with arthritis redefine self-concepts outside the confines of caring responsibilities, coupled with public health education programs around understanding the destructive nature of arthritis. Understanding the destructive and (potentially) preventable nature of arthritis may facilitate early detection and increased uptake of appropriate treatment options for osteoarthritis that have the ability to modify disease trajectories.

Harris M, Dolja-Gore X, Kendig H & Byles J.

First incident hospitalisation for Australian women aged 70 and beyond: A 10 year examination using competing risks.

Archives of Gerontology and Geriatrics, First published online 23 December 2015. doi:10.1016/j.archger.2015.12.006

There are increasing concerns regarding high hospital use among older adults and the capacity to manage the economic impact of the ageing population trend on healthcare systems. First hospitalisation in old age may act as a catalyst for ongoing intensification of health problems and acute care use. This study examined factors associated with first incident hospitalisation in women aged over 70, accounting for the health inequalities associated with geographic location. Survey data from 3780 women from the 1921 to 1926 cohort of the Australian Longitudinal Study on Women's Health were matched with the Admitted Patients Data Collection and National Death Index. Days to first event (hospitalisation or death) were modelled using competing risks methods. A total of 3065 (80.3%) women had at least one hospital admission. More than half of the top 15 reasons for first hospitalisation were related to cardiovascular disease, with atrial fibrillation the most common. Proportional subdistribution hazards models showed that first hospital admission was driven by enabling and need factors including asthma/bronchitis diagnosis (HR = 1.16; p = 0.047), private health insurance (HR = 1.16; p = 0.004) more than two prescribed medications in previous month (HR = 1.31; p = 0.001), more than four general practitioner visits in previous year (HR = 1.50; p = 0.034), lower physical functioning (HR = 0.99; p < 0.001) and living in an inner regional area (HR = 1.17; p = 0.003). First overnight hospitalisation was primarily related with potentially preventable and treatable chronic diseases. Primary and secondary strategies aimed at chronic disease generally, and better chronic disease management particularly for cardiovascular and respiratory diseases, may play a vital role in disease prevention or delay in readmissions among this population.

Herber-Gast G, Brown W & Mishra G.

Hot flushes and night sweats are associated with coronary heart disease risk in midlife: A longitudinal study.

BJOG An International Journal of Obstetrics and Gynaecology, 2015; 122(11):1560-7.

Objective: The purpose of this study was to investigate associations between vasomotor menopausal symptoms (VMS), that is, hot flushes and night sweats, and incidence of coronary heart disease (CHD).

Design and population: A prospective cohort study of 11725 women, who were aged 45-50 years at baseline in 1996, were followed up at three-year intervals for 14 years.

Methods and main outcome measure: Self-reported VMS and incident CHD were measured at each survey. We determined the association between VMS and CHD at the subsequent survey, using generalised estimating equation analysis, adjusting for time-varying covariates.

Results: At baseline, 14% reported rarely, 17% reported sometimes and 7% reported often having night sweats. During follow-up, 187 CHD events occurred. In the age-adjusted analysis, women who reported hot flushes and night sweats often, had a >2-fold greater odds of CHD (OR hot flushes 2.18 (95% CI 1.49-3.18); OR night sweats 2.38 (95% CI 1.62-3.50)) than women with no symptoms (P for trend <0.001 over frequency of symptoms). Adjustment for menopausal status, lifestyle factors, body mass index, diabetes and hypertension attenuated the associations (OR hot flushes 1.70 (95% CI 1.16-2.51), P for trend 0.01; OR night sweats 1.84 (95% CI 1.24-2.73), P for trend 0.004).

Conclusions: Women who report having hot flushes or night sweats often have an increased risk of developing CHD over a period of 14 years, even after taking the effects of age, menopause status, lifestyle and other chronic disease risk factors into account.

Holden L, Dobson A, Ware R, Hockey R & Lee C.

Longitudinal trajectory patterns of social support: Correlates and associated mental health in an Australian national cohort of young women.

Quality of Life Research, 2015; 24(9), 2075-2086.

Although social support is a significant contributor to health and well-being, little is known about patterns of perceived social support over time in young adulthood. It is also unclear which personal characteristics are associated with different patterns, and whether there is an association between social support and mental health over time. We explore these issues in a large national cohort of young women.

Methods: We used six waves of longitudinal data spanning 16 years, from 10,369 women from the Australian Longitudinal Study on Women's Health, initially aged 18–23. We used group-based trajectory modelling to identify patterns of social support across Surveys 2–6; multinomial logistic regression to identify socio-demographic and health-behaviour predictors at Survey 1 and correlates at Survey 6 for each trajectory group; and generalised linear mixed modelling to estimate mean levels of mental health over the trajectory period for each group, adjusted for confounders.

Results: Four distinct trajectory groups of social support were identified: 'High' (58.5 %), 'Decreasing' (20.6 %), 'Low' (9.3 %), and 'Increasing' (11.6 %). Poor health and living outside metropolitan areas at both Surveys 1 and 6 were characteristics of women in all trajectory groups other than the 'High' group, as were early motherhood and being un-partnered at age 34–39. Other characteristics were specific to one or two trajectory groups. Patterns of mental health over time were consistent with patterns of social support.

Conclusion: Longitudinal trajectory patterns of social support are associated with mental health, health

behaviours, and demographic factors even in early adulthood.

Hubbard IJ, Tavener M, Thijsen A, Francis L, Grennall C, Levi C & Byles J.
How do older Australian women experience life after stroke, and how does the WHO 18-item ICF core Set for Stroke compare?
International Journal of Stroke, 2015; 10: 64-65.

We examined older women's qualitative experiences of stroke with the World Health Organization's 18-item Brief International Classification of Functioning, Disability and Health Core Set for Stroke. Women were participants of the Australian Longitudinal Study on Women's Health, born between 1921 and 1926, who had experienced a stroke in the previous 3 years. An inductive thematic analysis was conducted of women's qualitative experiences of stroke, which were then examined with the 18-item Brief Core Set for Stroke for congruency. Our analysis showed that for older Australian women, their concerns of poststroke living were not adequately classified, potentially impeding a full recovery.

Hure A, Chojenta C, Powers J, Byles J & Loxton D.
Validity and reliability of stillbirth data using linked self-reported and administrative datasets.
Journal of Epidemiology. 2015; 25(1):30-37.

Background: A high rate of stillbirth was previously observed in the Australian Longitudinal Study of Women's Health (ALSWH). Our primary objective was to test the validity and reliability of self-reported stillbirth data linked to state-based administrative datasets.

Methods: Self-reported data, collected as part of the ALSWH cohort born in 1973-1978, were linked to three administrative datasets for women in New South Wales, Australia (n = 4374): the Midwives Data Collection; Admitted Patient Data Collection; and Perinatal Death Review Database. Linkages were obtained from the Centre for Health Record Linkage for the period 1996-2009. True cases of stillbirth were defined by being consistently recorded in two or more independent data sources. Sensitivity, specificity, positive predictive value, negative predictive value, percent agreement, and kappa statistics were calculated for each dataset.

Results: Forty-nine women reported 53 stillbirths. No dataset was 100% accurate. The administrative datasets performed better than self-reported data, with high accuracy and agreement. Self-reported data showed high sensitivity (100%) but low specificity (30%), meaning women who had a stillbirth always reported it, but there was also over-reporting of stillbirths. About half of the misreported cases in the ALSWH were able to be removed by identifying inconsistencies in longitudinal data.

Conclusions: Data linkage provides great opportunity to assess the validity and reliability of self-reported study data. Conversely, self-reported study data can help to resolve inconsistencies in administrative datasets. Quantifying the strengths and limitations of both self-reported and administrative data can improve epidemiological research, especially by guiding methods and interpretation of findings

Jackson CA, Dobson A, Tooth L, Mishra G.
Body mass index and socioeconomic position are associated with 9-year trajectories of multimorbidity: A population-based study.
Preventive Medicine, 2015, 81, 92-98.

Multimorbidity is a growing public health problem and is more common in women than men. However, little is known about multimorbidity trajectories, in terms of the accumulation of disease over time, or about the determinants of these trajectories. We sought to identify lifestyle and socioeconomic factors related to multimorbidity trajectories in mid-aged women.

Participants were from the Australian Longitudinal Study on Women's Health, a nationally representative population-based study. We included 4865 women born 1946–51, without chronic disease in 1998, followed triennially for 12 years. We used latent class growth analysis to identify 9-year multimorbidity trajectories and multinomial regression to calculate relative risk ratios (RRRs) for associations between baseline lifestyle and socioeconomic factors and trajectories.

We identified five multimorbidity trajectories: 'no morbidity, constant'; 'low morbidity, constant'; 'moderate morbidity, constant'; 'no morbidity, increasing'; and 'low morbidity, increasing'. Overweight and obesity were associated with an increased risk of the 'no morbidity, increasing' (RRR 1.70, 95% CI 1.16 to 2.50 and 2.69, 95% CI 1.69 to 4.28, respectively) and the 'low morbidity, increasing' (RRR 2.57, 95% CI 1.56 to 4.24 and 4.28, 95% CI 2.41 to 7.60, respectively) trajectories, as compared to the 'no morbidity, constant' group. Low education and difficulty managing on income were also associated with trajectories of poorer health.

Among mid-aged women, overweight/obesity and lower socioeconomic status are major risk factors for trajectories characterised by accumulation of chronic disease. These highlight key target areas for preventive approaches aimed at reducing the risk of accumulation of morbidities in mid-aged women.

Jackson CA, Jones M, Tooth L, Mishra G, Byles J & Dobson A.
Multimorbidity patterns are differentially associated with functional ability and decline in a longitudinal cohort of older women.
Age and Ageing, 2015; 44(5), 810-816.

Background: We aimed to identify multimorbidity patterns and relate these patterns to functional ability and decline.

Methods: We included 7270 participants of the older cohort of the Australian Longitudinal Study on Women's Health, who were surveyed every 3 years from 2002 to

2011. We used factor analysis to identify multimorbidity patterns from 31 self-reported chronic conditions among women aged 76–81 in 2002. We applied a linear increments model to account for attrition and related the multimorbidity patterns to functional ability and decline at subsequent surveys, as measured by activities of daily living (ADL) and instrumental activities of daily living (IADL). For each pattern, we determined mean ADL and IADL scores in the middle and highest third of factor scores in comparison to a reference group.

Results: We identified three multimorbidity patterns, labelled musculoskeletal/somatic (MSO), neurological/mental health (NMH) and cardiovascular (CVD). High factor scores for NMH, MSO and CVD were associated with significantly higher mean ADL and IADL scores (poorer functional ability) in 2005 compared with the reference group of low factor scores for all three factors. The CVD pattern was associated with the greatest decline in ADL between 2005 and 2011, whereas the NMH pattern was associated with the greatest decline in IADL.

Conclusions: Distinct multimorbidity patterns were differentially associated with functional ability and decline. Given the paucity of studies on multimorbidity patterns, future studies should seek to assess the reproducibility of our findings.

Jackson CA, Mishra G, Byles J, Tooth L & Dobson A.

Moderate agreement between self-reported stroke and hospital-recorded stroke in two cohorts of Australian women: a validation study.

BMC Medical Methodology Research, 2015; 15(7), 1-10.

Background: Conflicting findings on the validity of self-reported stroke from existing studies creates uncertainty about the appropriateness of using self-reported stroke in epidemiological research. We aimed to compare self-reported stroke against hospital-recorded stroke, and investigate reasons for disagreement.

Methods: We included participants from the Australian Longitudinal Study on Women's Health born in 1921-26 (n = 1556) and 1946-51 (n = 2119), who were living in New South Wales who returned all survey questionnaires over a defined period of time. We determined agreement between self-reported and hospitalised stroke by calculating sensitivity, specificity and kappa statistics. We investigated whether characteristics including age, education, area of residence, country of birth, language spoken at home, recent mental health at survey completion and proxy completion of questionnaire were associated with disagreement, using logistic regression analysis to obtain odds ratios (ORs) with 95% confidence intervals (CIs).

Results: Agreement between self-report and hospital-recorded stroke was fair in older women (kappa 0.35, 95% CI 0.25 to 0.46) and moderate in mid-aged women (0.56, 95% CI 0.37 to 0.75). There was a high proportion with unverified self-reported stroke, partly due to: reporting of transient ischaemic attacks; strokes occurring outside the period of interest; and possible reporting of stroke-like conditions. In the older cohort, a large proportion with unverified stroke had hospital records of other cerebrovascular disease. In both cohorts, higher education was associated with agreement, whereas recent poor mental health was associated with disagreement.

Conclusion: Among women who returned survey questionnaires within the period of interest, validity of self-reported stroke was fair to moderate, but is probably underestimated. Agreement between self-report and hospital-recorded stroke was associated with individual characteristics. Where clinically verified stroke data are unavailable, self-report may be a reasonable alternative method of stroke ascertainment for some epidemiological studies.

Jackson ML, Sztendur EM, Diamond NT, Byles JE & Bruck D.

Chronic sleep difficulties in non-depressed young women: A longitudinal population-based investigation.

Sleep Medicine, 2015; 16(9), 1116-1122.

Objectives/Background: Young women are at a risk of poor sleep, but the extent to which their sleep difficulties remain chronic is not known. Little is also known about the frequency of seeking health care for sleep and satisfaction with that health care. This longitudinal study investigated these issues over nine years in women who reported sleep difficulties over the preceding 12 months.

Methods: Data from the Australian Longitudinal Study on Women's Health were analysed (N = 9683). Information on self-reported sleep difficulties, help seeking, and health-care satisfaction was obtained from four surveys collected from 2000 (aged 22–27 years) to 2009. Generalized estimating equations were conducted to calculate odds ratios (OR) for the likelihood of women who reported sleep difficulties in 2000 to report sleep difficulties at subsequent surveys.

Results: The prevalence of self-reported sleep difficulties 'often' was consistent at 9.1–10.8%. Women who reported sleep difficulties 'often' in 2000 had a markedly increased risk of continued sleep difficulties 'often' over the subsequent 9 years [2003: OR (95% confidence interval, CI) = 11.07 (8.03–15.27); 2006: 12.19 (8.08–16.88); 2009: 10.70 (7.57–15.12)]. Of women who reported sleep difficulties 'often' in 2000 (N = 981), 45.1% had persistent sleep problems and 21.1% experienced relapse of symptoms. About one-third of women who reported sleep problems 'often' sought help.

Conclusion: Self-reported frequent sleep difficulties in non-depressed young women strongly predicted a continuation of this level of sleep difficulty over a decade, even if help is sought. Current health practice may not be breaking the ongoing chronicity of sleep difficulties in young women.

Joham A, Boyle J, Zoungas S & Teede H.

Hypertension in reproductive-aged women with polycystic ovary syndrome and association with obesity.

American Journal of Hypertension, 2015; 28(7), 847-851.

Background: Polycystic ovary syndrome (PCOS) is a common disorder with metabolic complications, yet the prevalence of hypertension is unclear. We aim to assess hypertension prevalence and the impact of obesity in women reporting PCOS compared to those not reporting PCOS.

Methods: This is a cross-sectional analysis of data from a large longitudinal study, the Australian Longitudinal Study on Women's Health (ALSWH). Women from the general community were randomly selected from the national health insurance database. Standardized data collection occurred at 6 survey time points. Data from Survey 4 in 2006 (n = 8,612, age: 28-33 years) were examined for this study. The main outcome measures studied were self-reported PCOS and hypertension.

Results: Reported PCOS prevalence was 5.8% (95% confidence interval (CI): 5.3%-6.4%). Women with PCOS had higher body mass index (BMI). Hypertension prevalence was 5.5% (95% CI: 3.3-7.7) in women reporting PCOS and 2.0% (95% CI: 1.6-2.3) in women not reporting PCOS (P < 0.001). Hypertension was associated with BMI (odds ratio: 1.07, 95% CI: 1.05-1.10, P < 0.001) with a trend towards an association with PCOS (P = 0.09). On subgroup analysis, hypertension was not associated with BMI in women reporting PCOS but was associated in those not reporting PCOS.

Conclusions: In this large community-based cohort, we note increased prevalence of hypertension and higher BMI in young women reporting PCOS. BMI association with hypertension appeared clear in women not reporting PCOS. Yet in women with PCOS, hypertension appeared to not be associated with BMI, akin to observations on diabetes risk in PCOS, suggesting that metabolic abnormalities in PCOS may be independent of BMI.

Joham A, Teede H, Ranasinha S, Zoungas S & Boyle J.

Prevalence of infertility and use of fertility treatment in women with Polycystic Ovary Syndrome: Data from a large community-based cohort study.

Journal of Women's Health, 2015; 24(4), 299-307.

Objective: Polycystic ovary syndrome (PCOS) affects 6-21% of women. PCOS is the primary cause of anovulatory infertility, with major health and economic costs, yet we are unaware of any community-based, natural history studies on fertility and fertility treatments published to date. We aim to compare infertility, fertility treatment use and relationship to body mass index (BMI) in women reporting PCOS to women not reporting PCOS in a community-based population.

Design: Cross-sectional analysis of a longitudinal cohort study, the Australian Longitudinal Study on Women's Health (ALSWH). Women from the general community were randomly selected from the national public insurance database. Mailed survey data were collected at multiple time points. At Survey 4, there were 9145 respondents aged 28-33. 478 women reported having PCOS from 8612 women with known PCOS status. Information regarding fertility status was available for 4856 women. This was the subgroup used in this analysis.

Measurements: The main outcome measures are self-reported PCOS status, BMI, infertility, use of fertility therapies including ovulation induction and in-vitro fertilization (IVF). Logistic regression was used to examine factors associated with infertility and use of fertility treatment.

Results: Self-reported PCOS prevalence was 5.8% (95% CI: 5.3%-6.4%). Infertility was noted by 72% of 309 women reporting PCOS, compared to 16% of 4547 women not reporting PCOS (p<0.001). Infertility was 15 fold higher in women reporting PCOS (adjusted OR 14.9, 95% CI 10.9-20.3), independent of BMI. Of women reporting infertility, there was greater use of fertility hormone treatment, (62%, n=116 vs 33%, n=162, p<0.001) in women reporting PCOS; however IVF use was similar.

Conclusions: In this community-based cohort of women, infertility and use of fertility hormone treatment was significantly higher in women reporting PCOS. Considering the prevalence of PCOS and the health and economic burden of infertility, strategies to optimise fertility are important.

Jones M, Mishra G & Dobson A.

Analytical results in longitudinal studies depended on target of inference and assumed mechanism of attrition.

Journal of Clinical Epidemiology, 2015; 68(10), 1165-1175.

Objectives: To compare methods for analysis of longitudinal studies with missing data due to participant dropout and follow-up truncated by death.

Study Design and Setting: We analyzed physical functioning in an Australian longitudinal study of elderly women where the missing data mechanism could either be missing at random (MAR) or missing not at random (MNAR). We assumed either an immortal cohort where deceased participants are implicitly included after death or a mortal cohort where the target of inference is surviving participants at each survey wave. To illustrate the methods a covariate was included. Simulation was used to assess the effect of the assumptions.

Results: Ignoring attrition or restricting analysis to participants with complete follow up led to biased estimates. Linear mixed model was appropriate for an immortal cohort under MAR but not MNAR. Linear increment model and joint modeling of longitudinal

outcome and time to death were the most robust to MNAR. For a mortal cohort, inverse probability weighting and multiple imputation could be used, but care is needed in specifying dropout and imputation models, respectively.

Conclusion: Appropriate analysis methodology to deal with attrition in longitudinal studies depends on the target of inference and the missing data mechanism.

Ju H, Jones M & Mishra G.

Illicit drug use, early age at first use and risk of premenstrual syndrome: A longitudinal study.

Drug Alcohol Dependancy, 2015; 152, 209-217.

Background: Premenstrual syndrome (PMS) is common among women of reproductive age. Limited studies have investigated the long-term association between illicit drug use and PMS.

Methods: The 1973-1978 cohort from the Australian Longitudinal Study on Women's Health, a prospective cohort study, was followed up for 13-year from 2000 to 2012. Data were collected through self-reported questionnaires on all variables, including PMS, illicit drug use and a range of sociodemographic, lifestyle, reproductive and psychological factors.

Results: When the women were 22-27 years of age, over 40% used illicit drug in the last 12 months, 9% first reported drug use before age 15 years and approximately 35% reported PMS. Over the study period, the prevalence of drug use in the last 12 months declined whereas that of PMS remained fairly stable except an increase when participants were 34-39 years old. Generalised estimating equations analysis showed that, compared to never drug users, significantly higher odds of reporting PMS were detected for illicit drug use in the last 12 months: multiple drugs (odds ratio (OR) 1.31, 95% confidence interval (CI) 1.21, 1.43), exclusive marijuana (OR 1.23, 95% CI 1.08, 1.40). A higher odds of PMS was identified for age at first drug use before 15 years (OR 1.20, 95% CI 1.03, 1.40).

Conclusions: Illicit drug use in the last 12 months, especially early age at first use and multiple drug use, is associated with increased risk of PMS. However current study is unable to prove causality.

Kennaugh R, Byles J & Tavener M.

Beyond widowhood: Do prior discovered themes that describe the experiences of older Australian widowed women persist over time?

Womens Health, 2015; doi: 10.1080/03630242.2015.1118731.

Previous cross-sectional research has explored experiences of widowed women in the 1921-26 cohort of the Australian Longitudinal Study on Women's Health and identified three major themes: health, social relationships and support, and financial and structural issues. The current study examined longitudinal data collected over 15 years to assess whether these themes persisted and/or evolved over time. The sample included 162 widowed women aged 70-90 years. Thematic analysis was used with a constant comparison method. Many women reported good health despite managing comorbidities. Social relationships frequently shifted from friends to family to more formal support. Most financial and structural issues related to managing increasing health costs as women aged. These results confirmed that the three major themes previously reported persisted over time, and underscore the importance of continuing to support women, and their changing needs, well beyond the initial period of bereavement.

Kirby E, Broom A, Sibbritt D, Refshauge K & Adams J.

Suffering, recognition and reframing: health care choices and plural care pathways for women with chronic back pain.

Current Sociology, 2015; 63(5), 652-668.

Chronic back pain is a major health and social problem in Australia, often concealed and given limited credibility vis-a-vis other health conditions. Care practices are diversified with allied health, biomedical and complementary and alternative medicine (CAM) practitioners regularly being consulted for help and care, often concurrently. While this differentiated 'healthcare market' may on one level be viewed as positive in terms of diverse therapeutic choices, there is also potential for difficulties with regard to care practices and negotiating competing therapeutic modalities. Drawing on qualitative interviews with 50 women aged 60–65 from the Australian Longitudinal Study on Women's Health living with chronic back pain, this article explores their accounts of suffering and the experiences of engaging in pluralistic healthcare choices, with a particular focus on CAM. The findings reveal the ways by which healthcare pluralism is connected to the dynamics of suffering and relations of recognition.

Lai JS, Hure AJ, Oldmeadow C, McEvoy M, Byles J & Attia J.

Prospective study on the association between diet quality and depression in mid-aged women over 9 years.

European Journal of Nutrition, 2015; doi: 10.1007/s00394-015-1078-8.

Purpose: To examine the longitudinal association between diet quality and depression using prospective data from the Australian Longitudinal Study on Women's Health.

Methods: Women born in 1946–1951 (n = 7877) were followed over 9 years starting from 2001. Dietary intake was assessed using the Dietary Questionnaire for Epidemiological Studies (version 2) in 2001 and a shortened form in 2007 and 2010. Diet quality was summarised using the Australian Recommended Food Score. Depression was measured using the 10-item Centre for Epidemiologic Depression Scale and self-reported physician diagnosis. Pooled logistic regression models including time-varying covariates were used to examine

associations between diet quality tertiles and depression. Women were also categorised based on changes in diet quality during 2001–2007. Analyses were adjusted for potential confounders.

Results: The highest tertile of diet quality was associated marginally with lower odds of depression (OR 0.94; 95% CI 0.83, 1.00; P = 0.049) although no significant linear trend was observed across tertiles (OR 1.00; 95% CI 0.94, 1.10; P = 0.48). Women who maintained a moderate or high score over 6 years had a 6–14% reduced odds of depression compared with women who maintained a low score (moderate vs low score—OR 0.94; 95% CI 0.80, 0.99; P = 0.045; high vs low score—OR 0.86; 95% CI 0.77, 0.96; P = 0.01). Similar results were observed in analyses excluding women with prior history of depression.

Conclusion: Long-term maintenance of good diet quality may be associated with reduced odds of depression. Randomised controlled trials are needed to eliminate the possibility of residual confounding.

Lazarevic N, Dobson AJ, Barnett AG & Knibbs, LD.
Long-term ambient air pollution exposure and self-reported morbidity in the Australian Longitudinal Study on Women's Health: A cross-sectional study.
BMJ Open, 2015, 5(10), e008714.

Objective: We sought to assess the effect of long-term exposure to ambient air pollution on the prevalence of self-reported health outcomes in Australian women.

Setting and participants: The geocoded residential addresses of 26 991 women across 3 age cohorts in the Australian Longitudinal Study on Women's Health between 2006 and 2011 were linked to nitrogen dioxide (NO2) exposure estimates from a land-use regression model. Annual average NO2 concentrations and residential proximity to roads were used as proxies of exposure to ambient air pollution.

Outcome measures: Self-reported disease presence for diabetes mellitus, heart disease, hypertension, stroke, asthma, chronic obstructive pulmonary disease and self-reported symptoms of allergies, breathing difficulties, chest pain and palpitations.

Methods: Disease prevalence was modelled by population-averaged Poisson regression models estimated by generalised estimating equations. Associations between symptoms and ambient air pollution were modelled by multilevel mixed logistic regression. Spatial clustering was accounted for at the postcode level.

Results: No associations were observed between any of the outcome and exposure variables considered at the 1% significance level after adjusting for known risk factors and confounders.

Conclusions: Long-term exposure to ambient air pollution was not associated with self-reported disease prevalence in Australian women. The observed results may have been due to exposure and outcome misclassification, lack of power to detect weak associations or an actual absence of associations with self-reported outcomes at the relatively low annual average air pollution exposure levels across Australia.

Lo TKT, Parkinson L, Cunich M & Byles J.
A 6-year trend of the healthcare costs of arthritis in a population-based cohort of older women.
Expert Review of Pharmacoeconomics and Outcomes Research, 2015; Nov 2:1-9.

Objective: To provide an accurate representation of the economic burden of arthritis by estimating the adjusted incremental healthcare cost of arthritis at multiple percentiles and reporting the cost trends across time.

Methods: A healthcare cost study based on health survey and linked administrative data, where costs were estimated from the government's perspective in dollars per person per year. Quantile regression was used to estimate the adjusted incremental cost at the 25th, 50th, 75th, 90th, and 95th percentiles.

Results: Data from 4287 older Australian women were included. The median incremental healthcare cost of arthritis was, in 2012 Australian dollars, $480 (95% CI: $498–759) in 2009; however, 5% of individuals had 5-times higher costs than the 'average individual' with arthritis. Healthcare cost of arthritis did not increase significantly from 2003 to 2009.

Conclusion: Healthcare cost of arthritis represents a substantial burden for the governments. Future research should continue to monitor the economic burden of arthritis.

Lo TKT, Parkinson L, Cunich M & Byles J.
Cost of arthritis: A systematic review of methodologies used for direct costs.
Expert Review of Pharmacoeconomics and Outcomes Research, 2015; 22, 1-15.

A substantial amount of healthcare and costs are attributable to arthritis, which is a very common chronic disease. This paper presents the results of a systematic review of arthritis cost studies published from 2008 to 2013. MEDLINE, Embase, EconLit databases were searched, as well as governmental and nongovernmental organization websites. Seventy-one reports met the inclusion/exclusion criteria, and 24 studies were included in the review. Among these studies, common methods included the use of individual-level data, bottom-up costing approach, use of both an arthritis group and a control group to enable incremental cost computation of the disease, and use of regression methods such as generalized linear models and ordinary least squares regression to control for confounding variables. Estimates of the healthcare cost of arthritis varied considerably across the studies depending on the study methods, the form of arthritis and the population studied. In the USA, for example, the estimated healthcare cost of arthritis

ranged from $1862 to $14,021 per person, per year. The reviewed study methods have strengths, weaknesses and potential improvements in relation to estimating the cost of disease, which are outlined in this paper. Caution must be exercised when these methods are applied to cost estimation and monitoring of the economic burden of arthritis.

Lo TKT, Parkinson L, Cunich M & Byles J.

Factors associated with higher healthcare cost in individuals living with arthritis: Evidence from the quantile regression approach.

Expert Review of Pharmacoeconomics and Outcomes Research, 2015; 15(5), 833-841.

Objective: To examine the factors associated with higher healthcare cost in women with arthritis, using generalized linear models (GLMs) and quantile regression (QR).

Methods: This is a cross-sectional healthcare cost study of individuals with arthritis that focused on older Australian women. Cost data were drawn from the Medicare Australia datasets.

Results: GLM results show that healthcare cost was significantly associated with various socio-demographic and health factors. Although QR analysis results show the same direction of association between these factors and healthcare cost as in the GLMs, they indicate progressively increased effect sizes at the 50th, 75th, 90th and 95th percentiles.

Conclusion: Findings suggest traditional regression models such as GLMs that assume a single rate of change to accurately describe the relationships between explanatory variables and healthcare costs across the entire distribution of cost can produce biased results. QR should be considered in future healthcare cost research.

Loxton D, Powers J, Anderson A, Townsend N, Harris M, Tuckerman R, Pease S, Mishra G & Byles J.

Online and offline recruitment of young women for a longitudinal health survey: Findings from the Australian Longitudinal Study on Women's Health 1989-95 Cohort.

Journal of Medical Internet Research, 2015; 17(5), e109.

Background: In 2012, we set out to recruit a cohort of at least 10,000 women aged 18-23 from across Australia. With recent research demonstrating the inadequacy of traditional approaches to recruiting women in this age group, we elected to conduct open recruiting.

Objective: Our aim was to report on the overall success of open recruiting and to evaluate the relative success of a variety of recruitment methods in terms of numbers and demographics.

Methods: We used referrals, Facebook, formal advertising, and incentives in order to recruit the cohort.

Results: In all, 17,069 women were recruited for the longitudinal online survey, from 54,685 initiated surveys. Of these women, most (69.94%, n=11,799) who joined the longitudinal cohort were recruited via Facebook, 12.72% (n=2145) via the fashion promotion, 7.02% (n=1184) by referral, 4.9% (n=831) via other Web activities, and 5.4% (n=910) via traditional media.

Conclusions: Facebook was by far the most successful strategy, enrolling a cohort of women with a similar profile to the population of Australian women in terms of age, area of residence, and relationship status. Women recruited via fashion promotion were the least representative. All strategies under represented less educated women—a finding that is consistent with more traditional means of recruiting. In conclusion, flexibility in recruitment design, embracing new and traditional media, adopting a dynamic responsive approach, and monitoring the results of recruiting in terms of sample composition and number recruited led to the successful establishment of a new cohort.

Madigan CD, Daley AJ, Kabir, E, Aveyard P & Brown W.

Cluster analysis of behavioural weight management strategies and associations with weight change in young women: A longitudinal analysis.

International Journal of Obesity, 2015; doi: 10.1038/ijo.2015.116.

Background/Objectives: Maintaining a healthy weight is important for the prevention of many chronic diseases. Little is known about the strategies used by young women to manage their weight, or the effectiveness of these in preventing weight gain. We aimed to identify clusters of weight control strategies used by women and determine the average annual weight change among women in each cluster from 2000 to 2009.

Methods: Latent cluster analysis of weight control strategies reported by 8125 participants in the Australian Longitudinal Study of Women's Health. Analyses were performed in March-November 2014.

Results: Weight control strategies were used by 79% of the women, and four unique clusters were found. The largest cluster group (39.7%) was named dieters as 90% had been on a diet in the past year, and half of these women had lost 5 kg on purpose. Women cut down on size of meals, fats and sugars and took part in vigorous physical activity. Additionally 20% had used a commercial program. The next largest cluster (30.2%) was the healthy living group who followed the public health messages of 'eat less and move more'. The do nothing group (20%) did not actively control their weight whereas the perpetual dieters group (10.7%) used all strategies, including unhealthy behaviours. On average women gained 700 g per year (over nine years), however the perpetual dieters group gained significantly more weight (210 g) than the do nothing group ($P<0.001$).

Conclusions: Most women are actively trying to control their weight. The most successful approach was to follow

the public health guidelines on health eating and physical activity.

Majeed T, Forder P, Mishra G & Byles J.
Women, work, and illness: A longitudinal analysis of workforce participation patterns for women beyond middle age.
Journal of Women's Health, 2015; 24(6), 455-465.

Background: Labour policies and economic incentives encourage women to work beyond middle age. However, women exhibit complex patterns of workforce participation over this life stage. This study examined transitions in and out of paid work across the life course of middle-aged women over a 14-year period and investigated associations between work and chronic diseases.

Methods: Latent class analysis identified dominant workforce participation patterns among 11,551 middle-aged women from the 1946–1951 birth cohort of the Australian Longitudinal Study on Women's Health. Multinomial logistic regression examined associations between work patterns and chronic diseases (diabetes, asthma, depression, and arthritis), while adjusting for health risk factors, sociodemographic factors and competing activities.

Results: Five latent classes were identified: "mostly in paid work" (48%), "early paid work" (9.4%), "increasingly paid work" (8.9%), "gradually not in paid work" (11.4%), and "mostly not in paid work" (22.3%). Results showed that women with chronic diseases (diabetes, asthma, depression, and arthritis) were less likely to be in paid work. These associations remained mostly unchanged after adjustments for other factors.

Conclusions: The findings of this study provide better understanding of workforce participation patterns in women's late working life. This has important implications for policy design, aimed to engage middle-aged women in paid employment for longer in spite of chronic diseases and their complications. We suggest that there is a need for work place programs that support people with chronic diseases. Policies are also needed to facilitate better prevention and management of chronic health issues over the life course for women, in order to encourage workforce participation over later years.

Mihrshahi S, Dobson A & Mishra G.
Fruit and vegetable consumption and prevalence and incidence of depressive symptoms in mid-age women: Results from the Australian Longitudinal Study on Women's Health.
European Journal of Clinical Nutrition, 2015; 69, (5) 585-91.

Background/Objectives: There is continued interest in the associations between diet and depression and several studies have focused on individual dietary factors or diet patterns to investigate the relationship. We investigated the association between fruit and vegetables and symptoms of depression in the mid-age cohort of the Australian Longitudinal Study on Women's Health.

Subjects/Methods: A total of 6271 women with a mean age of 55.45 (1.45 SD) years were followed up at three surveys over six years. A score of ≥10 on the Center for Epidemiological Studies Depression-10 scale indicated depressive symptoms. Fruit and vegetable intake was assessed using short questions.

Results: A total of 381 women (6.1%) were depressed at all three surveys over the 6 year survey period. Cross-sectional logistic regression analysis using general estimating equations showed a reduced odds of depressive symptoms (OR 0.86 (95% CI 0.79-0.95, P=0.001) among women who ate ≥ two pieces of fruit/day even after adjustment for several factors including smoking, alcohol, BMI, physical activity, marital status, education, energy, fish intake and comorbidities. The predictive model also showed a reduced odds of depressive symptoms (OR 0.82 (95% CI 0.70-0.96, P=0.012) among women who ate ≥ two pieces of fruit/day. There was also an association between vegetable intake and prevalence of depressive symptoms at higher levels of intake.

Conclusions: Increasing fruit consumption may be one important factor for reducing both the prevalence and incidence of depressive symptoms in mid-age women.

Mishra G, Barker M, Herber-Gast G & Hillard T.
Depression and the incidence of urinary incontinence symptoms among young women: Results from a prospective cohort study.
Maturitas, 2015; 81(4), 456-461.

Objective: To examine the association of depressive symptoms with subsequent urinary incontinence (UI) symptoms among young women.

Subjects and methods: Data were from a cohort of 5391 young women (born 1973-1978) from the Australian Longitudinal Study on Women's Health. Generalised Estimating Equations (GEEs) were used to link depressive symptoms, and history of doctor diagnosed depression at Survey 2 (S2) in 2000 with the incidence of UI symptoms in subsequent surveys (from S3 in 2003 to S6 in 2012).

Results: 24% of women reported the incidence of UI over the nine-year study period, while the prevalence rose over time from 6.8% (at S2, aged 22-27 years) to 16.5% (at S6, aged 34-39). From univariable GEE analysis, women with depressive symptoms or a history of depression were more likely to report subsequent UI symptoms. This remained after adjusting for socio-demographic, body mass index, health behaviours and reproductive factors, with depressive symptoms associated with 37% higher odds (odds ratio 1.37, 95% CI 1.16 to 1.61) and history of depression with 42% higher odds (1.42, 1.17 to 1.74) of incidence of UI.

Conclusions: When woman seek treatment for UI symptoms, health professionals should consider her current or history of depression.

Navin TJ, Stewart-Williams J, Parkinson L, Sibbritt D & Byles JE.

The identification of diabetes, heart disease, hypertension and stroke in mid- and older-aged women: Comparing self-report and administrative hospital data records.

Geriatrics & Gerontology International, 2015; doi:10.1111/ggi.12442.

Aim: To estimate the prevalence of diabetes, heart disease, hypertension and stroke in self-report and hospital data in two cohorts of women; measure sensitivity and agreement between data sources; and compare between cohorts.

Methods: Women born between 1946–1951 and 1921–1926 who participated in the Australian Longitudinal Study on Women's Health (ALSWH); were New South Wales residents; and admitted to hospital (2004–2008) were included in the present study. The prevalence of diabetes, heart disease, hypertension and stroke was estimated using self-report (case 1 at latest survey, case 2 across multiple surveys) and hospital records. Agreement (kappa) and sensitivity (%) were calculated. Logistic regression measured the association between patient characteristics and agreement.

Results: Hypertension had the highest prevalence and estimates were higher for older women: 32.5% case 1, 45.4% case 2, 12.8% in hospital data (1946–1951 cohort); 57.8% case 1, 73.2% case 2, 38.2% in hospital data (1921–1926 cohort). Agreement was substantial for diabetes: $\kappa = 0.75$ case 1, $\kappa = 0.70$ case 2 (1946–1951 cohort); $\kappa = 0.77$ case 1, $\kappa = 0.80$ case 2 (1921–1926 cohort), and lower for other conditions. The 1946–1951 cohort had 2.08 times the odds of agreement for hypertension (95% CI 1.56 to 2.78; $P < 0.0001$), and 6.25 times the odds of agreement for heart disease (95% CI 4.35 to 10.0; $P < 0.0001$), compared with the 1921–1926 cohort.

Conclusion: Substantial agreement was found for diabetes, indicating accuracy of ascertainment using self-report or hospital data. Self-report data appears to be less accurate for heart disease and stroke. Hypertension was underestimated in hospital data. These findings have implications for epidemiological studies relying on self-report or administrative data.

Parkinson L, Magin P Thomson, A, Byles J,Caughey, G, Etherton-Beer C, Gnjidic D, Hilmer S, Lo T, McCowan C, Moorin, R & Pond D.

Anticholinergic burden in older women: Not seeing the wood for the trees?

Medical Journal of Australia, 2015; 202(2), 91-94.

Objectives: To identify medicines contributing to and describe predictors of anticholinergic burden among community-dwelling older Australian women.

Design, setting and participants: Retrospective longitudinal analysis of data from the Australian Longitudinal Study on Women's Health linked to Pharmaceutical Benefits Scheme medicines data from 1 January 2008 to 30 December 2010; for 3694 women born in 1921–1926.

Main outcome measures: Anticholinergic burden calculated from Anticholinergic Drug Scale (ADS) scores derived from ADS levels (0 to 3) for all medicines used by each woman, summed over each 6-month period (semester), medicines commonly used by women with high semester ADS scores (defined as 75th percentile of scores).

Results: 1126 women (59.9%) used at least one medicine with anticholinergic properties. The median ADS score was 4 or 5 across all semesters. Most anticholinergic medicines used by women who had a high anticholinergic burden (ADS score, ≥ 9) had a low anticholinergic potency (ADS level 1). Increasing age, cardiovascular disease, and number of other medicines used were predictive of a higher anticholinergic burden.

Conclusions: A high anticholinergic medicines burden in this group was driven by the use of multiple medicines with lower anticholinergic potency rather than the use of medicines with higher potency. This is a novel and important finding for clinical practice as doctors would readily identify the risk of a high anticholinergic burden for patients using high potency medicines, but may be less likely to identify this risk for users of multiple medicines with low anticholinergic potency.

Pavey T, Burton N & Brown W.

Prospective relationships between physical activity and optimism in young and mid-aged women.

Journal of Physical Activity and Health, 2015; 12(7), 915-923.

Background: There is growing evidence that regular physical activity (PA) reduces the risk of poor mental health. Less research has focused on the relationship between PA and positive wellbeing. The study aims were to assess the prospective associations between PA and optimism, in both young and mid-aged women.

Methods: 9688 young women (born 1973-78) completed self-report surveys in 2000 (age 22-27), 2003, 2006, and 2009; and 11,226 mid-aged women (born 1946-51) completed surveys in 2001 (age 50 to 55) 2004, 2007 and 2010, as part of the Australian Longitudinal Study on Women's Health. Generalised estimating equation models (with 3-year time lag) were used to examine the relationship between PA and optimism in both cohorts.

Results: In both cohorts, women reporting higher levels of PA had greater odds of reporting higher optimism over the 9-year period, (young, OR=5.04, 95%CI: 3.85-6.59; mid-age, OR=5.77, 95%CI: 4.76-7.00) than women who reported no PA. Odds were attenuated in adjusted models,

with depression accounting for a large amount of this attenuation (young, OR=2.00, 95%CI: 1.57-2.55; mid-age, OR=1.64 95%CI: 1.38-1.94).

Conclusions: Physical activity can promote optimism in young and mid-aged women over time, even after accounting for the negative effects of other psychosocial indicators such as depression.

Peeters G, Herber-Gast G, Dobson A & Brown W.

Changes in the relationships between Body Mass Index and health outcomes across middle age and older adulthood.

Mayo Clinic Proceedings, 2015; 90(7), 903-910.

Objective: To examine patterns of the incidence of diabetes, hypertension, and mortality by single units of body mass index (BMI) and 5-year age groups using longitudinal data from middle-aged and older women.

Patients and Methods: Middle-aged (born between 1946 and 1951; N=13,715) and older (born between 1921 and 1926; N=12,432) participants in the Australian Longitudinal Study on Women's Health completed surveys in 1996 and at approximately 3-year intervals thereafter until 2011. Proportions of women with diabetes, hypertension, and mortality over 3-year intervals were estimated for each unit of BMI and 5-year age group (45 to <50, 50 to <55, 55 to <60, 70 to <75, 75 to <80, and 80 to <85 years) using generalized additive modeling with adjustment for time-varying covariates.

Results: Three-year incidence of diabetes (1.2%-3.6%), hypertension (5.2%-17.8%), and death (0.4%-9.5%) increased with age. For both diabetes and hypertension, the associations with BMI were curvilinear in middle-aged women and became almost linear in older women. With increasing age, the slope became steeper, and the increase started at lower BMI values. For hypertension, there was a marked increase in intercept from 75 years onward. In contrast, mortality risks were highest for low BMI (≤20) in all age groups. A clear U-shaped curve was observed only in the oldest age group.

Conclusion: The shapes of the relationships between BMI and incidence of diabetes, hypertension, and mortality change with age, suggesting that weight management interventions should be tailored for different age groups.

Peeters G, Jones M, Byles J & Dobson A.

Long-term consequences of noninjurious and injurious falls on well-being in older women.

Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 2015; 1-7.

Background. The physical and mental health consequences of falls are known to influence wellbeing in the short term. The aim was to investigate the long-term consequences of noninjurious and injurious falls on well-being in older women over 12 years.

Methods. A total of 10,277 participants (aged 73–78 years, 98.8% community-dwelling) returned the 1999 survey of the Australian Longitudinal Study on Women's Health. Follow-up surveys were completed at 3-year intervals. Surveys included questions about falls and related injuries in the past year. Scores on the health-related quality of life Short Form-36 subscales (range 0–100) were used to compare well-being between noninjurious fallers, injurious fallers, and nonfallers using linear mixed modeling with adjustment for confounders. Scores in the years before and after the first fall since enrolment were graphically depicted with time relative to the first fall since enrolment. For this purpose, nonfallers were matched with noninjurious and injurious fallers based on pattern of surveys returned, chronic conditions, and age to assign them a fictitious (time-of-first-fall).

Results. Over 12 years, there were 22.5% noninjurious fallers, 30.1% injurious fallers, and 47.5% nonfallers. Compared with nonfallers, noninjurious and injurious fallers scored significantly lower on six and seven of the eight domains at the time of the reported fall, respectively. Significant differences were apparent 12 years before the injurious fall for the subscales role physical, bodily pain, and general health. A drop in scores after the reported injurious fall was seen for role physical, bodily pain, and social functioning.

Conclusions. Among older women, a gap in well-being emerges years before the first reported fall, which may be driven by underlying risk factors rather than the fall itself.

Peeters G, Tett SE, Conaghan PG, Mishra GD & Dobson AJ.

Is statin use associated with new joint-related symptoms, physical function and quality of life? The Australian Longitudinal Study on Women's Health.

Arthritis Care & Research, 2015; 67, (1), 13-20.

Objectives: Previous studies have suggested that statins may prevent development of osteoarthritis and have anti-inflammatory effects. Our aim was to examine the associations between statin use and patient-reported joint symptoms in two large cohorts of middle-aged and older women.

Methods: Data were from 6966 mid-age (born 1946-51) and 4806 older (born 1921-26) participants in the Australian Longitudinal Study on Women's Health who completed surveys from 2001 to 2011 including questions about joint pain/stiffness, physical functioning and self-rated health (SRH). Administrative pharmaceutical data were used to classify participants according to statin use, cumulative volume of statin use and type of drug. Associations between statin use and newly reported symptoms were analysed using logistic regression with generalized estimating equations to account for repeated measures.

Results: 2096 (31.3%) of the mid-age women and 2473

(51.5%) of the older women were classified as statin users. After adjustment for confounders, statin use in mid-age women was weakly associated with poor physical functioning (odds ratio [OR]=1.29, 99% confidence interval [CI]=1.07-1.55) and poor SRH (OR=1.35, CI=1.13-1.61), but not with new joint pain/stiffness (OR=1.09, CI=0.88-1.34). No dose-response relationships were found. Pravastatin and atorvastatin were associated with poor physical functioning, while atorvastatin was also associated with poor SRH. Associations found in older women were mostly explained by confounders.

Conclusions: This large study did not demonstrate an association between statin use and reduced onset of joint pain/stiffness. Associations between statin use and poor physical functioning and poor self-rated health may be explained by factors other than joint pain/stiffness, for example muscle pain.

Peeters GMEE, Pisters M, Mishra GD & Brown WJ.

The influence of long-term exposure and timing of physical activity on new joint pain and stiffness in mid-age women.

Osteoarthritis & Cartilage, 2015; 23(1), 34-40.

Objective: To examine the influence of long-term exposure and timing of physical activity (PA) on new joint pain/stiffness in mid-age women.

Methods: Data were from 5105 participants (born 1946-51) in the Australian Longitudinal Study on Women's Health who completed survey items on PA (1998, 2001 and 2004) and joint pain/stiffness (2007 and 2010). PA was categorized in 5 levels at each survey and summed into a cumulative PA score (CPA, range 0-12). Associations were analysed using logistic regression, with separate models for the cumulative model (using CPA), the sensitive periods model (i.e. PA measured at each survey in one regression model) and the critical periods model (i.e. separate regression models for PA at each survey).

Results: 951 (18.6%) participants reported new-onset joint pain/stiffness. In the cumulative model, CPA was associated with joint pain/stiffness when included as a continuous variable (adjusted odds ratio [OR] = 0.97, 95% confidence interval [CI] = 0.95-0.99), but not when included as a categorical variable.. In both the sensitive periods and critical periods models, low to high levels of PA in 2001 and 2004 had stronger inverse associations with joint pain/stiffness than PA levels in 1998. The model fit was better for the sensitive periods than the cumulative or critical periods models.

Conclusions: In mid-age women, physical activity between the ages 47 and 58 was associated with a lower risk of joint pain/stiffness nine years later. Associations were stronger for PA in the last six years than for earlier PA.

Powers J, Dobson A, Berry H, Graves A, Hanigan I & Loxton D.

Lack of association between drought and mental health in a cohort of 45-61 year old rural Australian women.

Australian and New Zealand Journal of Public Health, 2015; 39(6), 518-523

Objective: To evaluate the impact of drought on the mental health of rural Australian women and those in vulnerable sub-populations: women who were more isolated, poorer and less educated; and women who had histories of chronic disease or poor mental health.

Methods: Surveys were mailed in 1996, 1998, 2001, 2004 and 2008 to 6664 women born between 1946 and1951 who were participating in the Australian Longitudinal Study on Women's Health. The surveys included the Mental Health Index of the Medical Outcomes Study Short-Form 36 (MHI). Drought was assessed by linking the latitude and longitude of women's place of residence at each survey to the Hutchinson Drought Index. Associations between MHI and drought were assessed using linear mixed-models.

Results: While 31% of the women experienced drought in 1998 and 50% experienced drought in 2007; experience of droughts was less common in the other years. Although drought varied from survey year to survey year, mental health did not vary with drought conditions for rural women or vulnerable sub-populations.

Conclusions: These findings are contrary to the long-held assumption that droughts increase mental health problems in Australia.

Implications: While similar results may not be true for men, empirical evidence (rather than assumptions) is required on associations between drought and mental health.

Powers J, Tavener M, Graves A & Loxton D.

Loss to follow-up was used to estimate bias in a longitudinal study: A new approach.

Journal of Clinical Epidemiology, 2015; 68(8), 870-876.

Objectives: To examine bias arising from loss to follow-up due to lack of contact.

Study Design and Setting: The 1973-1978 cohort of the Australian Longitudinal Study on Women's Health was first surveyed in 1996 and followed up in 2000, 2003, 2006, and 2009. At the 2000 survey, 9688 women responded (responders), 2972 could not be contacted, of whom 1515 responded subsequently (temporary no contact) and 1457 did not (permanent no contact). Characteristics were compared for these groups at baseline and follow-up in 2003, 2006, or 2009. Relative risk ratios were used to estimate bias.

Results: No-contacts were younger, more likely to live in cities, to be less educated and stressed about money than responders. No contacts were more likely to be in de facto relationships, separated, divorced, or widowed, to have experienced partner violence and be smokers. Compared with temporary no contact, permanent no contact were

less educated, less likely to be studying or employed. Despite differences in prevalence estimates, relative odds ratios were close to one and had confidence intervals that included one, indicating little effect of bias.

Conclusion: Although various characteristics were related to loss to follow-up, the relative risks estimates did not indicate serious bias due to loss to follow-up in this cohort of young women.

Powers JR, Anderson AE, Byles JE, Mishra G & Loxton D.

Do women grow out of risky drinking? A prospective study of three cohorts of Australian women.

Drug Alcohol Reviews, 2015; 34(3), 278-288.

Introduction and Aims: To examine women's drinking behaviour relative to Australian guidelines and identify associated factors over the lifespan.

Design and Methods: Data came from three prospective cohorts of the Australian Longitudinal Study on Women's Health aged 18-23 (n=14,247), 45-50 (n=13,715) and 70-75 years (n=12,432) when first surveyed in 1996. The same women were re-surveyed at roughly 3-year intervals until 2012. At each survey, four drinking behaviours were based on two guidelines: long-term drinking (no more than two standard drinks per day) and episodic drinking (no more than four standard drinks on an occasion): (i) no risk (within both guidelines); (ii) low episodic risk (less than once a month); high episodic risk (at least once a month); long-term risk (more than two drinks per day regardless of episodic drinking).

Results: No risk drinking increased with age, low episodic risk drinking remained almost constant between ages 18 and 39, and high episodic risk drinking declined rapidly. Few women drank at long-term risk. Factors associated with risky drinking varied with age; however, being a past or current smoker consistently increased the risk, and risks for smokers increased with age. Risky drinking was less likely to be practised by women providing care and needing help with daily tasks, or by pregnant women and those living with children.

Discussion and conclusions: Risky drinking behaviour should be addressed in younger women and in those who smoke. Interventions to reduce risky drinking, possibly in combination with reducing smoking, could be offered through general practice centres.

Rao A, Sibbritt D, Phillips J & Hickman L.

Prayer or spiritual healing as adjuncts to conventional care: A cross sectional analysis of prevalence and characteristics of use among women.

BMJ Open, 2015; 5(6), e007345.

Objectives: To determine the prevalence and characteristics of users of prayer or spiritual healing among women.

Design and setting: This cross sectional study was conducted as a part of the Australian Longitudinal Study on Women's Health (ALSWH), a 20-year study that examines various factors affecting women's health and wellbeing.

Participants: The sample used in the current study were women from the 1946–1951 cohort (n=9965) (59–64 years) who were surveyed in 2010.

Outcome measures: Use of prayer or spiritual healing; demographic factors and measures of health status. $\chi 2$ Tests, analyses of variance (to determine associations) and a stepwise backward logistic regression model (for the most significant predictors) using a likelihood ratio test were used to determine the outcome measures.

Results: It is estimated that 26% of Australian women from the 1946–1951 cohort (aged 59–64 years) use prayer or spiritual healing on a regular basis. Women were significantly more likely to use prayer or spiritual healing if they were non-smokers, non-drinkers or low-risk drinkers, had symptoms of severe tiredness (OR 1.25; 95% CI 1.12 to 1.40), depression, (OR 1.30; 95% CI 1.11 to 1.53), anxiety (OR 1.33; 95% CI 1.15 to 1.53), diagnosed cancer (OR 1.84; 95% CI 1.28 to 2.65) or other major illnesses (OR 1.43; 95% CI 1.18 to 1.75) and used other complementary therapies.

Conclusions: A significant proportion of adult women are using prayer or spiritual healing. Given that prayer or spiritual healing was significantly associated with health symptoms, chronic illnesses and positive health seeking behaviours, respect for prayer or spiritual healing practices is required within health care settings. Future research is recommended around specific populations using prayer or spiritual healing, reasons for their use and potential benefits on health related outcomes and general wellbeing.

Rowlands I & Lee C.

When mixed methods produce mixed results: Integrating disparate findings about miscarriage and women's wellbeing.

British Journal of Health Psychology, 2015; 20(1), 36-44.

Purpose: To discuss an example of mixed methods in health psychology, involving separate quantitative and qualitative studies of women's mental health in relation to miscarriage, in which the two methods produced different but complementary results, and to consider ways in which the findings can be integrated.

Methods: We describe two quantitative projects involving statistical analysis of data from 998 young women who had had miscarriages, and 8083 who had not, across three waves of the Australian Longitudinal Study on Women's Health. We also describe a qualitative project involving thematic analysis of interviews with nine Australian women who had had miscarriages.

Results: The quantitative analyses indicate that the main differences between young women who do and do not

experience miscarriage relate to social disadvantage (and thus likelihood of relatively early pregnancy) and to a lifestyle that makes pregnancy likely. Once these factors are accounted for, there are no differences in mental health. Further, longitudinal modelling demonstrates that women who have had miscarriages show a gradual increase in mental health over time, with the exception of women with prior diagnoses of anxiety, depression or both. By contrast, qualitative analysis of the interviews indicates that women who have had miscarriages experience deep emotional responses and a long and difficult process of coming to terms with their loss.

Conclusions: A contextual model of resilience provides a possible framework for understanding these apparently disparate results. Considering positive mental health as including the ability to deal constructively with negative life events, and consequent emotional distress, offers a model that distinguishes between poor mental health and the processes of coping with major life events. In the context of miscarriage, women's efforts to struggle with difficult emotions, and search for meaning, can be viewed as pathways to resilience rather than to psychological distress.

Rowlands I, Dobson A & Mishra G.

Physical health of young, Australian women: A comparison of two national cohorts surveyed 17 years apart.

PLOS One, 2015. doi:10.1371/journal.pone.0142088.

Introduction: Very little is known about the extent of physical health issues among young women in early adulthood and whether this is changing over time.

Methods: We used data from two national samples of young women aged 18–23 years, surveyed 17 years apart, who participated in the Australian Longitudinal Study on Women's Health. We used multinomial logistic regression to compare the women's physical health (i.e., self-rated health, common symptoms and conditions) and identify whether sociodemographic factors, health behaviours and stress explained any physical health differences between the samples.

Results: Women aged 18–23 years in 2013 (N = 17,069) were more likely to report poor self-rated health and physical symptoms (particularly urogenital and bowel symptoms) than women aged 18–23 years in 1996 (N = 14,247). Stress accounted for a large proportion of the physical health differences between the cohorts, particularly for allergies, headaches, self-rated health, severe tiredness, skin problems, severe period pain and hypertension.

Conclusions: Women's health appears to be changing, with young women born in more recent decades reporting greater physical symptom levels. Changing socio-cultural and economic conditions may place pressure on young adults, negatively affecting their health and wellbeing. Assessing the extent to which social structures and health care policies are offering adequate support to young women may offer avenues for promoting positive health and wellbeing.

Rowlands I, Dobson A, Loxton D & Mishra G.

Seeking health information online: Association with young Australian women's physical, mental, and reproductive health.

Journal of Medical Internet Research, 2015; 17(5), e120.

Background: Relatively little is known about the extent to which young adults use the Internet as a health information resource and whether there are factors that distinguish between those who do and do not go online for health information. Objective: The aim was to identify the sociodemographic, physical, mental and reproductive health factors associated with young women's use of the Internet for health information.

Methods: We used data from 17,069 young women aged 18-23 years who participated in the Australian Longitudinal Study on Women's Health. Multivariable logistic regression was used to estimate the association between sociodemographic, physical, mental and reproductive health factors associated with searching the Internet for health information.

Results: Overall, 43.54% (7433/17,069) of women used the Internet for health information. Women who used the Internet had higher odds of regular urinary or bowel symptoms (OR 1.44, 95% CI 1.36-1.54), psychological distress (very high distress: OR 1.24, 95% CI 1.13-1.37), self-reported mental health diagnoses (OR 1.16, 95% CI 1.09-1.23), and menstrual symptoms (OR 1.25, 95% CI 1.15-1.36) than women who did not use the Internet for health information. Internet users were less likely to have had blood pressure checks (OR 0.85, 95% CI 0.78-0.93) and skin cancer checks (OR 0.90, 95% CI 0.84-0.97) and to have had a live birth (OR 0.74, 95% CI 0.64-0.86) or pregnancy loss (OR 0.88, 95% CI 0.79-0.98) than non-Internet users.

Conclusions: Women experiencing "stigmatized" conditions or symptoms were more likely to search the Internet for health information. The Internet may be an acceptable resource that offers "anonymized" information or support to young women and this has important implications for health service providers and public health policy.

Schoenaker D, Soedamah-Muthu S, Callaway L & Mishra G.

Pre-pregnancy dietary patterns and risk of developing hypertensive disorders of pregnancy: Results from the Australian Longitudinal Study on Women's Health.

American Journal of Clinical Nutrition, 2015; 102(1), 94-101.

Background: Hypertensive disorders of pregnancy (HDPs), including gestational hypertension and pre-eclampsia, are common obstetric complications associated with adverse health outcomes for the mother and child. It remains

unclear how dietary intake can influence HDP risk.

Objective: We investigated associations between prepregnancy dietary patterns and risk of HDPs.

Design: We selected 3582 women participating in the Australian Longitudinal Study on Women's Health, which is an observational population-based study. Women were not pregnant at baseline in 2003 and reported at least one live birth between 2003 and 2012. Diet was assessed by using a validated 101-item food-frequency questionnaire in 2003, and factor analysis was used to identify dietary patterns. HDP were assessed by using the question, "Were you diagnosed or treated for hypertension during pregnancy?" Generalized estimating equation models were used to estimate RRs (95% CIs) adjusted for dietary, reproductive, sociodemographic, and lifestyle factors.

Results: During 9 years of follow-up of 3582 women, 305 women (8.5%) reported a first diagnosis of HDPs in 6149 pregnancies. We identified 4 dietary patterns labeled as meat, high-fat, and sugar; Mediterranean-style; fruit and low-fat dairy; and cooked vegetables. In the adjusted model, the meat, high-fat, and sugar, fruit and low-fat dairy, and cooked vegetable dietary patterns were not associated with HDP risk. The Mediterranean-style dietary pattern (characterized by vegetables, legumes, nuts, tofu, rice, pasta, rye bread, red wine, and fish) was inversely associated with risk of developing HDPs (quartile 4 compared with quartile 1: RR, 0.58; 95% CI, 0.42, 0.81).

Conclusions: In this population-based study of Australian women, we observed an independent protective dose-response association between prepregnancy consumption of a Mediterranean-style dietary pattern and HDP risk. Additional studies are recommended to confirm our findings by prospectively examining whether the implementation of the Mediterranean-style dietary pattern before pregnancy has a role in the prevention of HDPs.

Tavener M, Thijsen A, Hubbard I, Francis J, Grennall C, Levi C & Byles J.

Acknowledging how older Australian women experience life after stroke: How does the WHO 18-Item brief ICF core set for stroke compare?

Health Care for Women International, 2015; 36(12), 1311-1326.

We examined older women's qualitative experiences of stroke with the World Health Organization's 18-item Brief International Classification of Functioning, Disability and Health Core Set for Stroke. Women were participants of the Australian Longitudinal Study on Women's Health, born between 1921 and 1926, who had experienced a stroke in the previous 3 years. An inductive thematic analysis was conducted of women's qualitative experiences of stroke, which were then examined with the 18-item Brief Core Set for Stroke for congruency. Our analysis showed that for older Australian women, their concerns of post stroke living were not adequately classified, potentially impeding a full recovery.

Tooth L & Mishra G.

Does further education in adulthood improve physical and mental health among Australian women? A longitudinal study.

PLOS One, 2015. doi: 10.1371/journal.pone.0140334

Objective: We analyzed whether further education in young adult and mid-life [adult educational mobility] influences physical functioning and depressive symptoms in women.

Methods: 14,247 women born 1973–78 (younger cohort) and 13,715 women born 1946–51 (mid-aged cohort) from the Australian Longitudinal Study on Women's Health were followed for 14–16 years. Measures were the Short-Form 36 Health Survey physical functioning subscale (SF-36 PF) and Centre for Epidemiologic Studies 10-item Depression Scale (CESD-10). Linear mixed modelling, accounting for time varying covariates, assessed the influence of further education on physical functioning and depressive symptoms over time. Sensitivity analysis to assess the impact of missing data was conducted using multiple imputation.

Results: Compared to younger women with a pre-existing high level of education, women gaining further education (up to age 39 years) from low levels had lower SF-36 PF scores (poorer physical functioning) (fully adjusted beta estimates (95%CIs) -1.52 (-2.59, -0.44)) while those gaining further education from middle to high levels showed equivalent SF-36 PF scores (-0.08 (-0.61, 0.44)). A similar pattern was shown for CESD-10 scores (0.78 (0.29,1.25); -0.02 (-0.26, 0.21), respectively) where higher scores represented more depressive symptoms. For mid-age women, further education from a middle to high level resulted in equivalent SF-36 PF scores (-0.61 (-1.93,0.71)) but higher CESD-10 scores (0.49 (0.11, 0.86)), compared to highly educated women.

Conclusion: Women who delay further education until they are aged between their 40s and 60s can improve or maintain their physical functioning but may have missed the critical time to minimise depressive symptomatology. Public health policy should focus on encouraging women to upgrade their educational qualifications earlier in life in order to potentially offset the negative associations between their initial lower socio-economic position class of origin and their mental health.

van der Hoorn M, Tett S, de Vries O, Dobson A & Peeters G.

The effect of dose and type of proton pump inhibitor use on risk of fractures and osteoporosis treatment in older Australian women: A prospective cohort study.

Bone, 2015; 81, 675-682.

Objectives: Proton pump inhibitors (PPIs) are among the most prescribed medications worldwide, however, there is growing concern regarding potential negative effects on bone health. The aim was to examine the effect of dose and type of PPI use on subsequent use of osteoporosis

medication and fractures in older Australian women.

Methods: Data were included from 4432 participants (born 1921–26) in the 2002 survey of the Australian Longitudinal Study on Women's Health. Medication data were from the national pharmaceutical administrative database (2003–2012, inclusive). Fractures were sourced from linked hospital datasets available for four major states of Australia. Competing risk regression models used PPI exposure as a time-dependent covariate and either time to first osteoporosis medication prescription or fracture as the outcome, with death as a competing risk.

Results: Of the 2328 PPI users and 2104 PPI non-users, 827 (36%) and 550 (26%) became users of osteoporosis medication, respectively. PPI use was associated with an increased risk of subsequent use of osteoporosis medication (adjusted sub-hazard ratio [SHR] = 1.28; 95% confidence interval [CI] = 1.13-1.44) and subsequent fracture (SHR = 1.29, CI = 1.08-1.55). Analysis with PPI categorized according to defined daily dose (DDD), showed some evidence for a dose–response effect (osteoporosis medication: < 400 DDD: SHR = 1.23, CI = 1.06-1.42 and ≥ 400 DDD: SHR = 1.39, CI = 1.17-1.65, compared with non-users; SHRs were in the same range for fractures). Esomeprazole was the most common PPI prescribed (22.9%). Analysis by type of PPI use showed an increased subsequent risk for: (1) use of osteoporosis medication for rabeprazole (SHR = 1.51, CI = 1.08-2.10) and esomeprazole (SHR = 1.48, CI = 1.17-1.88); and (2) fractures for rabeprazole (SHR = 2.06, CI = 1.37-3.10). Users of multiple types of PPI also had increased risks for use of osteoporosis medication and fractures.

Conclusion: An appropriate benefit/risk assessment should be made when prescribing PPIs, especially for esomeprazole and rabeprazole, as osteoporosis and fracture risks were increased in this cohort of elderly females subsequent to PPI prescription.

ACCEPTED PUBLICATIONS

de Luca K, Parkinson L, Byles J, Lo TKT, Pollard H, Byles J & Blyth F.

The prevalence and cross-sectional associations of neuropathic-like pain among older, community-dwelling women with arthritis.

Pain Medicine

Objective: To estimate the prevalence and examine the associations of neuropathic-like pain in a community-based sample of older Australian women with arthritis.

Design: Population based cross-sectional survey.

Setting: Participants were recruited from the 1946-1951 cohort of the Australian Longitudinal Study of Women's Health.

Subjects: Women with self-reported arthritis (n = 147).

Methods: Primary outcome measure was self-reported neuropathic-like pain, defined as scores ≥12 via the painDETECT screening tool. Descriptive statistics summarized health and socio-demographic characteristics, and comparisons made using student's t-test or Wilcoxon Rank Sum test, and Chi-square tests. Independent health and demographic variables were examined by univariable logistic regression, and significant variables included in multiple variable logistic regression modelling.

Results: Thirty-nine women (26.5%) were screened as having neuropathic-like pain. Women with neuropathic-like pain were more likely to have poorer health, worse pain, higher pain catastrophizing, more fatigue, and more depression than women with nociceptive pain. Neuropathic-like pain was significantly associated with higher scores on the SF-MPQ sensory scale and pain catastrophizing scale, and with more medication use.

Conclusions: Neuropathic-like pain in women with arthritis was common and is associated with greater disability and poorer quality of life.

Dillon G, Hussain R, Rahman S, Kibele E & Loxton D.

Influence of intimate partner violence on domestic relocation in metropolitan and non-metropolitan young Australian women.

Violence Against Women

Data from a national, population-based longitudinal study of Australian women aged 26-34 years were analyzed to investigate the association between domestic relocation and multiple explanatory factors, namely: intimate partner violence (IPV), metropolitan versus non-metropolitan residence, level of education, income, housing tenure, number of children and changes in relationship status. Experience of IPV in the past 12 months was significantly associated with increased odds of domestic relocation. This association remained significant after controlling for age, social support, area of residence, income, number of children, education and housing situation. Change in relationship status attenuated the association between recent IPV and domestic relocation. Metropolitan versus non-metropolitan residence had no major influence on these results.

Dontje ML, Krijnen WP, de Greef MHG, Peeters GMEE, Stolk RP, van der Schans CP, et al.

Effect of diagnosis with a chronic disease on physical activity behavior in middle-aged women.

Preventive Medicine

Objective: Although regular physical activity is an effective secondary prevention strategy for patients with a chronic disease, it is unclear whether patients change their daily physical activity after being diagnosed. The aims of this study were to describe changes in levels of physical activity in middle-aged women before and after diagnosis with a chronic disease (heart disease, diabetes, asthma, breast cancer, arthritis, depression); and to examine

whether diagnosis with a chronic disease affects levels of physical activity in these women.

Methods: Data from 5 surveys (1998–2010) of the Australian Longitudinal Study on Women's Health (ALSWH) were used. Participants (N = 4840, born 1946–1951) completed surveys every three years, with questions about diseases and leisure time physical activity. The main outcome measure was physical activity, categorized as: nil/sedentary, low active, moderately active, highly active.

Results: At each survey approximately half the middle-aged women did not meet the recommended level of physical activity. Between consecutive surveys, 41%–46% of the women did not change, 24%–30% decreased, and 24%–31% increased their physical activity level. These proportions of change were similar directly after diagnosis with a chronic disease, and in the years before or after diagnosis. Generalized estimating equations showed that there was no statistically significant effect of diagnosis with a chronic disease on levels of physical activity in women.

Conclusion: Despite the importance of physical activity for the management of chronic diseases, most women did not increase their physical activity after diagnosis. This illustrates a need for tailored interventions to enhance physical activity in newly diagnosed patients.

Gardiner P, Mishra G & Dobson A.

The effect of socioeconomic status across adulthood on trajectories of frailty in older women.

Journal of the American Medical Directors Association

Background: To investigate whether distinct trajectories of frailty exist in older women and whether they are associated with measures of socioeconomic status (SES) across adulthood.

Methods: Participants were 7484 women born in 1921–1926 from the Australian Longitudinal Study on Women's Health who were surveyed every 3 years from 1999 to 2011. Frailty was measured at each survey using the FRAIL scale. Group-based trajectory modeling was used to assess patterns of frailty. Multinomial logistic regression was used to examine associations of trajectories with SES (level of education, occupation, and ability to manage on income) across adulthood.

Results: Three trajectory groups were identified: low (19.5%), increasing (40.7%), and high (39.9%). Compared with women in the increasing frailty group, those who reported difficulty managing on their income in 1999 were less likely to be in the low frailty group (relative risk ratio 0.57, 95% confidence interval 0.39–0.84) and more likely to be in the high frailty group (relative risk ratio 2.65, 95% confidence interval 2.07–3.39), after adjusting for other SES variables, age, and social support. Occupation and education were not associated with trajectories of frailty.

Conclusions: Some women remain frailty free until age 85–90 years. The strongest impact on frailty is late-life SES.

Harding JL, Sooriyakumaran M, Anstey K, Adams R, Balkau B, Brennan-Olsen SL, et al.

The metabolic syndrome and cancer: Is the metabolic syndrome useful for predicting cancer risk above and beyond its individual components?

Diabetes and Metabolism

Aims: The metabolic syndrome (MetS) is a risk factor for cancer. However, it is not known if the MetS confers a greater cancer risk than the sum of its individual components, which components drive the association, or if the MetS predicts future cancer risk.

Materials and methods: We linked 20,648 participants from the Australian and New Zealand Diabetes and Cancer Collaboration with complete data on the MetS to national cancer registries and used Cox proportional hazards models to estimate associations of the MetS, the number of positive MetS components, and each of the five MetS components separately with the risk for overall, colorectal, prostate and breast cancer. Hazard ratios (HR) and 95% confidence intervals (95%CI) are reported. We assessed predictive ability of the MetS using Harrell's c-statistic.

Results: The MetS was inversely associated with prostate cancer (HR 0.85; 95% CI 0.72-0.99). We found no evidence of an association between the MetS overall, colorectal and breast cancers. For those with five positive MetS components the HR was 1.12 (1.02-1.48) and 2.07 (1.26-3.39) for overall, and colorectal cancer, respectively, compared with those with zero positive MetS components. Greater waist circumference (WC) (1.38; 1.13-1.70) and elevated blood pressure (1.29; 1.01-1.64) were associated with colorectal cancer. Elevated WC and triglycerides were (inversely) associated with prostate cancer. MetS models were only poor to moderate discriminators for all cancer outcomes.

Conclusions: We show that the MetS is (inversely) associated with prostate cancer, but is not associated with overall, colorectal or breast cancer. Although, persons with five positive components of the MetS are at a 1.2 and 2.1 increased risk for overall and colorectal cancer, respectively, and these associations appear to be driven, largely, by elevated WC and BP. We also demonstrate that the MetS is only a moderate discriminator of cancer risk.

Joham A, Nanayakkara N, Ranasinha S, Zoungas S, Boyle J, Harrison C, Forder P, Loxton D, Vanky E & Teede H.

Obesity, Polycystic Ovary Syndrome and breastfeeding: An observational study.

Acta Obstetricia et Gynecologica Scandinavica

Objectives: Polycystic Ovary Syndrome (PCOS) affects nine to 21% of reproductive-aged women. The relationships between PCOS, BMI and breastfeeding are unclear. We aim to examine breastfeeding in women with and without

PCOS and the relationship to BMI.

Methods: This is a cross-sectional study set in the general community. Participants are women, aged 31-36 years, from the Australian Longitudinal Study on Women's Health. Data was analysed from the first child of respondents to Survey 5 (2009) reporting at least one live born child. Logistic regression analysis was used to examine factors associated with breastfeeding. The main outcome measures studied were breastfeeding initiation and duration and the main explanatory variables included self-reported PCOS and BMI.

Results: Of the 4898 women, 6.5% reported PCOS (95% CI: 5.8%-7.2%). Median duration of breastfeeding was lower in women reporting PCOS (6 months, 2 to 10 months) compared to women not reporting PCOS (7 months, 3 to 12 months), p=0.001). On multivariable regression analysis, there was no association between PCOS and breastfeeding outcomes. However, being overweight or obese was associated with not initiating breastfeeding and with breastfeeding less than six months, after adjusting for confounders.

Conclusions: High BMI is negatively associated with breastfeeding, but PCOS status does not appear to be related to breastfeeding initiation and duration, after adjusting for BMI.

Lai JS, Oldmeadow C, Hure AJ, McEvoy M, Byles J &Attia J.

Longitudinal diet quality is not associated with depressive symptoms in a cohort of mid-aged Australian women.

British Journal of Nutrition

There is increasing evidence for the role of nutrition in the prevention of depression. This study aims to describe changes in diet quality over 12 years among participants in the Australian Longitudinal Study on Women's Health in relation to changes in depressive symptoms. Women born between 1946 and 1951 were followed-up for 12 years (2001-2013). Dietary intake was assessed using the Dietary Questionnaire for Epidemiological Studies (version 2) in 2001, 2007 and every 2-3 years after that until 2013. Diet quality was summarised using the Australian Recommended Food Score (ARFS). Depressive symptoms were measured using the 10-item Centre for Epidemiologic Depression Scale at every 2-3-year intervals during 2001-2013. Linear mixed models were used to examine trends in diet quality and its sub-components. The same model including time-varying covariates was used to examine associations between diet quality and depressive symptoms adjusting for confounders. Sensitivity analyses were carried out using the Mediterranean dietary pattern (MDP) index to assess diet quality. Minimal changes in overall diet quality and its sub-components over 12 years were observed. There was a significant association between baseline diet quality and depression (β=-0·24, P=0·001), but this was lost when time-varying covariates were added (β=-0·04, P=0·10). Sensitivity analyses showed similar performance for both ARFS and MDP in predicting depressive symptoms. Initial associations seen when using baseline measures of diet quality and depressive symptoms disappear when using methods that handle time-varying covariates, suggesting that previous studies indicating a relationship between diet and depression may have been affected by residual confounding.

Leigh L, Byles J, Chojenta C & Pachana N.

Late life changes in mental health: A longitudinal study of 9683 women.

Aging and Mental Health

Objectives: To identify latent subgroups of women in late life who are alike in terms of their mental health trajectories.

Method: Longitudinal data are for 9683 ALSWH participants in the 1921–1926 cohort who completed at least two surveys between 1999 (aged 73–78 years) and 2008 (aged 82–87 years). Mental health was measured using the five-item mental health inventory (MHI-5). Latent profile analysis uncovered patterns of change in MHI-5 scores.

Results: Three patterns of change were identified for women who were still alive in 2008 (n = 7061), and three similar patterns for deceased women (n = 2622): (1) 'poor mental health' representing women with low MHI-5 scores, (2) 'good mental health' and (3) 'excellent' mental health, where scores remained very high. Deceased women had lower mental health scores for each class. Remote areas of residence, higher education, single marital status, higher Body Mass Index (BMI) and falls were the covariates associated with mental health in the survivor group. For the deceased group, education, BMI and falls were significant. Arthritis, stroke, heart disease, bronchitis/emphysema, diabetes and osteoporosis were associated with worse mental health for both groups, while asthma increased these odds significantly for the survivor group only. Hypertension and cancer were not significant predictors of poor mental health.

Conclusion: The results show associations between chronic disease and level of mental health in older age, but no evidence of a large decline in mental health in the period prior to death.

Leigh L, Hudson I & Byles J.

Sleeping difficulty, disease and mortality in older women: A latent class analysis and distal survival analysis.

Journal of Sleep Research

Objective: The objective of this study was to investigate the association between chronic diseases and sleep difficulty in older women.

Method: A total of 10,721 women from the ALSWH 1921-26 cohort, aged 70 to 75 years at baseline (1996), who answered sleep questionnaire data over 15 years follow-up, were surveyed. Longitudinal sleep difficulty class was regressed on baseline diseases.

Results: Arthritis and heart disease were the strongest

predictors of sleep difficulty; odds ratios for belonging to the greatest sleep difficulty class were 2.27 (95% confidence interval [CI] = [1.98, 2.61]) and 1.8 (95% CI [1.5, 2.16], respectively. Bronchitis/emphysema, osteoporosis, asthma, diabetes, and hypertension also predicted greater sleep difficulty.

Conclusion: Older women diagnosed with the aforementioned significant diseases may also be at greater risk of sleep difficulty. These women may need counselling or treatment for their sleep difficulty, to prevent depression, cognitive function decline, falls, frailty, and increased mortality, as well as greater risk of nursing home placement, well known to be reinforced by sleep trouble, and the associated health care costs and societal impacts poor sleep quality has for older adults.

Leung J, Martin J & McLaughlin D.
Rural-urban disparities in stage of breast cancer at diagnosis in Australian women.
Australian Journal of Rural Health

Objective: To examine urban-rural differences and individual risk factors for a late stage of breast cancer at diagnosis in Australian women.

Design: Individual-level longitudinal data were linked with cancer registry data from New South Wales, Queensland and Victoria.

Setting: Participants were drawn from the Australian Longitudinal Study on Women's Health 1946-1951 cohort (n = 13,715).

Participants: The sample included 195 women identified from the linked cancer registry data with a breast cancer diagnosis.

Interventions: Rural or urban residence was measured using ARIA+. Individual characteristics and socio-demographic variables examined included survey year, menopausal status, country of birth, education and marital status.

Main outcome measures: A late stage of breast cancer at diagnosis was defined based on the TNM Classification of Malignant Tumours.

Results: A late stage of breast cancer diagnosis was observed in 36% of women residing in urban areas and 40% of women residing in rural areas. After adjusting for individual characteristics, we found that obesity was the strongest risk factor for a late stage of breast cancer at diagnosis.

Conclusions: Given that women are becoming increasingly obese, and that the rate of obesity is higher in the Australian rural population, this paper provides further evidence for targeting interventions for obesity, particularly in rural Australia, as a public health priority.

Lo TKT, Parkinson L, Cunich M & Byles J.
Factors associated with the healthcare cost in older Australian women with arthritis: An application of the Andersen's Behavioural Model of Health Services Use.
Public Health

Objective: Factors associated with the utilisation of health care have not been rigorously examined in people with arthritis. The objective of this study was to examine the determinants of health care utilisation and costs in older women with arthritis using the Andersen's behavioural model as a framework.

Methods: ALSWH participants from Surveys 3-5 who reported arthritis were included in the study. Information about health care utilisation and unit prices were based on linked Medicare Australia data, which included prescription medicines and health services. Total health care costs of participants with arthritis were measured for the years 2002-2003, 2005-2006, and 2008-2009, which corresponded to the survey years. Potential explanatory variables of the health care cost and other characteristics of the participants were collected from the health surveys. Explanatory variables were grouped into predisposing characteristics, enabling factors and need variables conforming to the Andersen's Behavioural Model of Health Services Use. Longitudinal data analysis was conducted using generalized estimating equations.

Results: A total of 5834 observations were included for the three periods. Regression analysis results show that higher health care cost in older Australian women with arthritis was significantly associated with residing in an urban area, having supplementary health insurance coverage, more comorbid conditions, using complementary and alternative medicine, and worse physical functioning. It was also found that predisposing characteristics (e.g. area of residence) and enabling factors (e.g. health insurance coverage) accounted for more variance in the health care cost than need variables (e.g. comorbid conditions).

Conclusion: Results may indicate an inefficient and unfair allocation of subsidised health care among older Australian women with arthritis, where individuals with less enabling resources and more socio-economic disadvantages have a lower level of health care utilisation. Future research may focus on evaluating effectiveness of policies designed to reduce excessive out-of-pocket costs and improve equity in health care access in the older population.

Moran LJ, Grieger JA, Mishra G & Teede H.
The association of a Mediterranean-style diet pattern with polycystic ovary syndrome status in a community cohort study.
Nutrients

Polycystic ovary syndrome (PCOS) is a common condition in reproductive-aged women. While lifestyle management is first-line treatment in PCOS, the dietary intake of women with PCOS is unclear and there is no research assessing dietary patterns of women with and without PCOS. The aim of this study was to examine dietary patterns in a large cohort of women with and without PCOS. Data were from 7569 participants in the 1973–1978 cohort of

the Australian Longitudinal Study on Women's Health population assessed at 2009 (n = 414 PCOS, n = 7155 non-PCOS). Dietary patterns were evaluated using factor analysis and multiple logistic regressions assessed their associations with PCOS status. Three dietary patterns were identified that explained 27% of the variance in food intake between women with and without PCOS: Non-core foods; Meats and take-away and Mediterranean-style. The Mediterranean-style dietary pattern was independently associated with PCOS status. On adjusted analysis for each 1 SD increase in the Mediterranean-style dietary pattern, there was a 26% greater likelihood that women had PCOS. This may indicate an improvement in the quality of dietary intake following a diagnosis of PCOS. Future research should examine the contribution of dietary patterns to the incidence and severity of PCOS and the potential for modification of dietary patterns in the lifestyle management of PCOS.

Murthy V

The influence of communication and information sources upon decision-making around complementary and alternative medicine use for back pain among Australian women aged 60 to 65 years.

Health and Social Care in the Community

This study examined factors influencing decision-making on complementary and alternative medicine (CAM) use for back pain and back pain sufferers' communication about CAM use. A cross-sectional postal survey was conducted in 2011/2012 as a sub-study of the Australian Longitudinal Study on Women's Health (ALSWH). The sample contained 1620 women from the 1945-1951 cohort of the ALSWH, aged 60-65 years who were eligible for the sub-study, as they had experienced back pain during 12 months prior to the survey. Of these, 1310 (80.9%) returned completed questionnaires. A significant proportion of women consulted a CAM practitioner (76%, n = 1001) and/or had self-prescribed CAM treatment (75%, n = 985). Of the women who used CAM for their back pain, 20% consulted their general practitioner (GP) prior to using CAM and 34% always informed their GP following CAM use. Forty-three per cent of the women were influenced by their doctors, 39% by friends/colleagues, 36% by family/relatives, 33% by their partner, 30% by a CAM practitioner, 20% by a pharmacist, 16% by a book/magazine, 11% by mass media, 10% by an allied health worker and 6% by the Internet. Our results show that information sources used by women for their decision-making on CAM use differed according to the symptoms. While non-professional information sources (e.g. family/relatives) positively influenced women in their decision to use CAM for a range of back pain-related symptoms (e.g. headaches/migraines), doctors and allied health workers (e.g. nurses) negatively influenced women in their decision to consult a CAM practitioner for a range of back pain-related symptoms (e.g. headaches/migraines, neck pain). Women seek information from a wide range of professional and non-professional sources with regard to their decision-making around CAM use for back pain. Back pain care providers need to ensure effective communication with their back pain patients regarding safe, effective and co-ordinated back pain care options.

CONFERENCE PRESENTATIONS

In 2015, ALSWH data were used in over 45 conference presentations

Brown W, Pavey T, Heesch K.
Prevalence of walking in adult women, and prospective associations with health and wellbeing in older age.
2015 Annual Meeting of the International Society for Behavioural Nutrition and Physical Activity (ISBNPA) Edinburgh, Scotland, 3 – 6 June 2015.

Byles J.
Balancing health care use over later life: A longitudinal study of ageing, health and health service use by 12,432 Australian women over 19 years.
IAGG-Asia/Oceania 2015 Congress, Chiang Mai, Thailand, 19 October, 2015.

Byles J.
Striving for excellence in scholarship for Public Health Teaching & Learning Forum.
CAPHIA 2015 Public Health Awards, Hobart, Tasmania, 10 September 2015.

Byles J.
Chronic conditions, physical function and health care use across four age cohorts of Australian women.
Population Health Congress 2015, Hobart, Tasmania, 6 - 9 September 2015.

Byles J, Francis JL, Hubbard IJ, Tavener M & Chojenta CL.
Long-term outcomes for older Australian women with a history of stroke.
44th Annual British Society of Gerontology Conference, Newcastle-on-Tyne, UK, 1-3 July 2015.

de Luca K, Parkinson L, Byles J, Blyth F & Pollard H.
The prevalence and impact of neuropathic pain in older women with arthritis.
World Federation of Chiropractic 12th Biennial Conference, Athens, Greece, 13-16 May 2015.

de Luca K, Parkinson L, Byles J, Blyth F & Pollard H.
Discovering three distinct profiles of pain in 227 older women with arthritis.
World Federation of Chiropractic 12th Biennial Conference, Athens, Greece, 13-16 May 2015.

de Luca K, Parkinson L, Downie A & Byles J.
Three subgroups of pain phenotypes in 227 older, community-dwelling women with arthritis: A cross-sectional study.
Chiropractic Association of Australia National Conference. Melbourne, Victoria, 13-15 October 2015.

de Luca K, Parkinson L & Haldeman S.
Is spinal pain associated with comorbidity? A cross-sectional analysis of the relationship between spinal pain and lifestyle diseases.
Chiropractic Association of Australia National Conference. Melbourne, Victoria, 13-15 October 2015.

de Luca K, Parkinson L, Downie A & Byles J.
Mild, moderate or severe pain? How 227 older women living with arthritis have different profiles of the multi-dimensional experience of pain and the impact of profile membership on their health.
Chiropractors Association of Australia NSW Research Symposium. Sydney, NSW, 12 September, 2015.

Dillon G, Hussain R & Loxton D.
Prevalence and type of partner abuse reported by metropolitan, regional and rural women.
13th National Rural Health conference, Darwin, NT, 24-28 May 2015.

Dillon G, Hussain R & Loxton D.
Intimate partner violence and self-reported health: A comparison of women living in metropolitan, regional and rural areas.
4th NSW Rural Health and Research Congress, Armidale, NSW, 4 – 6 November 2015.

Dolja-Gore X, Harris ML, Kendig H & Byles J.
Determinants of overnight hospital admissions for Australians aged 85+ in their last year of life.
12th Annual 45 and Up Study Collaborators' Meeting, Sydney, NSW, 12 November 2015.

Dolja-Gore X.
Are Australian women with poor mental health receiving counselling services and how effective are they?
Population Health Congress 2015, Hobart, Tasmania, 6 - 9 September 2015.

Peeters G, Tett S, Hollingworth S, Gnjidic D, Hilmer S, Dobson A & Hubbard R.

Cardiovascular medication: Health gain versus fall risk.

3rd National Falls Symposium, Amsterdam, The Netherlands, 5 November 2015.

Harris ML, Oldmeadow C, Hure A, Loxton D, Luu J & Attia J.

Increased risk of type 2 diabetes in women: Does perceived stress hold the key?

Society for Longitudinal and Life Course Studies Conference, Dublin, Ireland, 18-21 October 2015.

Hickey M.

Predictors and modifying factors for new onset depression during the menopause transition: A large prospective cohort study.

62nd Society for Reproductive Investigation (SRI) Annual Scientific Meeting, San Francisco, USA, 25-28 March 2015.

Hillard T.

Depression and the incidence of urinary incontinence symptoms among young women: Results from a prospective cohort study.

10th European Congress Menopause & Andropause, Madrid, Spain, 20-22 May 2015.

Holowko N.

Social inequalities in body mass index and gestational weight gain in the first and second pregnancy among Swedish women.

2015 Annual Meeting of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA) Edinburgh, Scotland 3 - 6 June 2015.

Hubbard IJ, Tavener M, Thijsen A, Francis JL, Grenall C, Levi C & Byles J.

How do older Australian women experience life after stroke, and how does the WHO 18-item ICF Core Set for Stroke compare?

Stroke 2015, Melbourne, Victoria, 2–4 September, 2015.

Jackson C (authors: Graves A, McLaughlin D, Leung J & Powers J)

Consenters and refusers in the new young cohort of the Australian Longitudinal Study on Women's Health.

The Farr Institute 2015 International Conference, St Andrews, Scotland, 26-28 August 2015.

Ju H, Jones M & Mishra GD.

Smoking and trajectories of dysmenorrhoea among young Australian women.

The Australian Society for Medical Research (ASMR) Queensland Postgraduate Student Conference, Brisbane, Queensland, 27 August 2015.

Loxton D.

Recruiting participants in the 21st century: Australian Longitudinal Study on Women's Health.

13th National Rural Health Conference, Darwin, NT, 24 - 27 May 2015.

Loxton D.

Domestic violence and health across the life-course: Results from the Australian Longitudinal Study of Women's health.

2015 Australian STOP Domestic Violence Conference, Canberra, ACT, 7-9 December 2015.

Madigan C, Daley A, Kabir E, Aveyard P & Brown W.

Cluster analysis of behavioural weight management strategies and associations with weight change in young women: A longitudinal analysis.

2015 Annual Meeting of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA) Edinburgh, Scotland, 3-6 June 2015.

Majeed T, Forder P, Mishra G, Byles J.

Women, work and illness.

IAGG Asia/Oceania 2015 Conference, Chiang Mai, Thailand, 19–22 October, 2015.

Mishra G.

Cross-cultural perspectives on menopause: Findings from the InterLACE collaboration.

UN Commission for the Status of Women, New York, USA, 17 March 2015.

Mishra G.

Reproductive health across the life course and chronic disease events: Results from over 230,000 women across 10 countries.

Royal College of Obstetricians and Gynaecologists World Congress 2015 Brisbane, Queensland, 12-15 April 2015.

Peeters G, Beard J, Deeg D, Tooth L, Brown W & Dobson A.

Lifestyle and socio-economic factors influence the adult life-course of physical function in women.

68th Annual Scientific Meeting of The Gerontological Society of America, Orlando, USA, 18-22 November 2015.

Reilly N, Loxton D, Forder P, Harris S, Chojenta C, Milgrom J & Austin M-P.

Prevention and early intervention for perinatal mental health: An evaluation of outcomes for women who give birth in Australia.

Health Services Research Association of Australia and New Zealand (HSRAANZ), 9th Biennial Health Services and Policy Research Conference, Melbourne, Victoria, 7-9 December 2015.

Rich J, Inder K, Harris M, Perkins D & Byles J.
Who cares for whom? Giving and receiving healthcare for women over 70 in remote Australian places.
10th IAGG (International Association of Gerontology and Geriatrics) Asia/Oceania 2015, Chiang Mai, Thailand, 19-22 October 2015.

Rich J, Loxton D & Wright S.
Ageing in drought – A longitudinal thematic analysis of older women's experiences of drought in Australia.
The fifth European Conference for Social Work Research, Lbubljanna Slovenia, 22-24 April 2015.

Rowlands I, Dobson A & Mishra G.
Is the health of young Australian women getting worse? A comparison of two national cohorts of women surveyed 17 years apart.
Population Health Congress 2015, Hobart, Tasmania, 6-9 September 2015.

Schoenaker D, Soedamah-Muthu S, Callaway L & Mishra G.
Associations between pre-pregnancy dietary patterns and risk of gestational diabetes: Findings from an Australian population-based cohort study.
World Obesity Federation Hot Topic Conference 2015: Obesity and Pregnancy, London, UK, 29-30 October 2015.

Schoenaker D, Soedamah-Muthu S & Mishra G.
Dietary patterns assessed prior to pregnancy are associated with development of hypertensive disorders during pregnancy: Results from the Australian Longitudinal Study on Women's Health.
International Conference on Diet and Activity Methods (ICDAM). Brisbane, Queensland, 1-3 September 2015.

Schoenaker D, Soedamah-Muthu S, Callaway L & Mishra G.
Pre-pregnancy dietary patterns are associated with risk of developing gestational diabetes: Results from a population-based cohort study.
Australasian Diabetes in Pregnancy Society (ADIPS) Annual Scientific Meeting. Adelaide, SA, 28-30 August 2015.

Schoenaker D, Soedamah-Muthu S, Callaway L & Mishra G.
Pre-pregnancy consumption of a Mediterranean-style diet was associated with a lower risk of developing hypertensive disorders of pregnancy: Results from the Australian Longitudinal Study on Women's Health.
Royal College of Obstetricians and Gynaecologists (RCOG) World Congress 2015, Brisbane, Queensland, 13-15 April 2015.

Schoenaker D.
Adherence to dietary guidelines for grains and legumes by young Australian women: Findings from the Australian Longitudinal Study on Women's Health.
2015 Grains and Legumes Nutrition Council (GLNC) Consumption Symposium, Sydney, NSW, 30 April 2015.

Stanford S.
Understanding women who self-harm: Predictors and long-term outcomes in a longitudinal community sample.
Suicide & Self-harm Prevention Conference 2015, Cairns, Queensland, 24-26 June 2015.

Tett S, van der Hoorn M, Dobson A & Peeters G.
Proton pump inhibitors - Should more care be taken with prescribing for older women?
31st International Conference on Pharmacoepidemiology & Therapeutic Risk Management (ICPE), Boston, USA, 22-26 August 2015.

Teede, HJ.
PCOS prevalence, relationship to obesity and management.
Endocrine Society of Australia Seminar, Sydney, NSW, 1-3 May 2015.

Teede, HJ.
PCOS and obesity (symposium).
United States Endocrine Society meeting, San Diego, USA, 5-8 March 2015.

Tooth L & Mishra G.
Further education at different life course stages: Associations with physical and mental health in women.
Population Health Congress 2015, Hobart, Tasmania, 6 - 9 September 2015.

Uijtdewilligen L, Twisk JWR, Singh AS, Chinapaw MJM, van Mechelen W & Brown WJ.
Biological, socio-demographic, work and lifestyle determinants of sitting in young adult women: A prospective cohort study.
14th International Society of Behavioral Nutrition and Physical Activity Meeting, Edinburgh, UK, 3–6 June 2015.

Waller M, Mishra G & Dobson A.
Using linked data to estimate the prevalence of dementia in Australian women.
The Farr Institute 2015 International Conference, St Andrews, Scotland, 26-28 August 2015.

SEMINARS & WORKSHOPS

Arriaga M.
Why is my research important to you? Lifestyle-related risk factors for rarer cancers in Australia.
Translational Cancer Research Network (TCRN) Consumers Meeting, Sydney, NSW, 19 May 2015.

Arriaga M.
Relative importance of lifestyle-related risk factors for rarer cancers in Australia.
Prince of Wales Clinical School (POWCS) Postgraduate Research Seminar. Sydney, NSW, 24 October 2014.

Byles J.
Health services use at longitudinal studies on health, evidence to inform government policy and program development
Australian Government Department of Health, Canberra, ACT, July 1 2015.

Byles J.
19 to 90's: A long view of life from the Australian Longitudinal Study on Women's Health.
Australian Research Centre for Sex, Health & Society, La Trobe University, Melbourne, Victoria, 28 July 2015.

Byles J.
A Quality Life – Gender, Health and Wellbeing.
COTA Australia's National Policy Forum, National Press Club, Canberra, ACT, 2 July 2015.

Dobson A.
Australian Longitudinal Study on Women's Health.
Better Data, Better Lives - Celebrating World Statistics Day, Brisbane, Queensland, 20 October 2015.

Gardiner P, Peeters G, McLaughlin D & Waller M.
Ageing in Australia: The 1921-26 birth cohort of the Australian Longitudinal Study on Women's Health.
School of Population Health Seminar Series, University of Queensland, Brisbane, Queensland, 24 February 2015.

Loxton D.
Intimate Partner Violence and Health.
Australian Government Department of Health, Canberra, ACT, July 1 2015.

Schoenaker D.
The role of dietary factors in the development of hypertensive disorders of pregnancy and gestational diabetes.
MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, 16 November 2015.

COMPLETED STUDENT PROJECTS 2015

Association of dietary patterns and macronutrient intake with type 2 diabetes risk

Candidate: Amani Alhazmi

Degree: PhD

The University of Newcastle

Supervisors: Professor Manohar Garg and Dr Elizabeth Stojanovski

Type 2 diabetes is a pervasive health crisis that threatens all nations. The epidemic has grown in parallel with the increase in obesity due to different factors, including nutrition transition. This project comprised four interconnected research stages that aimed to contribute to the evidence base informing associations of dietary patterns and macronutrient intake in relation to type 2 diabetes risk.

The first stage was to review the existing evidence for the association of macronutrients and dietary patterns with type 2 diabetes risk by conducting two systematic literature reviews and meta-analyses. The existing evidence on the association of macronutrient intake and dietary patterns with type 2 diabetes risk was synthesised. The first review found that while total carbohydrate is associated with an increased risk of type 2 diabetes, high vegetable fat intake may decrease the risk. The evidence from the second review showed that adherence to a healthy dietary pattern was inversely associated with type 2 diabetes risk, whereas an unhealthy dietary pattern was positively associated with the disease. These reviews highlighted the need for well-designed prospective cohort studies to further examine these associations.

The second stage investigated the association between macronutrient intake and type 2 diabetes in middle-aged Australian women. A prospective cohort study of 8370 Australian women from the ALSWH 1946-51 cohort who were free of type 2 diabetes at baseline, and who had six years (2002–2007) of follow up survey data, was undertaken. Dietary intake was assessed with a self-reported validated food frequency questionnaire (FFQ) and the association between macronutrients and type 2 diabetes was investigated using multiple logistic regressions adjusted for potential confounding variables.

After the six-year follow-up, 311 women developed type 2 diabetes. The data indicate that consumption of monounsaturated fatty acid (MUFA), total omega-3 polyunsaturated fatty acid (n-3 PUFA), Alpha-linolenic acid (ALA), and omega-6 polyunsaturated fatty acid (n-6 PUFA) may increase the risk of developing type 2 diabetes in women.

The potential association between fatty acids and type 2 diabetes found in the study was then further investigated in a nested case-control study of 187 adults aged 55–85 years from the Hunter Community Study (HCS). This study aimed to examine the association of fasting whole blood fatty acid concentrations with incident type 2 diabetes. The results suggested that higher fasting whole blood concentrations of omega-6 polyunsaturated fatty acids (n-6PUFA) arachidonic acid (ARA) and dihomo-gamma-linolenic acid (DGLA) as well as ALA, Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA) are associated with an increased risk of diabetes, whereas increased fasting whole blood concentrations of lignoceric acid is inversely associated with diabetes risk. These findings may negate previous evidence and emphasise the critical need for further investigations in this area.

Focus then shifted to investigate the association between diet and type 2 diabetes in a prospective cohort study using a complementary approach to determine the ability of two diet quality scores to predict the incidence of type 2 diabetes. The methods employed in this study were similar to those of the first prospective cohort study. The study suggested that the risk of type 2 diabetes in Australian women with the highest diet quality score as measured by the Dietary Guideline Index (DGI) was about 50% lower than those with the lowest diet quality score. This project provides detailed data on the associations between macronutrient intake and dietary patterns in relation to type 2 diabetes risk. A well-designed, adequately powered intervention research investigating the effect of these dietary factors in relation to type 2 diabetes risk is necessary to form future recommendations on preventive dietary approaches.

Rurality, vulnerability and intimate partner violence

Candidate: Gina Dillon

Degree: PhD

University of New England

Supervisors: Professor Rafat Hussein, Associate Professor Deborah Loxton and Dr Asad Khan

Women in regional and rural areas of Australia experience higher rates of violence from partners and spouses than women living in major metropolitan centres. This project examined data from 7917 women participating in the Australian Longitudinal Study on Women's Health.

While one in five (20%) women living in major metropolitan centres reported having been in a violent relationship with a partner or spouse at some time in their adult life, these numbers rose to one in four women from regional (24%) and rural (26%) areas.

The project also compared the type of partner abuse women living in metropolitan, regional and rural areas faced over a 12 month period. Using detailed answers, the proportion of women experiencing physical, emotional, sexual abuse or harassment behaviours were noted. Overall women from metropolitan, regional and rural areas reported the four types of abuse at very similar rates. In the past 12 months:

- 12.5% of respondents reported emotional abuse
- 2.5% reported physical abuse
- 2.8% reported harassment
- 0.6% reported sexual abuse.

Some women reported multiple types of abuse simultaneously. Experiencing partner abuse has serious negative physical and mental health effects. These health conditions can remain even after the abuse has stopped, through ongoing problems with depression, anxiety and post-traumatic stress disorder.

Urban rural differences in health care for women with colorectal, breast and lung cancer

Candidate: Janni Leung

Degree: PhD

The University of Queensland

Supervisors: Associate Professor Deirdre McLaughlin, Dr Samantha MacKenzie and Professor Annette Dobson

Rural cancer patients have poorer survival rates than urban cancer patients, but it is not known why this occurs. Evidence shows that rural populations may experience health service disadvantages; however, research in this area has not considered and adjusted for relevant individual characteristics that could be confounding factors. No research has examined the combined effects of health service factors and individual factors on cancer survival between the rural and urban population

This project examined rural-urban differences in breast cancer screening service use by Australian women, as well as disease and psycho-social outcomes. Methods involved systematic reviews and analyses of the Australian Longitudinal Study on Women's Health and linked cancer registry data. Results showed no rural disadvantages in mammography rates. Obesity was the strongest risk for advanced breast cancer at diagnosis. There were no rural-urban differences in social support or physical and psychological quality of life among survivors. Public health policies targeting general risk factors, such as obesity, may improve breast cancer outcomes and general health across urban and rural populations.

Healthcare resources use in older Australian women with arthritis

Candidate: Thomas Lo

Degree: PhD

The University of Newcastle

Supervisors: Professor Lynne Parkinson, Professor Julie Byles and Dr Michelle Cunich

Objective: The aims of this thesis were to:

1) estimate the healthcare cost of arthritis from the Australian Government's perspective, by employing valid methods which also account for the impact of comorbidities, in older Australian women with arthritis;

2) examine the trend of the healthcare costs of arthritis between 2003 and 2009; and

3) analyse the explanatory factors of the cost using statistical models.

Methods: The thesis was grouped into two parts. Part one was a detailed examination of different case-definitions of arthritis using population-based data. It included a systematic review of published prevalence studies, and an empirical assessment of the performance characteristics of different case-definitions. Part two focused on identifying the most appropriate measurement methods for the cost of arthritis by systematically reviewing published cost of arthritis studies, and subsequently applying these methods (with the best case-definition option identified from part one) to compute the healthcare cost of arthritis and assess the explanatory factors for healthcare cost. This research was based on data for participants in the older cohorts of the Australian Longitudinal Study on Women's Health. The healthcare utilisation and cost information were obtained from the linked Medicare Australia datasets.

Results: In part one, the systematic review found that self-reported doctor-diagnosed arthritis was the most common case-definition in recent prevalence of arthritis studies. Examination of the agreement between self-reported doctor-diagnosed arthritis and musculoskeletal symptoms found that there was adequate agreement between these two measures. Utility of healthcare administrative data for identification of arthritis was also explored by means of case identification algorithms systematically built using elements from Medicare data. The algorithms were found to have no better than fair agreement with self-reported doctor-diagnosed arthritis. Overall, results indicate that self-reported doctor-diagnosed arthritis is the best option for a case-definition to study the economic burden of arthritis in the Australian context.

In part two, the results from the systematic review indicated that the incremental cost method is most appropriate for accounting for the costs of comorbidities (often overlooked in previous Australian studies) in individuals with arthritis. Results also indicated that gamma regression and quantile regression statistical methods should be adopted in the cost of arthritis studies in this thesis. Accordingly, the mean adjusted incremental healthcare cost among older Australian women with arthritis was estimated at (AUD 2012) $502.59 per person per year in 2009. This analysis also showed that the cost of comorbidities accounts for a considerable proportion of the healthcare costs. Healthcare cost distribution was severely positively skewed, as illustrated by the estimates at several percentiles; the top 10% of the population incurred 300% greater costs. Longitudinal analysis did not find significant changes in arthritis costs between 2003 and 2009. Results also show that explanatory variables had statistically significantly different effects on healthcare cost at different quantiles of cost. Specifically, quantile regression found that, for each increase in the SF-36 physical component score (PCS), healthcare cost decreased by $47, $71, $137, and $195 at the 50th, 75th, 90th, and 95th percentiles respectively; and for each increase in the number of comorbid conditions, healthcare cost increased by $195, $200, $419, and $639 at the 50th, 75th, 90th, and 95th percentiles respectively. Moreover, generalized estimating equations predict that need variables (such as the SF-36 PCS score and comorbid conditions) have less influence on cost than do predisposing characteristics (such as area of residence), and enabling factors (such as complementary health insurance coverage).

Conclusion: This thesis makes contributions in three main areas. First, it provides robust evidence to show that self-reported doctor-diagnosed arthritis is the best case-definition option for population-based epidemiological studies. Second, this thesis extends our understanding of the healthcare cost of arthritis by employing advanced methods in cost research. It was possibly the first study in Australia that assessed the cost of arthritis (all forms combined) using individual-level data, and the incremental cost method to account for the impact of comorbidity on the cost of arthritis. An assessment of the cost trends over time using longitudinal data also provides insights

into the dynamics of the healthcare cost of arthritis. Third, this thesis sets new directions and methods for future research on the determinants of healthcare cost. It provides evidence that individuals with different levels of healthcare utilisation are heterogeneous groups, and that their healthcare costs are influenced by different sets of explanatory factors at different degrees between these sub-groups. It also provides evidence that traditional regression methods, which produce a single rate of change (a slope) as indicated by the regression coefficient, are incapable of accurately describing the relationships between the explanatory variable and costs across the entire cost distribution. It further demonstrates that quantile regression is a very useful tool, not only in the estimation of the adjusted cost of arthritis at multiple percentiles, but also in the assessment of the explanatory factors of cost in population sub-groups. The findings of this thesis will lead to a more accurate understanding of the economic burden of arthritis and provide important insights into the determinants of healthcare costs in Australians with arthritis.

ENQUIRIES

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Data Archiving

The Australian Longitudinal Study on Women's Health has a policy to archive ALSWH data with the Australian Data Archive (ADA) at the Australian National University on an annual basis. To date, data have been archived for Surveys 1, 2, 3, 4, 5 and 6 of the 1973-78 and 1921-26 cohorts, along with the six month follow-up surveys for the 1921-26 cohort. Data from Surveys 1, 2, 3, 4, 5, 6 and 7 have been archived for the 1946-51 cohort, along with data from Survey 1 and Survey 2 of the 1989-95 cohort.

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A detailed description of the background, aims, themes, methods, representativeness of the sample and progress of the study is given on the project web page. 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.

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