Australian Longitudinal Study   
on Women’s Health

**Annual Report 2021**



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# Introduction

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

ALSWH now involves more than 57,000 women in four cohorts that encompass the adult lifespan:

* Women born 1989-95 (aged 26-32 in 2020)
* Women born 1973-78 (aged 43-48)
* Women born 1946-51 (aged 70-75)
* Women born 1921-26 (aged 95-**100**)

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

This report outlines progress and achievements of the Australian Longitudinal Study on Women’s Health (the Study) during 2021.

# Directors Report

Like women all around the country, our ALSWH team has been busy balancing the challenges of the Coronavirus Disease 2019 (COVID-19) with the need to maintain our main focus on broader aspects of women’s health. So it’s been business as “usual”, and business as “unusual”; focusing our hearts and minds on what might be different in 2021 as COVID-19 continued to drive upheaval of women’s lives and the communities they belong to.

During this year, 28 women in the oldest cohort (born 1921-26) reached the age of 100 years – we sent birthday cards to celebrate their achievement of this significant milestone. We continued to survey women in this cohort at six monthly intervals (May and November) and launched the ninth survey of the 1973-78 cohort (aged 43-48). Preparations also commenced for a ‘refresh’ of the Study’s two youngest cohorts to improve their representativeness of the general population of Australian women through recruitment of new participants with ancestry from North-Eastern, South-Eastern and Southern Asia.

Women from the 1973-78 cohort participated in a major substudy, ‘*Menarche to Pre‑Menopause*’, which involved collection of a range of biomedical data (including saliva or blood samples, and physical activity monitors) either at home using mailed kits, or through visits to clinics located across the country. By the end of the year, despite the challenges presented by various COVID-19 lockdowns, over 1,300 women had been able to provide data, which will be used to investigate the associations between female reproductive factors, from menarche and menses through to pregnancy and subfertility, and the risks of cardiometabolic and respiratory conditions during the menopausal transition.

Other ongoing activities this year included preparation of a major report on women’s reproductive health for the Australian Government Department of Health - the report, ‘*Reproductive Health: Contraception, conception, and change of life’* is available on the Study [website](https://alswh.org.au/post-outcomes/2021-major-report-reproductive-health-contraception-conception-change-of-life/) and a summary is included in this report. Data from our 2020 surveys of how COVID‑19 was affecting women and their lives was also used to prepare a report ‘*Australian women’s mental health and wellbeing in the context of the COVID-19 pandemic in 2020*’ for the National Mental Health Commission – this report is available [here](https://alswh.org.au/post-outcomes/australian-womens-mental-health-and-wellbeing-in-the-context-of-the-covid-19-pandemic-in-2020/). We also conducted a survey focussing on women’s attitudes towards and access to COVID-19 vaccinations.

Study data were also used to provide information to support government policy through submissions to the Queensland Government’s new Queensland Women’s Strategy and their Inquiry into Social Isolation and Loneliness in Queensland. The ALSWH symposium for the Department of Health was again held virtually, showcasing our latest research on topics including the health impacts of COVID-19, endometriosis and in-vitro fertilization (IVF) domestic violence and healthy ageing.

In addition, 55 new projects using anonymised ALSWH data, including some with linked administrative data, involving national and international collaborators began during the year. Sixty-six peer-reviewed scientific papers, on all aspects of women’s health, were published or accepted for publication, and more than 30 presentations, (most presented virtually) were made at national and international conferences.

We would like to thank the Department of Health for their ongoing support of the Study, our colleagues for all their hard work, and the women who have continued their participation in the research over the last 25 years.

Professor Gita Mishra

Professor Julie Byles

# **2021 Major Report:** Reproductive health: Contraception, conception, and change of life - Findings from the Australian Longitudinal Study on Women’s Health

Reproductive health is an ever-present part of women’s lives; demanding attention from first period until well beyond menopause. It is intrinsically linked to physical and mental health, socioeconomic status, ability to work, and quality of life. Issues like contraceptive access, unwanted pregnancies, reproductive disorders, infertility, childbirth, and the menopause transition, take an emotional and physical toll on women that ripples out to have huge social and economic ramifications. The Study’s 2021 Major Report (the Report) to the Department of Health examines reproductive health and was developed in consultation with stakeholders. It investigates:

* women’s use of contraceptives across their reproductive years
* women’s family planning experiences including fertility problems, pregnancy, and perinatal mental health
* the menopause transition and the impact of menopausal symptoms on health outcomes in later life
* the impact of COVID-19 on family planning and contraceptive choices in 2020.

The Report examines both cross-sectional and longitudinal data, and reports on trends observed across three of the four ALSWH cohorts born 1989-95, 1973-78, and 1946-51 (data from the 1921-26 cohort was not used in the Report). A summary of key findings from the Report is provided below and the [full Report](https://alswh.org.au/post-outcomes/2021-major-report-reproductive-health-contraception-conception-change-of-life/) is available on the website, along with short interactive presentations on:

* [Contraceptive trends](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-Contraceptive-Trends-myxvItNji4)
* [Long acting reversible contraception (LARC](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-LARC-ahQKRN3dZW))
* [The Oral Contraceptive Pill](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-The-Pill-QkSUaAOLBq) (OCP)
* [Pregnancy and assisted reproductive technology](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-Pregnancy-and-ART-wknLZuniUN) (ART)
* [Perinatal mental health](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-Perinatal-Mental-Health-zIdRUkTM48)
* [Family planning and COVID-19](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-Family-planning-and-COVID-19-GiOdf3HmTp)
* [Menopause](https://alswh.org.au/shorthand/reproductive-health-report/#group-section-Menopause-nP21FpZJdE)

Contraception

**PREVALENCE OF CONTRACEPTIVE USE ACROSS THE LIFESPAN**

* The OCP (including the combined OCP and mini-pill) and condoms are the most common forms of contraception used among women born 1989-95.
* Use of the OCP and condoms is highest when women are in their late teens and early twenties, then declines as they enter their mid- to late twenties.
* Use of the LARC implant, is reported by around 10% of young women, while use of the hormonal Intra Uterine Device (IUD) increases as women enter their mid- to late twenties.
* There was a reduction in use of contraception as women entered their mid- to late twenties, most likely reflecting the desire to have children.
* Simple prevalence figures on contraception use by women born 1989-95 do not reflect the highly transitional nature of contraception use. Knowing what contraception a woman may be using at a certain age does not mean it is easy to predict which method of contraception she may be using one, two or three years later. Ensuring choices are available for women is essential.
* In the generation of women born 1973-78, the OCP and condoms were the most prevalent contraception used.
* Use of LARC methods (which for the 1973-78 cohort analyses combined the hormonal IUD, copper IUD, implant, injection and vaginal ring) more than doubles as women age, increasing from 10% when first asked (when women were 28 to 33 years) to 24% (when they were 40 to 45 years).

**SOCIOECONOMIC AND HEALTH BEHAVIOUR VARIATIONS IN THE USE OF CONTRACEPTIVES**

**Use of contraception by women in the 1989-95 cohort by socioeconomic factors**

* Women with higher levels of education were more likely to use the OCP and the hormonal IUD, and were less likely to use other contraceptives, and no contraception, compared with women with lower levels of education.
* Women who managed on their available income were more likely to use the OCP, and were less likely to use no contraception, compared with women who found it difficult to manage on their income.
* Women who had never married or were in a de facto relationship were more likely to use the OCP, condoms, the hormonal IUD, and the implant, and were less likely to use no contraception, compared with women who were married.
* Women living in urban areas were more likely to use the OCP, and were less likely to use the implant, hormonal IUD and no contraception compared with women living in remote areas.
* The OCP and the implant were used in higher proportions by women who spoke English. Of interest, use of the OCP was highest in women who spoke an Asian language when they were 40 to 45 years. Women who spoke an Asian or other non‑English language were more likely to use condoms, and the implant was also used in higher proportions by women who spoke an Asian language (especially when they were 40 to 45 years). Women who spoke a language other than English were more likely to use no contraception, compared to women who spoke English or an Asian language.

**Use of contraception by women in the 1989-95 cohort by health behaviour factors**

* Women who consumed high levels of alcohol were more likely to use the hormonal IUD and less likely to use no contraception than women who consumed alcohol at a lower level. Women who were low risk drinkers when they were 18 to 23 years had higher use of the OCP. Women who did not drink has less use of the implant and hormonal IUD when they were 40 to 45 years.
* Women who were physically inactive were more likely to use no contraception and less likely to use the OCP than women who were physically active, even at a low level.
* Women with body mass index (BMI) in the overweight or obese categories reported higher rates of implant use, other contraception, or no contraception (at Survey 1), and were less likely to use the OCP, compared with women who were a healthy weight.
* Women who smoked were more likely to use no contraception and were less likely to use the OCP and condoms (used alone or in combination), compared with women who did not currently smoke.
* Women who used marijuana or illicit drugs were more likely to use no contraception and less likely to use the OCP and condoms (used alone or in combination), compared with women who reported they did not use marijuana or illicit drugs.

**Use of contraception by women in the 1973-78 cohort by socioeconomic factors**

* Women who were married or in a de facto relationship were more likely to use the OCP and condoms (used alone or in combination). Use of LARCs was highest in women who were married or separated/divorced/widowed. Women who had never married or were separated/divorced/widowed were more likely to use condoms or no contraception.
* Women living in urban areas were more likely to use no contraception and less likely to use the OCP and LARCs (at Survey 8), compared with women living in remote areas.
* The OCP was used in higher proportions by women who spoke English, whereas condom use, the withdrawal method, and no contraception were reported in higher proportions by women who spoke a European language. Women who spoke an Asian language had lower use of LARCs.

**Use of contraception by women in the 1973-78 cohort by health behaviour factors**

* Women who consumed high levels of alcohol were less likely to use the OCP and no contraception, and were more likely to use condoms, compared with women who consumed lower levels of alcohol.
* Women who were physically inactive reported lower rates of OCP and condom use than women who were active.
* Women with BMI in the overweight or obese categories were more likely to report no use of contraception but were less likely to use the OCP than with women who were a healthy weight. Underweight women at Survey 8 (40 to 45 years) had less use of LARCs.
* Women who smoked were less likely to use no contraception and the OCP than women who reported they did not currently smoke.
* Women who used illicit drugs were less likely to use the withdrawal method and more likely to use no contraception, compared with women who reported they did not use illicit drugs.

**THE USE OF CONTRACEPTIVES FOLLOWING REPRODUCTIVE EVENTS**

**Women in the 1989-95 cohort**

* Women who had no children or other reproductive events were more likely to primarily use the OCP and condoms during their twenties.
* Women with one child were more likely to use no contraception than the OCP or condoms when they were aged 19 to 30 years.
* Women with two children were generally equally likely to use the OCP, condoms, or no contraception when they were aged 19 to 30 years.
* Women who had experienced a miscarriage were generally equally likely to use the OCP, condoms, or no contraception between the ages of 18 and 25 years, but were more likely to use no contraception after that.
* Women who had experienced a termination when aged 18-23 years were more likely to report using LARC when they were aged 19-24 years. They had generally higher use of the OCP until they were 25 years, and higher use of condoms across all the surveys. Around 30% of women reported using no contraception when they were 24 to 30 years.

**Women in the 1973-78 cohort**

* Women who had no children were more likely to primarily use the OCP and condoms until in their mid-thirties when they were then more likely to use no contraception.
* Women with one child were most likely to use the OCP until they were aged 28 to 33 years. After this time, rates of no contraception use increased.
* Women with two children were more likely to use the OCP and condoms until they were 34 to 39 years, after which time, their use of LARC increased. Women in this category were most likely to use no contraception when they were 25 to 30 years.
* Women with three or more children were more likely to not use any contraception until they were 28 to 33 years. After this time, rates of OCP and condom remained the same and use of LARC increased.
* Women who had experienced a miscarriage were generally equally likely to use the OCP, condoms, or no contraception between the ages of 18 and 36 years, and were more likely to use no contraception after this time.
* Women’s use of OCP following termination (compared with use following live birth or miscarriage) was higher in all surveys from age 18-23 to 28-33, use of LARC was higher from age 31-36 to 34-39, and use of fertility awareness methods was lower from age 31 onwards.

**TRENDS IN WOMEN’S USE OF LARC**

* The lifetime prevalence of copper IUDs (27.5%) was higher than for implants (15.3%) in the 1973-78 cohort. However, in the 1989‑95 cohort, this trend was reversed, with implants having a greater lifetime prevalence (32.0%) compared to IUDs (19.9%).
* The median age of first implant insertion was 31 years for the 1973-78 cohort, and 20 years for the 1989-95 cohort. This age was considerably younger than the median age of first IUD insertion, which was 37 years for the 1973-78 cohort, and 24 years for the 1989-95 cohort.
* The factor most strongly associated with LARC use (defined as the hormonal IUD, copper IUD or implant) was the number of children women had, with higher odds of LARC use with increasing numbers of children. Similar effects were seen for history of pregnancy (both cohorts) and history of termination (1989-95 cohort).
* Women in the 1989-95 cohort were less likely to use LARC when they had a history of miscarriage.
* Women in the 1989-95 cohort with a history of being in a violent relationship were more likely to use LARC than women who had not been in a violent relationship.

**Women in the 1989-95 cohort**

* The older women were, the less likely they were to use LARC, particularly implants.
* Women born in non-English speaking countries were less likely to use IUDs, compared to those born in Australia or other English-speaking countries.
* LARC use increased with higher levels of education.
* Unpartnered women were more likely to use LARC than partnered women.
* Women in regional areas were more likely to use implants, compared with women in major cities.
* Women in the underweight BMI category were less likely to use LARC, and women in the obese category were more likely to use LARC, compared with women in healthy weight categories.
* Current smokers were more likely to use LARC than non-smokers.
* Non-drinkers and those who drank rarely were less likely to use LARC, compared to low-risk drinkers.

**Women in the 1973-78 cohort**

* Country of birth was associated with use of implants, but not IUDs, with women born outside Australia less likely to use implants.
* Non-partnered women were more likely to use implants than partnered women.
* Women in regional and remote areas were more likely to use implants, compared with women in major cities.
* Smokers were less likely to use IUDs, compared to non-smokers.
* Non-drinkers were less likely to use IUDs than low-risk drinkers.

**SHORT AND LONG TERM USE OF THE OCP**

* For women born 1989-95 and 1973-78, around 50% of OCP use periods involved a single script. Women may have switched to another OCP not listed on the PBS or may have transitioned to another form of contraception (e.g., LARC), or ceased using contraception.
* One third (35%) of women born 1989-95 only used OCPs for short periods of time (150 days or less).
* Women born 1989-95 who used an OCP in the short-term were more likely to have a certificate/diploma (although similar numbers had a university degree), to be partnered, and to have previously been in a violent relationship than women who used an OCP in the long-term (>150 days).
* Compared to women born 1989-95 who used an OCP in the long-term (>150 days), those who used an OCP in the short-term were more likely to be psychologically distressed, to have poor to fair general health, to report a chronic condition, and to have had a previous miscarriage or termination.
* Women born 1989-95 who used an OCP for a short period of time were more likely to smoke tobacco, be non-drinkers, and have a slightly higher BMI than women who used OCP for a long period of time (>150 days).
* In the 1973-78 cohort, 38% of women only used OCPs in the short-term (150 days or less).
* Where women used the OCP for longer than 150 days (long-term use), the median length of OCP use was 503 days for women in the 1989-95 cohort, and 575 days for women in the 1973-78 cohort.
* Among women in the 1989-95 cohort who used an OCP in the long-term, duration of OCP use was shorter for women who were older, had a higher BMI, or who smoked or used illicit drugs.
* Among women in the 1973-78 cohort who used an OCP in the long-term, duration of use of OCP was shorter for women who had poorer mental health, did not live in outer regional or remote areas, had been in a violent relationship, or had endometriosis or polycystic ovary syndrome (PCOS).
* PBS data may underestimate OCP use, since not all OCPs are covered by the PBS. However, the difference in OCP users identified through the PBS and those who report OCP use in the ALSWH surveys with no PBS records for OCP use are small. The main differences appear to be that the PBS OCP data may slightly over-represent women who have more children and more socio‑economic disadvantage.

Conception

**PATTERNS OF PREGNANCY AND ART**

**Reproductive outcomes**

* Among women born 1989-95 (aged up to 30 years) who completed one of the two most recent surveys (N = 10,103), 14% have reported giving birth, 7% have reported a miscarriage, and the average birth rate was 1.5.
* Among women born 1973-78 (aged up to 45 years) who completed one of the two most recent surveys (N = 8,149), 81% have reported giving birth, 36% have reported a miscarriage, and the average birth rate was 2.3.

**Reproductive health problems**

* Among women in the 1989-95 cohort who had completed one of the two most recent surveys, 10% reported endometriosis and 15% reported PCOS.
* Among women in the 1973-78 cohort who had completed one of the two most recent surveys, 12% reported endometriosis and 9% reported PCOS.

**Pregnancy intentions**

* At the most recent survey when aged 24-30 years, one in ten women from the 1989‑95 cohort reported that they were pregnant or trying to conceive.
* Among women from the 1973-78 cohort, one in five women reported that they were pregnant or trying to conceive when aged 28-33 years (Survey 4), compared to 4% when aged 40-45 years at Survey 8 (2018)
* Women who were pregnant reported better health behaviours (higher fruit consumption, less likely to be in the obese BMI category, smoked less) than those who were not pregnant. However, there was no difference in health behaviours between women who were trying to conceive and those who were not trying to conceive.
* Women who were trying to conceive had the highest prevalence of reproductive health problems including endometriosis (1973-78 cohort) and PCOS (1989-95 and 1973-78 cohorts), compared to those who were pregnant or not trying to conceive.

**Fertility issues**

* At age 24-30, 6% of women born 1989-95 reported fertility issues.
* For women born 1973-78, the percentage ever reporting fertility issues increased from 4% at 22-27 years to 24% at 40-45 years. One in three women who completed one of the two most recent surveys reported fertility issues at some point, and 76% of these had sought help for fertility issues.
* The prevalence of fertility issues was similar at equivalent ages for women born 1989‑95 and 1973-78, however, seeking help was more common in the 1973‑78 cohort.

**ART**

* MBS data indicated 7,137 treatment cycles for 1,537 women (215 from the 1989-95 cohort and 1,322 from the 1973-78 cohort).
* For those women who have accessed ART so far, the number of cycles ranged from 1 to 36 cycles, with an average of 4.6 cycles per woman. Most women (72%) had accessed IVF only, rather than intra-uterine insemination (IUI).
* Women born 1989-95 who engaged with ART services early in their reproductive life (aged 17-24) were less likely to have a partner compared to women who engaged ART services later in life.
* Women born 1973-78 who engaged with ART services late in their reproductive life (aged 40-45) were less likely to have a partner than women who engaged ART services earlier in life.
* Women who engaged with ART services late in their reproductive life (aged 40‑45; 1973-78 cohort) tended to report that that they had not given birth by 40-45 years.
* Overall, the 1989-95 cohort started ART sooner and used it at higher rates when compared to the 1973-78 cohort.
* The prevalence of reproductive health problems was high among women accessing ART services, with 25% of women born 1989-95 and 1973-78 reporting endometriosis, 20% of women born 1973-78 reporting PCOS, and 42% of women born 1989-95 reporting PCOS. Slightly more women with endometriosis used both IVF and IUI, and more women with PCOS used IUI.
* Women who undertook a higher number of ART cycles tended to have endometriosis, had not given birth prior to starting ART treatment, and reported one rather than two or more births across all surveys (note that births cannot be tied to ART).

**PERINATAL MENTAL HEALTH**

* Rates of screening for perinatal mental health have increased, with 85% of women born 1973-78 reporting being screened in 2009, compared to 91% of women in 2018.
* Women born 1989-95 with no formal qualifications were less likely to report being screened for perinatal mental health issues than those women with higher qualifications.
* Women born 1989-95 have higher rates of perinatal depression and anxiety than women born 1973-78.
* For women born 1989-95 and 1973-78, postnatal diagnoses for depression and anxiety were more common than antenatal diagnoses.
* Among first births, 46% of women born 1989-95 and 37% of women born 1973‑78 experienced a traumatic birth (emergency caesarean, labour lasting more than 36 hours, emotional distress during labour, or stillbirth).
* For women born 1989-95 and 1973-78, traumatic birth experiences were associated with an increase in the risk of perinatal depression or anxiety, even after controlling for selected sociodemographic factors and history of mental health issues Odds Ratio (OR) = 1.74 (95%Confidence Interval (CI) = 1.30, 2.33) and OR = 1.63 (95%CI = 1.40, 1.88), respectively).

**FAMILY PLANNING AND USE OF CONTRACEPTIVES DURING THE COVID-19 PANDEMIC**

**Quantitative findings**

* 10% of women aged 25-31 years changed their pregnancy plans during the pandemic, compared to less than 1% of women aged 42-47 years.
* 11% of women aged 25-31 years were either pregnant or trying to fall pregnant, compared to 2% of women aged 42-47 years.
* 14% of women aged 25-31 years and 3% of women aged 42-27 years indicated that their contraception use had changed since the pandemic began.
* Very few women reported difficulties in accessing contraception during the pandemic.

**Qualitative findings**

* The pandemic introduced challenges in accessing reproductive health services and adhering to regular contraceptive methods.
* Women described changes to sexual activity during the pandemic, such as having limited opportunities for sexual activity, or a reduced interest in sex.
* Women wrote of limited maternal health service use, economic instability, additional stress, and uncertainty as reasons contributing to their change of mind on pregnancy and having children.

Change of life

**MENOPAUSE**

**Natural menopause**

* In the 1946-51 cohort, 90% of women reached natural menopause by age 55, with an average age at 50.9 years. However, 1.3% experienced premature menopause (<40 years), and 5.8% experienced early menopause (40‑44 years).
* Women who were less educated, separated/ divorced/ single, reported finding income management difficult all the time and were more likely to have menopause at an earlier age.
* In the 1973-78 cohort, almost 10% of women had reached menopause by age 40-45 years, and 20% had entered perimenopause.
* Cigarette smoking, being underweight, early age at menarche (≤11 years), and nulliparity/low parity were associated with an increased risk of premature and early menopause. Smokers who quit smoking for more than ten years prior to the menopause can minimise this risk.
* Women with premature menopause or a very short reproductive lifespan (<30 years) had an increased risk of non-fatal cardiovascular disease (CVD), especially early onset CVD events before age 60.

**Hysterectomy and oophorectomy**

* In the 1946-51 cohort, 37.9% of women had a hysterectomy and/or oophorectomy by age 68-73 years – 12.6% reported a hysterectomy with bilateral oophorectomy (surgical menopause). The average age at hysterectomy was 46.3 years, with one third occurring before age 45.
* In the 1973-78 cohort, 5.7% of women had undergone a hysterectomy and/or oophorectomy by age 40-45 years – 0.8% reported a hysterectomy with bilateral oophorectomy.
* Earlier surgical menopause before age 45 poses an additional risk of CVD, compared with natural menopause at the same age.
* Women with hysterectomy/oophorectomy were at a higher risk of type 2 diabetes in both normal weight and overweight/obese groups.
* Hysterectomy with ovarian conservation before age 50 did not increase the risk of all-cause mortality, compared with the no hysterectomy group. However, hysterectomy with bilateral oophorectomy before age 50 and no use of hormone therapy led to an increased risk of premature mortality.

**Vasomotor Menopausal Symptoms (VMS)**

* In the 1946-51 cohort, almost 25% of women experienced hot flushes often at age 50-58 years, and 5.8% experienced hot flushes often at age 68-73.
* Five symptom profiles of hot flushes were identified throughout the course of over 20 years (45-73 years): minimal (62.2%), later onset, resolved (17.4%), early onset (10.8%), later onset, not resolved (5.9%), and persistent (3.3%). The ‘persistent’ and ‘later onset, not resolved’ groups still experienced hot flushes at age 68-73 years. Similar results were found for night sweats.
* Three in four women who experienced hot flushes often sought help at age 45-50, with help seeking decreasing over time to 25% at age 59‑64. Of these women, 20-25% reported they were not satisfied with the help given.
* In the 1973-78 cohort, less than 3% of women reported that they experienced hot flushes often at age 37-45 years. However, help-seeking among those women rose from 30.7% at age 37-42 to 41.3% at age 40-45.
* Cigarette smoking, being in overweight/obese BMI categories, and high fat-sugar diet were associated with a higher risk of VMS, while high intakes of soy products, fruit, and Mediterranean diet were associated with a lower risk of VMS. Women who quit smoking before age 40 had a similar level of risk as never smokers.
* Both hot flushes and night sweats were associated with increased risk of CVD, especially those experiencing both symptoms often.

**Menopausal Hormone Treatment (MHT)**

* In the 1946-51 cohort, the use of MHT peaked at age 50-55 years (32.6%), with 7.3% still taking MHT at age 68-73 years. Among women taking MHT at age 45-50, 52.4% reported a hysterectomy and/or bilateral oophorectomy.
* In the 1973-78 cohort, 1.4% reported currently taking MHT at age 40-45 years. Of these, 40.2% reported a hysterectomy and/or bilateral oophorectomy.

# Vitamin D testing and Australian women

Recent research using ALSWH data investigated vitamin D testing rates in Australian women. A summary of the findings, published in the [*Archives of Osteoporosis*](https://link.springer.com/article/10.1007/s11657-020-00840-2)*,* is provided here.

In the early 2000s, vitamin D testing in Australia increased by a dramatic 3,587%. Concerns about the costs of potentially unnecessary testing led to a MBS review report, and the Australian government introduced new criteria in 2014 to limit testing to those at high risk of vitamin D deficiency. Our study investigated:

1. whether the new criteria changed testing rates in Australian women in the short or long-term; and
2. the characteristics of women still undergoing tests.

Using Medicare data we looked at national vitamin D testing trends in Australian women aged 15 years and over before and after the introduction of new testing criteria. We also used data from 7,771 women from the ALSWH cohort born 1946-1951 to examine who was more likely to have a vitamin D test under the new criteria.

**Vitamin D testing rates are trending up**

Although vitamin D testing initially declined after the new criteria was introduced in 2014, this reduction was not sustained. Between 2016 and 2019 vitamin D testing rates in Australian women increased in all age groups.

Chart, line chart

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**Which women are getting Vitamin D tests?**

Women who have signs or symptoms of vitamin D deficiency (e.g. women with signs or symptoms of osteoporosis or osteomalacia) require testing. Women who live at latitudes with less sun exposure and who are more likely to have vitamin D deficiency also require testing. We wanted to know which other socioeconomic, demographic, health and health service utilisation factors were associated with vitamin D testing under the new criteria. We linked MBS data on the frequency of vitamin D testing to ALSWH survey data from the 1941-56 cohort.

As expected, we found that women who had a bone density test and those living at latitudes with less sun exposure were more likely to have a vitamin D test. Other predictors of having a vitamin D test under the new criteria were:

* having had a vitamin D test before the introduction of the new criteria
* visiting a GP more than twice a year (the strongest associations were in women who visited more than 8 times year)

Women who were less likely to have vitamin D testing were current smokers, lived outside a major city or had less than a high school education.

**What next for vitamin D testing?**

The introduction of the new criteria has not led to sustained declines in testing. The majority of women (56%) in the ALSWH 1946-51 cohort had at least one vitamin D test after the introduction of the new criteria. However, in the Australian population the prevalence of moderate and severe vitamin D deficiency is only 6% and 1% respectively.

The Royal College of Pathologists of Australia (RCPA) supports testing individuals at risk, and recommends testing to check the efficacy of supplementation. Because results can be affected by the season, they suggest testing is most appropriate at the end of winter. Both the RCPA and the Royal Australian College of General Practitioners recommend against routine screening if there are no symptoms present.

High testing rates and repeated testing indicate women are either being routinely tested as part of a suite of regular blood tests, or a small proportion may be being monitored after starting vitamin D supplements. Testing of women living at latitudes with less sun exposure and in women who have had bone density testing suggests that some targeted testing is occurring in women with a higher risk of vitamin D deficiency.

However, it is clear from this study that some level of over-testing for vitamin D deficiency in Australian women is still occurring and other interventions will be necessary to reduce over-testing.

[Wilson LF, Xu Z, Mishra GD, Dobson AJ, Doust J. Did changes to recommended testing criteria affect the rate of vitamin D testing among Australian women. Arch Osteoporos. 2020 Oct 16; 15(1):162.](https://link.springer.com/article/10.1007/s11657-020-00840-2%20)

# ALSWH Policy Symposium

The ALSWH 2021 symposium for the Department of Health was again conducted virtually. Registration was open to a range of stakeholders from the Department of Health, other Government sectors and related agencies, and just under 350 people attended lunchtime sessions scheduled across the week 29 November – 3 December. During the symposium updates were provided on progress of the current ‘refresh’ of the 1989-95 and 1973-78 cohorts with women with North-Eastern, South-Eastern and Southern Asian ancestry, and on establishment of a Secure E-Research Platform to access data. Findings from current research were also presented - topics covered were:

*Risk factors for health and wellbeing in mid life*

* **Following the experiences over 20 years of women in the 1973-78 cohort (from ages 18-23 to 40-45) and women in the 1946-51 cohort (from ages 45-50 to 68-73)** (Prof Annette Dobson)

*Endometriosis and IVF*

* **Prevalence and incidence, and employment after diagnosis of endometriosis** (Prof Gita Mishra)
* **BMI and timing of diagnosis** (Prof Gita Mishra)
* **Timing of diagnosis and IVF outcomes** (Dr Katrina Moss)

*Mental health, COVID-19 vaccine hesitancy*

* **Overview of postpartum depression research** (A/Prof Leigh Tooth)
* **Women’s mental health during 2020** (Prof Deborah Loxton)
* **COVID-19 vaccine uptake and hesitancy: Results from COVID-19 Survey 15 (September 2021)** (Prof Deborah Loxton and Peta Forder)

*Violence against women*

* **Update on current research** (Prof Deborah Loxton)
* **Sexual violence over the life course (Study funded by Australia’s National Research Organisation for Women’s Safety)** (Prof Deb Loxton)
* **Women’s safety during 2020: Results from COVID-19 surveys during 2020** (Peta Forder)

*Healthy ageing and longevity to 100 years*

* **Getting to 100 – an overview of the cohort born 1921-26** (Prof Julie Byles)
* **Prospects for health ageing in the 1946-51 cohort** (Prof Julie Byles)
* **ALSWH and the decade of healthy ageing** (Prof Julie Byles)

Videos of the symposium presentations are available on the ALSWH YouTube channel:[**https://www.youtube.com/user/ALSWHinfo**](https://www.youtube.com/user/ALSWHinfo)

# New projects in 2021

ALSWH data is available for use by approved researchers. Forty-three collaborative projects using ALSWH data were approved in 2021 – the titles, lead collaborators, and synopses of the new projects are listed here.

**A1216: Changes in use of MBS subsidised services during the COVID-19 pandemic**

* Prof Julie Byles - Centre for Women’s Health Research, The University of Newcastle

The COVID-19 pandemic led to the introduction of several new telehealth items to the MBS to facilitate safe contact between health practitioners and patients. These items do not cover all services, as many services require face to face contact. This project will compare use of General Practitioner (GP), Specialist, Allied Health, Midwife, Mental Health and Telehealth services through the MBS before and during the COVID-19 pandemic to examine the change in service use during the pandemic.

**A1204: Women’s drinking during the COVID-19 crisis: Predictors of increased and heavy episodic alcohol consumption and women’s narratives around drinking**

* A/Prof Penny Bukyx - The University of Newcastle

This study aims to undertake a detailed exploration of the factors associated with increased alcohol consumption and hazardous alcohol consumption among Australian women during the pandemic.  Data will be drawn from the ALSWH longitudinal data set and supplementary ‘COVID-19’ rapid surveys. Regression analyses will explore the relationship between demographic characteristics, previously (i.e., pre-COVID-19) self-reported level of alcohol use, work and parenting responsibilities, and mental health on the one hand and increased and/or hazardous alcohol use during the pandemic on the other. Participants will be the approximately 7000 women who completed the supplementary COVID-19 Survey 6 regarding alcohol consumption in July 2020. Qualitative comments collected via this survey will also be thematically analysed for further insights into women's experience of alcohol consumption during the pandemic.

**A1226: Australian women’s mental health and wellbeing in the context of the COVID-19 pandemic**

* Prof Deb Loxton - Centre for Women’s Health Research, The University of Newcastle

The COVID-19 pandemic has had a noticeable impact on mental health and mental health services, with uptake showing an increase of 14.5% from 2019 to 2020. Crisis line contacts were also 15% higher during 2020, compared to 20191. ALSWH reported high levels of general stress and psychological distress among women in their twenties and forties during 2020. The purpose of the current research is to highlight the impact of COVID-19 and policies designed to control COVID-19 on the mental health of women from across Australia, including the impact of economic factors such as poverty and employment. The report to the Mental Health Commission will profile those who were most at risk of experiencing mental health problems during 2020, by taking account of previous mental health, sociodemographic status, caring responsibilities and a history of abuse prior to the pandemic. The report will also identify the burdens experienced, and coping strategies used by women during 2020, and establish the impact of the pandemic on women’s safety.

**A1262: The impact of COVID-19 on the food consumption of women in Australia**

* Tara Tolhurst - The University of Newcastle

This study investigates the impact of the COVID-19 pandemic on the food consumption of women across the cohorts of the ALSWH through a qualitative study. Thematic data analysis will be conducted to understand the experiences of women and the underlying reasons for changes in food consumption in response to the COVID-19 pandemic. The analysis will be contextualised by provided quantitative descriptive statistics on food consumption in the COVID-19 pandemic.

**A1215: A life-course approach to infertility and mental health**

* Dr Tazeen Majeed - School of Medicine and Public Health, The University of Newcastle

Infertility is a major problem affecting millions of people globally. It is estimated that in Australia, 1 in 6 couples are unable to conceive. This can cause a number of short term and long-term health problems, with mental health issues having the potential to impact women over their life course. Using the ALSWH, this study will establish how infertility and related socioeconomic and other associated factors can impact the mental health of women, which may have the potential to affect the women over their life course.

**A1227: Cardiovascular risk and metabolic health screening in women with polycystic ovary syndrome**

* Jillian (Chau Thien) Tay - Monash University

PCOS is a complex hormonal disorder common affecting one in five women and one in four Australian Indigenous women. PCOS is known to be associated with risk factors for heart disease such as diabetes, high blood pressure and high cholesterol levels. In this project, we will compare the prevalence of risk factors for heart disease and the prevalence of screening for diabetes, blood pressure and cholesterol in women with and without PCOS.

**A1252: Evaluating the impact of the 2018 PCOS guidelines**

* Jillian (Chau Thien) Tay - Monash University

PCOS is a complex hormonal disorder affecting one in five women and one in four Australian Indigenous women. It is associated with many long-term health complications including infertility, diabetes, hypertension, high cholesterol and poor mental health. The 2018 international evidence-based PCOS guidelines recommend regular screening for metabolic and mental health complications in women with PCOS. We will evaluate the impact of the PCOS guidelines by examining changes in clinical screening of PCOS complications. Findings will help guide future translation of guidelines into clinical practice.

**A1229: Use of ART by women with endometriosis**

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

ART includes IUI and IVF. It is the primary treatment option for women with endometriosis who experience infertility. However, information on differences in the use of ART by women with and without endometriosis is scarce. This research will address this gap.

**A1233: The use of assisted reproduction in women with polycystic ovary syndrome**

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

Approximately 70% of women with PCOS can experience difficulty trying to conceive. This can be due to increased hormone levels, higher weight, and irregularities in or absence of ovulation. This research will investigate the range of strategies (use of complementary and alternative medicine (CAM), ovulation induction, IUI and IVF) used by Australian women with PCOS while trying to conceive.

**A1240: Contraception use by Australian women**

* A/Prof Leigh Tooth - Centre for Longitudinal and Life Course Research, The University of Queensland

There are limited Australian data on the use of contraception by women, their choice of contraceptive methods, patterns of use of contraceptive methods over various reproductive life stages and following reproductive events such as having a child or miscarriage. There is a lack of information on the socioeconomic, demographic and health characteristics of women in Australia who use different contraceptive methods. Reliable and up-to-date data on how the choice and use of contraception varies over the course of reproductive life, as well as the socio-economic determinants, are important to help inform government policies and strategies.

**A799A: Pregnancy planning and risk of adverse pregnancy and birth outcomes**

* Dr Danielle Schoenaker - University of Southampton

Preconception care addresses health and lifestyle behaviours of women prior to pregnancy, and is increasingly recognised as an essential health service to achieve healthy outcomes for women and their children. While previous studies have shown that better health and lifestyle prior to pregnancy are associated with better health outcomes during and after pregnancy, there remain gaps in our knowledge on the benefits and implementation of preconception care. To better inform the design of future preconception interventions, this study aims to examine the proportion of women planning a pregnancy, their preconception health and lifestyle behaviours, and the relationships of these with subsequent pregnancy and birth outcomes.

**A038C: Relationship between BMI, diet quality, physical activity and health service utilisation: An updated analysis**

* Prof Clare Collins - The University of Newcastle

Are better quality diets associated with lower healthcare costs over time? Are improvements in diet quality over time associated with lower healthcare costs? Does diet quality, including fruit and vegetable consumption, change over time? And what are the characteristics of women with different dietary trajectories over time? The aim of this study is to examine whether i) higher baseline diet quality and fruit and vegetable consumption, as measured by the Australian Recommended Food Score and Fruit and Vegetable Variety Index, and ii) change in these diet quality indices over time, are associated with lower 20-year cumulative health care costs within the 1946-51 cohort of the ALSWH. A further aim is to investigate changes in diet quality and fruit and vegetable consumption over time and characteristics of women with different dietary trajectories, using three timepoints of dietary data.

**A1223: Dietary patterns and infertility problems**

* Jessica Greiger - The University of Adelaide

Infertility affects around one in 6 couples, and is associated with significant emotional, social and health burden. There are a number of studies demonstrating certain foods or nutrients may associate with infertility, but there is still no conclusive guidance on the best types of  
foods to support fertility. Moreover, assessment of dietary patterns, as a holistic approach, has been rarely assessed in relation to fertility. This study will investigate dietary patterns and the association with reproductive health parameters.

**A1241: Diet and sleep problems in a sample of Australian older women**

* Dr Saman Khalesi - Central Queensland University

Almost half of Australian adults do not get adequate sleep, with the frequency of sleep-related problems increasing with age. Poor sleep can influence functioning and may increase the long-term risk of developing chronic disease. Diet may influence sleep; for example, carbohydrate and tryptophan-rich foods (e.g., milk) can improve sleep, while high-fat foods, alcohol and caffeine may disrupt sleep. However, dietary habits and sleep can be influenced by age-related physiological and psychosocial changes, stress and physical  
inactivity. This study will explore the link between dietary intakes of older Australian women and sleep with consideration for other confounding factors.

**A1257: The impact of Mediterranean diet adherence on medicines use pattern**

* Dr Imaina Widago - Quality Use of Medicines and Pharmacy Research Centre, University of South Australia

Mediterranean diet (MedDiet) is a plant-based dietary pattern high in fruit, vegetables, legumes, wholegrains  nuts, seeds and fish, with olive oil being the main fat source. Being predominately plant-based, the MedDiet is low in saturated fat, and rich in several antioxidants. Adherence to a MedDiet has been shown to be associated with beneficial cardiometabolic and cognitive health outcomes and promotes healthy ageing. However, there is limited knowledge on the benefit of a MedDiet on reducing medicine use. Therefore, this project will explore the relationship between adherence to a MedDiet and patterns of medicine use among the Australian population.

**A829A: Relationship between diet quality index and incident non-communicable diseases (NCDs): 1973-78 cohort**

* A/Prof Alexis Hure - College of Health, Medicine and Wellbeing, The University of Newcastle

Unhealthy diet has been identified as a major modifiable risk factor for prevention of NCDs. Diet quality, measuring a range of foods, food groups, and/or nutrients, has been widely applied in studies relating NCD mortality. Limited work currently exists regarding the investigation of unhealthy diet and multimorbidity, defined as the presence of two or more chronic medical conditions. Given that NCD mortality and multimorbidity increase with age, especially among women, this program of work aims to understand the association between diet quality and NCD mortality and morbidity among ALSWH cohorts.

**A830A: Longitudinal model building for diet quality and incident NCDs: 1973-78 cohort**

* A/Prof Alexis Hure - College of Health, Medicine and Wellbeing, The University of Newcastle

For investigating diet-disease associations, overall diet quality, measuring a range of foods, food groups, and/or nutrients has been adopted and widely applied in measuring NCD mortality risk. Exploration of the relationship between diet quality and NCD multimorbidity which is simultaneous presence of two or more chronic medical conditions is scare. Since NCD mortality and multimorbidity are more prevalent in women, this work aims to recognize how diet quality is associated with NCDs (each disease, multimorbidity) and mortality among the ALSWH 1973-78 cohort.

**A505B: Dietary iron and haem iron intakes among women of reproductive age from the ALSWH**

* A/Prof Alexis Hure - College of Health, Medicine and Wellbeing, The University of Newcastle

Iron is an essential transitional metal and micronutrient; however, deficient and excess levels are associated with adverse outcomes. During pregnancy iron deficiency is associated with preterm birth and low birth weight and elevated iron stores with increased risk of gestational diabetes and preeclampsia. This record-linkage study uses a longitudinal survey to assess low and high levels of dietary iron and haem iron intakes and risk of adverse pregnancy and birth outcomes. We will examine dietary intakes from the 1973-78 ALSWH cohort in 2003 and 2009 and obstetric data from the ALSWH surveys and linked Perinatal Data Collection and Admitted Patients Data Collection (APDC) in New South Wales, Queensland, Western Australia, and the Australian Capital Territory.

**A856: The association between types of meat consumption and the risk of type 2 diabetes: A federated meta-analysis in the InterConnect project**

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

The habitual consumption of red and processed meat may elevate the risk of type 2 diabetes (T2D). However, research evidence to-date has been highly heterogenous, reflecting a variation in dietary habits related to meat consumption and T2D risk. Existing evidence is predominantly from North America and Europe, with little information from Australia, or other areas. Moreover, evidence for poultry intake remains sparse. To better understand the potential link between meat consumption and T2D by geographical regions, the inclusion of the ALSWH study in InterConnect, an international collaboration investigating this topic, is important. InterConnect is aiming to recruit 30 studies worldwide in this meta-analysis project.

**A758A: Carbohydrate restriction and risk of type 2 diabetes in reproductive-aged women with and without a history of gestational diabetes**

* Dr Danielle Schoenaker - University of Southampton

Women diagnosed with gestational diabetes are at increased risk of developing type 2 diabetes immediately after pregnancy. In the general population, type 2 diabetes risk can be influenced by dietary intake. Among women with and without a history of gestational diabetes who participated in the 1946-51 cohort, we found that women who restricted their intake of carbohydrates the most, were at higher risk of developing type 2 diabetes during mid-life. As a follow-up of this study, the current project aims to examine if a diet low in carbohydrates is associated with development of type 2 diabetes in women in the 1973-78 cohort with and without a history of gestational diabetes, to confirm if our previous findings can be extrapolated to development of type 2 diabetes during the reproductive years.

**A1222: Exploring the experience of living with diabetes in Australian women: A qualitative exploration**

* Dr Jennifer White - The University of Newcastle

The purpose of this study is to explore the experience of living with diabetes in women participating in the ALSWH.

**A1235: Trajectories of physical activity, falls and consequences of falls from middle age to older age**

* Wing Kwok - The University of Sydney

The prevalence of falls increases from mid-life to older adulthood. The relationship between ongoing physical activity and sitting spent in middle age and subsequent falls and consequences of falls is not clear. This study aims to examine the relationship between 1) physical activity, 2) sitting time, 3) sitting time by different level of physical activity with subsequent falls, and describe patterns of physical activity level from middle age to older age and the association with 1) self-reported falls and injurious falls 2) falls events involving care in emergency departments and hospitals 3) consequences and 4) health care utilisation including costs.

**A1242: Lifestyle trajectories and risk of dementia**

* Sara Dingle- Deakin University

Several modifiable lifestyle behaviours (e.g., diet, physical activity, alcohol consumption, smoking and social interaction) have been shown to influence dementia risk, but limited research has taken into consideration the clustering of these risk behaviours in this association. The purpose of this study is to apply advanced statistical modelling to consider potential clustering effects and examine how lifestyle trajectories impact on risk of dementia.

**A1244: The uptake of MBS and PBS funded precision medicine in Australia**

* Dr Marcin Sowa - The University of Queensland

Our study aims to explore the timelines and patterns of uptake of precision medicine after it becomes publicly funded on Medicare. There are reasons to believe that utilisation of genetic services and precision treatments might initially be concentrated in groups of the Australian population. We are particularly interested in exploring how long such differences persist, and whether a balanced uptake of precision medicine following its adoption by Medicare is becoming faster over time. The outcomes of this study will have implications for the assessment of Medicare achieving the goals of a timely and equitable access of current health care.

**A1254: Exploring the experience of utilization rates of cardioprotective medications in Australian women with a history of cancer**

* Aaron Sverdlov - The University of Newcastle

Modern cancer therapies improve survival rates for many cancers. CVD rates and risk factors increase in cancer patients and survivors compared with the general population. CVD emerged as a leading cause of long-term morbidity and mortality  
in this population. A cross-sectional-observational study of 333 admissions to John Hunter Hospital cardiology unit between July 2018-January 2019 identified cardioprotective therapies, especially statins and antiplatelet agents, were underutilized in patients with cancer  
history compared with patients without cancer and comparable cardiovascular  
risk factors. This study will explore the experience of use of cardioprotective medications in women with cancer histories compared to those with none on a larger, more representative scale.

**A1256: Life events, mental wellbeing and healthcare utilisation**

* Dr Danusha Jayawardana - The University of Queensland

Major life events have been shown to have significant impacts on people’s wellbeing. However, whether life events in turn affect healthcare use is a question that is unexplored. The aim of this project is two-fold.  First, this study will examine the effect of life events on mental wellbeing of women. Second, the study will explore whether the occurrence of life events lead to a significant change in healthcare resource use.

**A1258: Implications of chronic disease for elderly contributions to market and productive non-market activities**

* Marie Ishida - Nossal Institute for Global Health, University of Melbourne

Recent estimates suggest that unpaid work accounts for about 10% to 40% of gross domestic product in Organisation for Economic Co-operation and Development countries, including significant contributions by the elderly. A recognition of the value of unpaid services provided to society by the elderly also implies that policy evaluations of interventions should extend assessments to go beyond traditional indicators to include implications for non-market activities. In the context of interventions to improve health, this would mean extending measures of cost-effectiveness or cost-benefit ratios to go beyond traditional approaches that focus on outcomes such as beneficiaries’ quality of life, or  
their paid work contributions. The proposed work will shed light on this subject by exploring the potential consequences of chronic conditions for the economic value of elderly contributions in Australia and selected Asian countries – as workers and as providers of unpaid services, or productive non-market activities.

**A1260: Effectiveness of Better Access psychological treatment services among Australian women: A stratified analysis using predicted symptom trajectories**

* A/Prof Meredith Harris - The University of Queensland

Since 2006, the Better Access program has aimed to increase the number of Australians accessing evidence-based psychological treatment though reimbursement of eligible providers under the MBS. This study aims to investigate: (1) patterns of service utilisation and characteristics of women who have used Better Access psychological treatment services, and whether these have changed over the 15-years since the program was introduced, and (2) whether mental health outcomes differ between women who have and have not used these services, according to their level of need.

**A1266: Testing a methodological approach for measuring agreement across data sources and trends in the incidence and methods of induced abortion by characteristics of young women in Australia using self-report and linked administrative health data**

* Dr Kristina Edvardsson - La Trobe University

Induced abortion is a common reproductive experience for women in Australia and is recognised as an essential service. Presently abortion data for public health planning and  
assessment is limited. We utilise self-reported abortion data from six waves of the ALSWH’s new young cohort (2013-2019) and its linkages with the MBS, PBS and the National Morbidity Hospital Database to: (1) evaluate levels of agreement between self-report and administrative data, and (2) test a measurement approach for ascertainment of abortion method, time trends in method distribution and characteristics associated with method type among this sample of young women.

**A1268: Text mining on qualitative ALSWH data**

* Dr Jananie William - Australian National University

Qualitative data collected through ALSWH surveys have been found to contain valuable  
information but it is difficult to access these data quickly and easily. This project will investigate automated text-mining, and specifically, the use of statistical learning techniques to better utilise ALSWH qualitative data. We will explore different types of statistical learning algorithms and assess them for both accuracy and automation within the context of the longitudinal survey data. We aim to select a number of methods that produce the best results in terms of accuracy and automation when it comes to interpreting the qualitative  
longitudinal data.

**A1269: Coding of senility and old age in hospital data and death records**

* Prof Julie Byles - Centre for Women’s Health Research, The University of Newcastle

There is global debate concerning the appropriateness of the introduction of codes in the International Classification of Diseases 11th Revision in which old age is classified under general symptoms and a new extension code for age related disease. Use of such codes is supported by some who view ageing as a preventable/reversible pathological process, while others are concerned that these codes may lead to ageism in the determination of health needs and allocation of healthcare. This project will investigate how the existing codes have been applied in relation to hospital admission and cause of death, and under what circumstances.

**A797A: Chronic Conditions from Multiple Sources (CCMS): Production and update of CCMS datasets and data dictionary**

* Prof Annette Dobson, Centre for Longitudinal and Life Course Research, The University of Queensland

The Study’s 2020 Major Report examined the prevalence and incidence of common chronic conditions among ALSWH cohorts. The methodology for the ascertainment of the conditions which was developed for that report used all available data sources (ALSWH surveys and administrative data, and external linked data). This methodological work forms the basis for the production of the CCMS datasets.

**A1261: Major Report 2022: A focus on health and well-being for women in mid-life**

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

This report for 2022 aims to primarily use longitudinal data collected from women in the ALSWH to assess factors affecting women’s health in mid-life. While data from all cohorts will be presented as an initial overview, data from the 1946-51 and 1973-78 cohorts will be primarily used to show what the middle years have been like for women born in the post-war baby boom, and what they might be like for next generation who are now entering mid-life.

**A1264: The accumulation of violence and multidimensional disadvantage in the lives of young Australian women**

* Dr Alice Campbell Life – Life Course Centre & Institute for Social Science Research, The University of Queensland

Gendered violence is a source of disadvantage in the lives of women and a key contributor to gender inequality in contemporary Australia. According to the Australian Bureau of Statistics, girls are more likely than boys to be abused before the age of 15 (16% vs 11%), and women are almost four times as likely as men to have been the victim of sexual violence since the age of 15 (18% vs 5%). The aim of this project is to document how violence accumulates in the lives of Australian women from childhood to young adulthood, and how this violence contributes to women's multidimensional disadvantage.

**A1211: Costs of domestic and family violence: An international comparisons study**

* Prof Deb Loxton - Centre for Women’s Health Research, The University of Newcastle

Abuse and violence across a lifetime impacts health, which influences the need for individual and societal resources. However, it is not well established if the impact of lifetime violence and abuse are comparable between countries with similar resources. This analysis will investigate commonalities and differences between Australian and United Kingdom cohorts with respect to the impact of exposure to abuse and violence on life outcomes, using ALSWH and the Avon Longitudinal Study of Parents and Children (ALSPAC). This project will also investigate the feasibility of extrapolating the outcomes from the ALSPAC cohort in terms of lifetime costs using ALSWH data.

**A1280: Socio-demographic characteristics, quality of life, and health-related behaviours of childless women from young adulthood to middle age**

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

Childlessness, either by choice (voluntarily childless) or as a consequence of biological or other constraints (involuntarily childless), is increasing in high-income countries and contributes to the fertility decline. The increase in childlessness indicates the importance of exploring the consequences of this social change. Previous studies mainly used cross-sectional designs and focused on mental health among older women with fertility issues. In the current research, ALSWH (1973-78) cohort data will be used to understand the socio-demographic characteristics, quality of life, and health-related behaviours of women in the childless group, from young adulthood to middle age.

**A331B: Emerging adulthood, life transitions, and wellbeing**

* Prof Christina Lee - The University of Queensland

The transitions from adolescence to adulthood are more protracted and complex today than for previous generations. Young people spend longer in education and training, and the traditional transitions of early adulthood – leaving the family home, adult employment, marriage/relationship, and parenthood – tend to occur later, in a range of sequences, or indeed not at all. This project uses the longitudinal strengths of the ALSWH to describe the transitions and sequences of the 1973-1978 cohort over Surveys 1 to 8, and the relationships between different patterns of transition and several measures of psychological well-being. It also includes analyses of health behaviours, physical health, and health service use.

**A1282: Longitudinal analysis of the relationship between social health and health care utilization among older women from culturally and linguistically diverse communities**

* A/Prof Melody Ding, The University of Sydney

Previous studies have reported associations between social health and health care utilization. However, these associations were not consistent. The current study will examine the association between social support, loneliness and health care utilization. This study will also examine differences between women from culturally and linguistically diverse communities. The findings of this study will contribute the understanding of the long-term effect of loneliness and social support on health care utilization. It will provide knowledge that is necessary to improve the screening and treatment of older women in the health care system and to prevent unnecessary health care use.

**A1283: Resilience after surgery in older women**

* Dr Geeske Peeters - Radboud University Medical Centre, The Netherlands

Resilience is the individual’s ability to recover from a stressor, e.g., an illness or surgery. Resilience tends to be lower in older, frailer individuals with multiple diseases. Insufficient ability to recover from treatment is a contra-indicator for treatment. To date, physical resilience has mainly been investigated in small patient groups in clinical settings. Little  
is known about the public health impact of poor physical resilience. The aim of this body of work is to examine physical resilience from a public health perspective. We will examine the definition and prevalence of poor physical resilience in older women.

**A414B: InterLACE: International collaboration for a life course approach to reproductive health and chronic disease events**

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

InterLACE provides a unique opportunity to conduct world-leading research in collaboration with key national and international investigators on women’s health studies from 11 nations. We will undertake cross-cohort research by combining data at the individual level from more than 800 000 participants in 26 existing longitudinal studies (including ALSWH young & mid-age cohorts) to investigate the role of reproductive health across life on subsequent chronic diseases, especially CVD events and type 2 diabetes mellitus. While this poses cross-cohort and cross-cultural research challenges, InterLACE has the capability to address research questions and generate robust evidence that is not possible from any single cohort study.

**A822B: The association between maternal and childhood Nitrogen Dioxide and fine particulate matter exposure and health and development of Australian children**

* Salma Mohamed Ahmed - School of Public Health, The University of Queensland

In 2016/2017, mothers from the 1973-78 ALSWH cohort were invited to participate in the Mothers and their Children’s Health (MatCH) study to complete a survey about their children (aged under 13 years). Recently, air pollution exposure estimates (nitrogen dioxide and fine particulate matter) have been linked to geocoded residential addresses of ALSWH participants. Therefore, the purpose of this project is to understand the health impact of decade long air pollution exposures experienced first-hand by mothers on the generation that follows as well as how environment contributes to disease risk in their children.

# Completed Student Projects

**Sexual fluidity amongst Australian women over the life course**

**PhD candidate**: Alice Campbell

**Supervisors**: Dr Francisco Perales and Prof Janeen Baxter

**Institution**: Institute for Social Science Research, The University of Queensland

Sexual minority status is a well-established risk factor for poor health outcomes. However, this evidence is based overwhelmingly on cross-sectional analyses, which fail to account for the potentially dynamic nature of sexual orientation over the life course. New theories have recently been proposed that treat sexual orientation and sexual identity as potentially dynamic phenomena shaped by a person’s social, cultural, political, biographical and interpersonal contexts. Yet, empirical evidence supporting these perspectives remains sparse, with very few analyses of large population samples and virtually no evidence originating outside the United States. This thesis examined how social and historical contexts shape women’s sexual identity trajectories and, in turn, how women’s sexual identity trajectories shape their health and wellbeing outcomes using large-scale, longitudinal survey data from two birth cohorts of Australian women (born 1973-1978 and 1989-1995).

My thesis begins with an overview of the theoretical model that guides my empirical work, which I call my Life Course-Sexual Landscapes model. Next, I introduced the dataset used throughout my thesis and discuss the optimal operationalisation of sexual identity change based on theory and previous evidence. I then tested the quality of my data through a systematic analysis of sexual identity and changes in sexual identity as predictors of longitudinal nonresponse. My results suggest that sexual minority status may be a risk factor for longitudinal nonresponse among older but not younger cohorts of women. Effect sizes were nevertheless small.

In my second empirical chapter, I examined how shifts to the sexual landscape over historical time have shaped women’s sexual identity trajectories. I found that emerging adult women today are less likely than previous generations to identify as exclusively heterosexual, and those who do are more likely to subsequently change to a minority sexual identity. In contrast, emerging adult women today are more likely than their predecessors to report a mainly heterosexual or bisexual identity and to hold that identity stably over time. These differences are not only statistically significant but substantial in size.

In my third empirical chapter, I examined how women’s positions on the sexual landscape relate to their propensities to change their identity in a more or less same-sex-oriented direction. Drawing from my Life Course-Sexual Landscapes model, I hypothesised that women who occupy a position on the sexual landscape characterised by relatively high levels of heteronormativity will have a lower propensity to change their identity in a more same-sex-oriented direction and a higher propensity to change their identity in a less same-sex-oriented direction. I tested my hypothesis using multinomial logistic regression models and found it to be largely supported.

In my fourth and final empirical chapter, I turned my attention to the outcomes of sexual identity change and examined whether young women who change their sexual identity are at an increased risk of experiencing psychological distress. I found no evidence that this is uniformly the case. Rather, associations are heavily dependent on the nature of changes: namely, the direction of changes and women’s locations on the sexual identity continuum. Altogether, my thesis provides evidence on sexual identity change from a novel country context and among the most contemporary cohort of emerging adult women.

My findings suggest that more young women are liable to identify outside the heterosexual norm and to change their sexual identity than ever before. They also suggest that changing to a non-heterosexual identity increases a woman’s risk of experiencing psychological distress. My results affirm my Life Course-Sexual Landscapes model as a useful framework for understanding both the pathways to and outcomes of sexual identity change in women. Importantly, they suggest that we must continue to work at removing the structural barriers that produce disparities by sexual orientation if we are to protect the mental health of young women and realise social justice.

**Health care utilisation and health economics of diabetes among Australian women**

**PhD candidate**: Befikadu Wubishet

**Supervisors**: Dr Melissa Harris, Prof Julie Byles and Danielle Lang

**Institution**: Centre for Women’s Health Research, and School of Medicine and Public Health, The University of Newcastle

**Background:** Diabetes is one of the major chronic diseases posing a huge health and economic burden to patients, families, and health care systems in almost all corners of the world. Mainly due to its association with numerous complications and comorbidities, diabetes negatively affects patients’ health outcomes, such as health-related quality of life (HRQOL), survival, and healthy life expectancy (HLE). Therefore, quantifying the impacts of diabetes based on methods that enable accurate identification of patients has important policy and practice implications.

**Aims:** 1) Demonstrate a robust method of diabetes case ascertainment through simultaneous use of multiple data sources; and 2) assess the impact of diabetes on survival, HLE, and HRQOL.

**Methods:** The participants in this thesis were the 1921–26 and 1946–51 birth cohorts of the ALSWH. ALSWH is a population-based prospective longitudinal study among Australian women that is largely focused on women’s health and its determinants. The data sources used in this thesis were the ALSWH survey data and linked administrative datasets, including the PBS, MBS, APDC, and NDI datasets.

**Results:** The findings revealed that PBS and MBS had a moderate to substantial level of agreement with both the survey and hospital admission data in identifying women with diabetes. This thesis revealed that diabetes is one of the chronic conditions for which the validity and completeness of case ascertainment can be improved through the simultaneous use of multiple data sources. Women with diabetes had shorter survival compared to women without diabetes, but even those women with prevalent diabetes had a median survival of nearly 10 years at ages 76–81 years. Diabetes was associated with reductions in total life expectancy (TLE), HLE, and the proportion of remaining life years spent in good health at all ages after 70 years. Low education, having three or more comorbidities, and obesity were also associated with reductions in TLE and HLE and increased unhealthy life expectancy. Women with diabetes had significant reductions in HRQOL scores over time compared to women without diabetes.

**Conclusions:** The findings of this thesis indicated that the validity and completeness of diabetes case ascertainment can be improved through simultaneous use of multiple data sources. Diabetes had a larger negative impact on women’s HLE than their overall survival. Lower educational status, multimorbidity, and obesity were also negatively associated with women’s health outcomes. These findings suggest a need for interventions aimed at diabetes prevention; and further improvements in the care of women with diabetes to improve their quality of life and promote healthy ageing.

**Electronic cigarette use and cigarette smoking among Australian women**

**PhD candidate**: Alemu Sufa Melka

**Supervisors**: Dr Catherine Chojenta, Prof Deborah Loxton and A/Prof Elizabeth Holliday

**Institution**: Centre for Women’s Health Research and School of Medicine and Public Health, The University of Newcastle

**Background:** E-cigarette use is a globally contentious topic. Most previous studies on e-cigarette use have not examined differences in usage in relation to gender. Findings regarding the association between e-cigarette use and subsequent cigarette smoking initiation and smoking cessation are also inconsistent. In Australia, no studies have investigated the association between e-cigarette use and smoking initiation among young adults who have never smoked. Additionally, few population-based longitudinal studies have investigated the association of e-cigarette use with smoking cessation, either internationally or in Australia. This thesis aimed to identify and investigate the risk and protective factors of e-cigarette use and the role that e-cigarettes play in smoking initiation and cessation in Australian women.

**Methods:** This thesis used online survey data collected from the ALSWH cohort of women who were born between 1989 and 1995. The research was conducted to identify the risk and protective factors of e-cigarette use and the role that e-cigarettes play in smoking initiation and smoking cessation.

**Results:** Young age, smoking status, alcohol use, intimate partner violence and adverse childhood experiences (i.e., traumatic childhood experiences) were identified as factors that positively associated with e-cigarette use in the study population. This thesis discovered that although ever e-cigarette use is associated with subsequent cigarette smoking among never smokers, it also hinders subsequent cigarette smoking cessation among current smokers. Conversely, an umbrella review found that most nicotine and non-nicotine drugs (e.g., nicotine replacement therapy, bupropion and varenicline) are effective treatments for smoking cessation.

**Conclusion:**. Certain efforts are required to prevent young people and non-smokers from nicotine addiction that is acquired through e-cigarette use. Subsequent interventions to curb the use of e-cigarettes among young Australian women should target risk factors such as young people, alcoholics, people with a history of intimate partner violence and people exposed to childhood adversity.

**Women’s experiences of sleep problems and their use of health services and self-care including CAM**

**PhD candidate**: Sophie Meredith

**Supervisors**: Prof David Sibbritt, Prof Jon Adams and Dr Jane Frawley

**Institution**: University Technology Sydney

**Objectives:** There is very limited research describing the levels or types of health service use or self-care for women with sleeping problems and no study to date has provided an overview of the use of all treatment options for sleeping problems among women. The aim of this doctoral study was to illuminate the prevalence and type of health service use —including CAM—and self-care by older women with sleeping problems. It also aimed to investigate the relationship between demographic profile, and characteristics such as age, income, BMI and sleeping problems in older Australian women and explore the interrelationship between chronic illness and sleeping problems in women.

**Method:** The thesis included two stages of research. The first stage utilized data from the ALSWH. Stage 2 analysed data from a sub-study of the 45 and Up Study, the largest ongoing study of healthy ageing in the southern hemisphere. It investigated risk factors for sleeping problems in a cohort of older women aged 50-100.

**Results:** Around one in every two older women have sleeping problems.  Health service use and self-care is increased in women with sleeping problems compared to women without sleeping problems. Women with sleeping problems were more likely to use herbal medicines and more frequently visit a GP than women without sleeping problems.

* Longitudinal analysis from the ALSWH surveys found that sleeping problems were less likely to arise in women aged 62−67 years than when women were aged 56−61 years. Women with sleeping problems were also more likely to be sedentary and less likely to engage in low levels of exercise, moderate exercise or high levels of exercise than women without sleeping problems (p < 0.001). Sleeping problems are also significantly associated with chronic conditions.
* Analysis of a sub-study of the 45 and Up Study showed that 43% of women with comorbid chronic conditions reported sleeping problems. Women were more likely to have a sleeping problem if they reported some difficulties with available income (p < 0.005) or were struggling with available income (p < 0.005). Women were less likely to

have sleeping problems if they were highly physically active (p < 0.005).

**Conclusion:** Health service use and self-care is elevated amongst women with sleeping problems in the form of increased GP consultations and herb use. Medical professionals need to enquire about sleeping problems in older women and their self-care—particularly herb use, to safeguard patient-safety and reduce the risk of adverse drug reactions and herb-drug interactions.

**Multiple health behaviours in cancer survivors: Does a cancer diagnosis provide a teachable moment for health behaviour change?**

**PhD candidate**: Daniel Tollosa

**Supervisors**: Prof Erica James, A/Prof Elizabeth Holliday, A/Prof Alexis Hure and Dr Meredith Tavener

**Institution**: School of Medicine and Public Health, The University of Newcastle

Healthy lifestyle behaviours (not smoking, minimal alcohol consumption, healthy diet, and regular physical activity) and maintaining a healthy weight could reduce various aspects of cancer burden, and thus cancer diagnosis may be a cue for health behaviour change (known as a ‘teachable moment’). However, compelling evidence in support of this hypothesis is limited. This thesis helps fill this gap by presenting evidence about whether a cancer diagnosis is a trigger for adherence to multiple health behaviour recommendations.

Four studies were conducted: one systematic review and meta-analysis summarising evidence regarding adherence to multiple lifestyle recommendations; and three empirical studies (one cross-sectional and two longitudinal) examining whether a cancer diagnosis provides a teachable moment for health behaviour change. The empirical studies utilised data from the 1946-51 cohort (n=13,714 at baseline in 1996) of the ALSWH.

The systematic review and meta-analysis (n=51 included studies, n=2,620,566 participants) found that adherence to health behaviour recommendations among cancer survivors was low (95% CI: 17%, 30%, I2 =99.2%), with relative adherence lower among long-term survivors (95% CI: 14%, 36%, I2 =99.0%) compared to more recently diagnosed survivors (95% CI: 27%, 35%, I2 =83.2%). Similarly, the cross-sectional study (using the 2013 and 2016 [n=2,613, 63-70 years] ALSWH surveys) showed adherence to multiple health lifestyle recommendations was low among female cancer survivors in Australia, although adherence was significantly higher compared to women without a cancer history. The first longitudinal study utilised a repeated cross-sectional design (n=8,340 at baseline, aged 50-55 years), and showed that compared to the period pre- diagnosis, adherence to multiple health behaviour recommendations improved during the period immediately following diagnosis, but these initial improvements were not sustained in the longer term. The second longitudinal study utilised 15 years of follow-up data in women diagnosed with breast cancer (n=153 at baseline, mean age = 52.38 years), and demonstrated disparate results for different health behaviours, with a cancer diagnosis having a greater positive impact on physical activity and fruit intake compared to smoking and alcohol consumption, and no changes in intake of whole vegetables or other nutrient recommendations. Being in a healthy weight range was significantly reduced following diagnosis and continued to decline over the survivorship period.

Overall, this program of work concluded that a cancer diagnosis may offer a teachable moment for improving health behaviours, although there was variation across different behaviours, and the early positive changes are not sustained. There is a need to increase the availability and uptake of multiple health behaviour change interventions for cancer survivors over the survivorship period.

**Pattern of medication use in women with dementia**

**PhD candidate**: Kailash Thapilaya

**Supervisors**: Prof Julie Byles and Dr Melissa Harris

**Institution**: Centre for Women’s Health Research, The University of Newcastle

Dementia is one of the biggest global health challenges of the current generation, due not only to the nature of the disease but also the complexity of managing medications among the population. Incidence of dementia is increasing exponentially, with a higher prevalence among women. This thesis investigated:

* the prevalence of commonly used medications among women with dementia a year before and after a dementia diagnosis
* the implementation of medication reviews for Australian women with dementia, focusing on those living in residential aged-care (RAC)
* polypharmacy prevalence and polypharmacy trajectories over time among older women with and without dementia.

For this research project, survey data from the ALSWH 1921 – 1926 birth cohort were linked with government administrative datasets including the PBS, MBS, aged-care datasets, state-based hospital datasets and the NDI. Advanced analytical techniques, such as Latent Class Analysis, Generalised Estimating Equations, logistic regressions and Group-Based Trajectory Modelling were used to investigate the aims of the thesis.

Findings from the studies revealed that considerable proportions of women utilised psychotropic medications both before and after a dementia diagnosis. Among women with dementia, the use of psychotropic medications was higher for those with frailty and those living in RAC. The annual medication review was more common for women with dementia in general—and among those living in RAC in particular—when compared to women without dementia and those not living in RAC; however, the incidence of medication review was modest, indicating limited uptake of medication review services funded under the MBS. The findings also showed that more than 50% of women in the cohort were experiencing polypharmacy consistently for a long time. Women with dementia and comorbidities—and those living in RAC—demonstrated a higher likelihood of experiencing polypharmacy.

Non-pharmacological alternative approaches must be effectively implemented to lower the use of psychotropic and polypharmacy among the older population. It is also crucial to increase medication review services, especially among the vulnerable older population to ensure optimal use of medication and reduced drug-related problems.

**Assessment of incidence and predictors of hypertension in pregnancy in women with PCOS**

**PhD candidate**: Mahnaz Bahri Khomami

**Supervisors**: A/Prof Lisa Moran, Dr Anju Joham and Prof Helena Teede

**Institution**: Monash Centre for Health Research and Implementation, Monash University

PCOS, with a prevalence of 5-13%, is a common endocrine disorder in reproductive-aged women. PCOS is associated with a range of metabolic, reproductive and psychological features, underpinned by insulin resistance and hyperandrogenism. Obesity is prevalent in PCOS and can exacerbate PCOS clinical features. There is also growing evidence reporting that the rates of pregnancy complications are higher in women with PCOS compared to women without PCOS. However, heterogeneity in study methods and populations in this area contributes to a lack of clarity on the association of PCOS per se with observed higher risk of pregnancy and birth outcomes.

This thesis focused on the association of PCOS with pregnancy and birth outcomes after consideration of potential risk factors and confounders.

Chapter 1 comprised a comprehensive narrative review discussing PCOS and its common features and how these relate to increased risk of adverse pregnancy and birth outcomes, followed by current management strategies. Knowledge gaps on the association of PCOS with pregnancy and birth outcomes were also highlighted.

Chapter 2 comprised two systematic reviews, meta-analyses and meta-regressions on maternal and infant pregnancy and birth outcomes in women with and without PCOS. Women with PCOS had higher pre-conception BMI and gestational weight gain. In women with PCOS, the rates of miscarriage, gestational diabetes (GDM), gestational hypertension (GH), preeclampsia (PE), induction of labour and caesarean section were higher. Infants born to mothers with PCOS had higher rates of preterm birth (PTB) and large for gestational age (LGA). The association of PCOS with maternal outcomes differed by PCOS phenotype, study location and obesity, but was no longer significant after adjusting for in vitro fertilization pregnancies. The association of PCOS with infant outcomes varied by PCOS phenotype and study location and was no longer observed in BMI-matched studies.

Chapter 3 comprised two original research manuscripts. The first of these assessed the longitudinal association of PCOS status with incidence and recurrence of hypertensive disorders in pregnancy (HDP). While the crude rate of HDP was higher in women with PCOS, there was no association between PCOS and HDP incidence after adjusting for known confounders. Following this, the association of PCOS with pregnancy and birth outcomes in low risk women with and without PCOS was explored. Outcomes of interest included GDM, GH, PE, PTB, small for gestational age and LGA. Findings demonstrated that where women enter into pregnancy with similar health status, women with PCOS had lower risk for LGA babies.

The research within this thesis addresses knowledge gaps on the impact of PCOS status *per se* on pregnancy and birth outcomes. This thesis provides new insights into the potential pathways resulting in increased rate of adverse pregnancy and birth outcomes in PCOS. Given the heterogeneity in current literature, future studies should focus on women with well-defined PCOS status and homogenous risk profile with regards to individual pregnancy outcomes for more conclusive results.

**Associations between eating disorders in mothers and children’s diet and weight**

**Masters candidate**: Dr Caley Tapp

**Supervisor**: A/Prof Leigh Tooth

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

**Background:** Maternal eating disorder (ED) has been found to impact on the feeding behaviours of young children, as well as their temperament. Less is known about how maternal eating disorder is associated with behavioural problems in older children.

**Objective:** To investigate whether maternal ED-linked symptoms are associated with behaviour problems in older children, and whether this association differs by child sex.

**Method:** Data on mother’s (N = 2243) ED-linked symptoms were collected in 1996 as part of the ALSWH, a prospective longitudinal epidemiological study. Data on children (N = 3830, 5-12 years) were collected in 2016/17 as part of the MatCH study. Six maternal ED exposures were categorised using questions originally designed to map to Diagnostic and Statistical Manual of Mental Disorders, 4th Edition bulimia nervosa diagnostic criteria. Child outcomes were maternal-rated behaviour problems and prosocial behaviour, both measured using the Strengths and Difficulties Questionnaire.

**Results:** Female children of mothers with ED-linked symptoms had poorer prosocial behaviour, compared to healthy controls. This association was weaker for male children. Maternal ED-linked symptoms were associated with higher total behavioural difficulties. For male children, a higher number of problem behaviours was associated with maternal binge eating, while for female children, more behavioural difficulties were observed for mothers who reported overeating behaviours. The size of the effect of maternal ED-linked symptoms was attenuated by adjustment for maternal depression, while other potential confounds had little impact.

**Discussion:** Historical maternal ED-linked symptoms are associated with higher number of behavioural difficulties in older male and female children. Lower levels of prosocial behaviours for female children of mothers with ED-linked symptoms were also found.

**Lifestyle and health in Australia: A study on the relationship between lifestyle practices and self-assessed health**

**Masters candidate**: Yufan Wang

**Supervisors**: Dr Marcin Sowa and A/Prof Jeffrey Kline

**Institution**: School of Economics The University of Queensland

There are still unanswered questions on the relationship between various lifestyle practices and self-assessed health (SAH). This study investigated associations using two waves of survey data from the ALSWH. By adopting the health production function framework, we deemed lifestyles as a non-market inputs into the production function that augment the overall utilities of women. We hypothesized that all Alameda Seven lifestyle practices would increase the probability of women being in a higher SAH category as a result of increase in utilities. The two waves of survey data are from two consecutive generations of women born either between 1973-1978 or 1946-1951. By using an ordinal probit model, we empirically tested the hypothesis and examined inter-generational effects between these two cohorts of women. Initially, we first hypothesized good lifestyle practices are associated with individuals being in a higher SAH category. Secondly, we hypothesized that women from the younger generation (1973-1978 cohort) have greater chances of being in a higher SAH category compared to women from the older cohort (1946-1951) when performing similar lifestyle practice. Our empirical results supported our initial hypothesis that only two lifestyle practices - Snacking Habit and Eating Pattern from Alameda Seven - are not associated with better SAH outcomes. The remaining lifestyles (Exercise, maintaining healthy weight, no-smoking, moderate alcohol consumption, adequate sleeping and minimal stress level) are all associated with having greater chances of being in a higher SAH category. Moreover, the younger generation women seem to have lower chances of being in a better SAH category compared to older women when engaging in similar lifestyle behaviours - which contradicts our second hypothesis.

# Study Management Committee

## Professor Julie Byles

*BMed, PhD*  
Director, ALSWH  
Research Centre for Women’s Health, The University of Newcastle

## Professor Gita Mishra

*BSc, MSc, PhD*Director, ALSWHCentre for Longitudinal and Life Course Research, The University of Queensland

## Associate Professor Leigh Tooth

*BOccThy (Hons), PhD*Deputy Director, ALSWHCentre for Longitudinal and Life Course Research, The University of Queensland

## Professor Deborah Loxton

*B Psych (Hons), Dip Mgt, PhD*Deputy Director, ALSWHResearch Centre for Women’s Health, The University of Newcastle

# Collaborators and Investigators

This list includes collaborators (excluding students) from all currently active projects using ALSWH data. For further information, please [visit the ALSWH website](http://www.alswh.org.au/substudies-and-analyses/analyses).

A/Prof Julia Lowe

Sunnybrook Health Sciences Centre

A/Prof Ruth McNair

Dept of General Practice, University of Melbourne

Prof Angela Taft

School of Nursing and Midwifery, La Trobe University

Dr Samantha Hollingworth

School of Pharmacy, The University of Queensland

Prof Jane Fisher

School of Public Health and Preventive Medicine, Monash University

Dr Robert Ware

School of Public Health, University of Queensland

A/Prof Prof. Lynette MacKenzie

Faculty of Health Sciences, The University of Sydney

Prof Catherine D'Este

National Centre for Epidemiology and Population Health (NCEPH), The Australian National University

Prof Manohar Garg

School of Biomedical Sciences & Pharmacy, University of Newcastle

Dr Nicola Burton

School of Applied Psychology, Griffith University

A/Prof Deborah Bateson

Family Planning NSW

Dr Kristiann (Kristi) Heesch

School of Public Health, Queensland University of Technology

Kim Colyvas

School of Mathematical & Physical Sciences, University of Newcastle

A/Prof Timothy Dobbins

National Drug and Alcohol Research Centre, University of New South Wales

A/Prof Elizabeth Savage

Centre for Health Economics Research and Evaluation, University of Technology Sydney

A/Prof Jannique Van Uffelen

Department of Kinesiology, University of Leuven

Dr Sabrina Pit

Northern Rivers University Department of Rural Health, The University of Sydney

Prof Tonda Hughes

College of Nursing, University of Illinois

Dr Sam Brilleman

Monash University

Karly Cini

Murdoch Children's Research Institute

A/Prof Alison Ferguson

School of Humanities & Social Sciences, University of Newcastle

Prof Hugh Craig

School of Humanities & Social Sciences, University of Newcastle

Prof John Attia

School of Medicine and Public Health, The University of Newcastle

Prof Marie-Paule Austin

Perinatal and Women's Mental Health, University of New South Wales

Prof Jeanette Milgrom

School of Behavioural Sciences, The University of Melbourne

Yolanda Van Gellecum

Institute for Social Science Research, The University of Queensland

Dr Amie Steel

Health Services Research, University of Technology Sydney

Prof Sallie Pearson

University of New South Wales

Prof Nicholas Talley

Faculty of Health, The University of Newcastle

Prof Steve Kisely

Centre for Health Data Services, The University of Queensland

Dr Amani Hamad Alhazmi

King Khalid University

Dr Lisa Wood

Centre for Asthma and Respiratory Disease, The University of Newcastle

A/Prof Dianna Magliano

Baker IDI Heart and Diabetes Institute

A/Prof Jonathan Shaw

Baker IDI Heart and Diabetes Institute

Prof Rachel Huxley

Deakin University

Dr Stephen Goodall

Centre for Health Economics Research and Evaluation, University of Technology Sydney

Prof Danielle Mazza

Department of General Practice, Monash University

Sanjeeva Ranasinha

Monash Centre for Health Research and Implementation, Monash University

Dr Katie de Luca

Department of Chiropractic, Maquarie University

Dr Jacqueline Boyle

Monash Centre for Health Research and Implementation, Monash University

Dr Cassie Curryer

School of Humanities & Social Sciences, The University of Newcastle

Bill Pascoe

The University of Newcastle

Dr Maria Donald

School of Public Health, The University of Queensland

Sheree Harris

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

Dr Toby Pavey

School of Exercise and Nutrition Sciences, Queensland University of Technology

Prof Yvonne Van der Schouw

University of Utrecht

Prof Debra Anderson

Faculty of Health, University of Technology Sydney

Prof Bruce Chapman

Crawford School of Public Policy

Prof Ilona Koupil

Stockholm University & Karolinska Institute

Amy Heshmati

Stockholm University / Karolinska Institute

Prof Michelle Miller

Flinders University

Megan Valentine

Faculty of Science & Information Technology, The University of Newcastle

Prof Jennifer Martin

School of Medicine and Public Health, The University of Newcastle

Prof Patricia Davidson

Johns Hopkins University

Dr David Davidson

Flinders University

Dr Bronwyn Clark

School of Human Movement Studies, The University of Queensland

Dr Tracy Kolbe-Alexander

The University of Southern Queensland

Dr Maarit Laaksonen

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

Prof Karen Canfell

Cancer Research Division, Cancer Council NSW

Dr Robert MacInnis

Cancer Council Victoria

Prof Robert Cumming

University of Sydney

A/Prof Rachael Moorin

Curtin Health Innovation Research Institute, Curtin University

Dr Sjaan Gomersall

The University of Queensland

Dr Paul Gardiner

Centre for Research in Geriatric Medicine, The University of Queensland

Dr Sungwon Chang

University of Technology Sydney

Dr Cynthia Forlini

School of Medicine, Deakin University

Prof James Hebert

Cancer Prevention and Control Program, University of South Carolina

Dr Nitin Shivappa

University of South Carolina

A/Prof (Jenny) Chun Yee Wong

International University of Japan

Dr Jency Thomas

LaTrobe University

Prof Carol Jagger

Institute of Ageing and Health, Newcastle University

Dr Steffen Otterbach

University of Hohenheim

Prof Peter Davies

Centre for Children's Health Research, The University of Queensland

A/Prof Kylie Hesketh

School of Exercise and Nutrition Sciences, Deakin University

Prof Carol Bower

Telethon Institute for Child Health Research (TICHR), University of Western Australia

Prof Peter Sly

Centre for Children's Health Research, The University of Queensland

Carl Holder

Clinical Research Design & Statistics, Hunter Medical Research Institute

Dr Baki Billah

School of Public Health and Preventative Medicine, Monash University

Dr Christopher Oldmeadow

Clinical Research Design, Information Technology and Statistical Support (CReDITSS) Unit, Hunter Medical Research Institute

Dr Maria Arriaga

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

Prof Martha Hickey

The University of Melbourne

Dr Elizabeth Tracey

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

Prof Robert Sanson-Fisher

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

Prof Stephen Ackland

Medical Oncology, The University of Newcastle

A/Prof Renate Meyer

Department of Statistics, The University of Auckland

Yong-Yi Lee

The University of Queensland

Dr Yu-Wei Chen

Faculty of Health Sciences, The University of Sydney

A/Prof Mitch Duncan

School of Medicine and Public Health, The University of Newcastle

Dr Nirmala Pandeya

School of Public Health, The University of Queensland

Dr Helen Feist

Australian Population and Migration Research Centre, University of Adelaide,

Dr Lyn Francis

Western Sydney University

Dr Jack Noone

Centre for Social Impact, University of New South Wales

A/Prof Stephane Heritier

Monash University

Prof Ellen Aagaard Nohr

University of Southern Denmark

Prof Anne Taylor

North West Adelaide Health Study (NWAHS), University of Adelaide

Dr Vasant Hirani

Concordia Health and Ageing in Men Project (CHAMP), The University of Sydney

Dr Charrlotte Seib

School of Nursing and Midwifery, Griffith University

Dr Andrew Kingston

Newcastle University

Dr Holger Cramer

Department of Internal and Integrative Medicine, University of Duisburg-Essen

Dr Gregore Mielke

School of Human Movement and Nutrition Sciences, The University of Queensland.

Dr Zachary Marcum

University of Washington

Manon Overdijk

Windesheim University of Applied Sciences

Dr Kim Betts

School of Public Health, The University of Queensland

Dr Caroline Salom

School of Public Health, The University of Queensland

A/Prof Anna Barker

School of Public Health and Preventative Medicine, Monash University

Dr Shamasunder Acharya

General Medicine / Endocrinology, John Hunter Hospital

Assoc. Prof. Huy Tran

Pathology North, New South Wales Health Pathology

Dr Margaret Lynch

Research Innovation and Partnerships, Hunter New England Local Health District

Christine Sefton

The University of Newcastle

Dr Briony Hill

Monash Centre for Health Research and Implementation, Monash University

Mathew Ling

School of Psychology, Deakin University

Jacklyn Jackson

School of Health Sciences, The University of Newcastle

Dr Lucy Bryant

Graduate School of Health, University of Technology Sydney

A/Prof Kay Price

Division of Health Sciences, University of South Australia

Peter Hull

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

Dr Thach Tran

School of Public Health and Preventive Medicine, Monash University

Prof Donna Chung

School of Occupational Therapy and Social Work, Curtin University

Dr Steve Fraser

Deakin University

Dr Clint Miller

Deakin University

Dr Carlene Britt

Monash University

Dr Rosanne Freak-Poli

Monash University

Dr Karin Hammarberg

Monash University

Dr Alice Owen

Monash University

Dr Joanne Ryan

Monash University

Irene Chung

School of Pharmacy, University of Wisconsin

Prof Hans Stampfer

School of Psychiatry and Clinical Neurosciences, The University of Western Australia

Prof Isabel Ferreira

School of Public Medicine, University of Wollongong

Simon Chiu

Hunter Medical Research Institute

Prof Anthony Perkins

Griffith University

Dr Bertrand Yew Kian Loyeung

School of Life Sciences, University of Technology Sydney

A/Prof Ratilal Lalloo

School of Dentistry, The University of Queensland

Dr Megan Gu

Macquarie University

Dr Bronwyn Loong

Australian National University

Dennis Anheyer

Department of Internal and Integrative Medicine, University of Duisburg-Essen

Chris Sexton

School of Dentistry, The University of Queensland

Dr Luciana Torquati

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

Dr Judith Reddrop

Women's Wellbeing

Dr Karin English

The University of Queensland

Dr Darren Mansfield

Monash Health

Dr Lin Mo

Monash Health

Prof Marjorie Walker

Hunter Medical Research Institute, The University of Newcastle

Dr Harindra Jayasekara

Cancer Council Victoria

Dr Kevin McGeechan

School of Public Health, The University of Sydney

Dr Serena Yu

University of Technology Sydney

Dr Lauren Bruce

Monash Centre for Health Research and Implementation, Monash University

Dr Joanna McHugh Power

National College of Ireland

Dr Monica Cations

Flinders University

Dr Jacqueline Coombe

Melbourne School of Population and Global Health, The University of Melbourne

A/Prof Kate Laver

Flinders University

Dr Kate McBride

Western Sydney University

Prof Andrew Page

School of Medicine and the Translational Research Institute, Western Sydney University

Dr Catharine Fleming

School of Science and Health, Western Sydney University

Karolina Olsarova

The University of Queensland

Dr Katherine Downing

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

Prof Jo Salmon

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

Prof Anna Timperio

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

Dr Cate Bailey

Monash Centre for Health, Research and Implementation, Monash University

Dr Renae Fernandez

University of Adelaide

A/Prof Alice Rumbold

South Australian Health and Medical Research Institute Women and Kids

Prof Vivienne Moore

School of Public Health, The University of Adelaide

A/Prof Michael Stark

Paediatrics and Reproductive Health, The University of Adelaide

Prof Michael Davies

Robinson Research Institute, The University of Adelaide

Dr Marian Esler

Family Safety Branch, Department of Social Services

Rose Beynon

Family Service Taskforce, Department of Social Services

Hau Nguyen

Monash University

A/Prof Subramanyam Vemulpad

Maquarie University

A/Prof Leah East

University of New England

Dr Cindy Woods

University of New England

Dr Catherine Bondonno

Edith Cowan University

Prof Jonathan Hodgson

Edith Cowan University

Lauren Blekkenhorst

Edith Cowan University

Dr Tiffany Gill

Adelaide Medical School, The University of Adelaide

Dr Dana Hanna

Research School of Economics, Australian National University

Junyi Pan

Research School of Finance, Actuarial Studies & Statistics, Australian National University

Dr Kassia Beetham

Australian Catholic University

Dr Jemima Spathis

School of Exercise Science, Australian Catholic University

Dr Samantha Hoffmann

Centre for Sport Research, School of Exercise and Nutrition Sciences, Deakin University

Prof Vicki Clifton

Mothers and Babies Theme, Mater Medical Research Institute, The University of Queensland

Penny Reeves

Hunter Medical Research Institute, The University of Newcastle

A/Prof Jenny Visser

Erasmus University Medical Centre

Prof Harold (David) McIntyre

Mater Clinical Unit, The University of Queensland

Prof Emmanuel Stamatakis

Charles Perkins Centre, The University of Sydney

Prof Bu Yeap

Faculty of Health and Medical Sciences, The University of Western Australia

Prof David Handelsman

ANZAC Research Institute

Dr Aya Mousa

Monash University

Amreen Naqash

University of Kashmir

Prof Mieke van Driel

The University of Queensland

Dr Johanna Lynch

The University of Queensland

Dr Darsy Darssan

School of Public Health, The University of Queensland

A/Prof Chunsen Wu

University of Southern Denmark

Prof Jason Abbott

University of New South Wales

Prof Peter Rogers

The University of Melbourne

Prof Vicki Flenady

Mater Research Institute, The University of Queensland

Kirsty Nitschke

Faculty of Health and Medicine, The University of Newcastle

A/Prof Hannah Keage

School of Psychology, Social Work and Social Policy, University of South Australia

Alexandra Denham

School of Medicine and Public Health, The University of Newcastle

Prof Marie Hutchinson

School of Health and Human Sciences, Southern Cross University

Dr Qunyan Xu

University of South Australia

Prof Adrian Esterman

University of South Australia

A/Prof Jane Warland

University of South Australia

A/Prof Julila Brotherton

VCS Population Health

Prof David Durrheim

The University of Newcastle

Dr Borja del Pozo-Cruz

Australian Catholic University

Dr Jiesi Guo

Australian Catholic University

Prof Jeffrey Peipert

Indiana University

Dr Natalie Amos

Monash University

Dr Edoardo Botteri

Cancer Registry Norway

Dr Nathalie C Stoer

Cancer Registry of Norway

Dr Elisabete Weiderpass

International Agency for Research on Cancer (IARC)

Dr Michael Lee

University of Technology Sydney

Dr Lee Ashton

Priority Research Centre for Physical Activity and Nutrition, The University of Newcastle

Prof Mark Nieuwenhuijsen

Barcelona Institute for Global Health

Dr Maria Christine Magnus

Centre for Fertility and Health, Norwegian Institute of Public Health

Assoc. Prof Emily W Harville

Tulane School of Public Health and Tropical Medicine

Dr Lisa Vincze

Griffith University

Dr Leesa Hooker

La Trobe University

Dr Eliza Skelton

The University of Newcastle

Dr Dotoetha Dumuid

Alliance for Research in Exercise, Nutrition and Activity (ARENA), University of South Australia.

Dr Joanne Enticott

Monash Centre for Health Research and Implementation, Monash University

Prof Christobel Saunders

The University of Western Australia

Prof David Preen

University of Western Australia

Prof Bruno Stricker

Erasmus University,

Prof Jeff Hughes

Curtin University

Prof Max Bulsara

University of Notre Dame

Cameron Wright

Curtin University

A/Prof

Shelley Wilkinson

Mater Medical Research

Prof Debra Jackson

University of Technology Sydney

Dr Jessica Ferguson

The University of Newcastle

Dr Bruno Pereira Nunes

Federal University of Pelotas

Dr Shelley Keating

School of Human Movement and Nutrition Sciences, The University of Queensland

A/Prof Timothy Higgins

Australian National University

Dr Mridula Bandyopadhyay

University of Melbourne

Prof Christina Lee

School of Psychology, University of Queensland

Prof Nancy Pachana

School of Psychology, The University of Queensland

Dr Natasha Koloski

Office PVC - Health, The University of Newcastle

Ruth Brady

School of Human Movement and Nutrition Sciences, The University of Queensland

Dr Louise Wilson

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

Dr Zhiwei Xu

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

Paul McElwee

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

Colleen Loos

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

Prof Mohammad Reza Baneshi

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

Prof Nick Wareham

MRC Epidemiology Unit, Cambridge University

Dr Matthew Pearce

MRC Epidemiology Unit, Cambridge University

Dr Tom Bailey

School of Nursing, Midwifery and Social Work, The University of Queensland

Prof Jeff Coombes

School of Human Movement and Nutrition Sciences, The University of Queensland

Prof Chris Reid

Curtain University

Dr Dongshan Zhu

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

A/Prof Romy Lauche

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

Dr Lucy Leigh

Hunter Medical Research Institute

Dr Jane Rich

Faculty of Health and Medicine, The University of Newcastle

Dr Hsiu-Wen Chan

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

David Fitzgerald

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

Richard Hockey

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

Prof Jayne Lucke

School of Public Health, The University of Queensland

Prof Walter Abhayaratna

Canberra Health Services

Dr Tania Dey

South Australia Centre for Economic Studies, University of Adelaide

Courtney Baleato

School of Health Sciences, University of Newcastle

Dr Matthew Ahmadi

The University of Sydney

Dr Roger Engel

Macquarie University

Dr Petra Graham

Macquarie University

Dr Mark Jones

Faculty of Health Sciences & Medicine, Bond University

Prof Annette Dobson

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

Dr Natalie Ward

Faculty of Health and Medical Sciences, The University of Western Australia

Prof Reinie Cordier

Social Work, Education and Community Wellbeing, Northumbria University

Dr Gilly Hendrie

CSIRO Nutrition and Health Program

Shanna Fealy

School of Nursing, Midwifery, and Indigenous Health, Charles Sturt University

Dr Hsin-Fang Chung

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

Udari Colombage

School of Health, Federation University

Prof Jon Adams

School of Public Health, University of Technology Sydney

Prof David Sibbritt

Faculty of Health, University of Technology Sydney

Dr Jane Frawley

University of Technology Sydney

Danielle Lang

School of Medicine and Public Health, The University of Newcastle

Prof Kichu Nair

School of Medicine and Public Health, The University of Newcastle

Dr Natasha Weaver

School of Medicine and Public Health, The University of Newcastle

Dr Peter Saul

Palliative Care, Newcastle Private Hospital

Dr Daniel Barker

The University of Newcastle

Dr Charles Douglas

School of Medicine and Public Health, The University of Newcastle

Dr Francisco Perales

Institute for Social Science Research, The University of Queensland

Prof Janeen Baxter

Institute for Social Science Research, The University of Queensland

Prof Wendy Brown

School of Human Movement and Nutrition Sciences, The University of Queensland

Dr Enamul Kabir

University of Southern Queensland

Dr Rachel King

University of Southern Queensland

Dr Elizabeth Spencer

School of Humanities & Social Sciences, The University of Newcastle

Prof John Hall

School of Public Health and Community Medicine, University of New South Wales

Dr Anju Joham

Monash Centre for Health Research and Implementation, Monash University

Prof Helena Teede

Monash Centre for Health Research and Implementation, Monash University

A/Prof Tracy Comans

School of Public Health, The University of Queensland

Dr Kim-Huong Nguyen

The University of Queensland

Prof Jane Hall

Centre for Health Economic Research and Evaluation, University of Technology Sydney

Prof Kees Van Gool

Centre for Health Economics Research and Evaluation, University of Technology Sydney

Dr Maryam Naghsh Nejad

Centre for Health Economics Research and Evaluation, University of Technology Sydney

Dr Syed Hasan

University of Huddersfield

Prof Kerry Sherman

Macquarie University

Dr Alissa Beath

Macquarie University

Dr WenBo (Penny) Peng

Faculty of Health, University of Technology Sydney

Prof Ian Yang

Faculty of Medicine, The University of Queensland

Dr Melinda Hutchesson

The University of Newcastle

Dr Vanessa Shrewsbury

The University of Newcastle

Dr Rachael Taylor

The University of Newcastle

Dr Tracy Schumacher

Department of Rural Health, The University of Newcastle

Prof Ranjeny Thomas

The University of Queensland

Prof Lyn March

Institute of Bone and Joint Research, Faculty of Medicine and Health, The University of Sydney

Prof Luke Connelly

The University of Queensland

Dr Danielle Schoenaker

University of Southampton

Prof Jimmy T Efird

The University of Newcastle

Dr Elizabeth Neale

University of Wollongong

Prof Nita Forouhi

MRC Epidemiology Unit, Cambridge University

Tom Bishop

MRC Epidemiology Unit, Cambridge University

Chunxiao Li

MRC Epidemiology Unit, Cambridge University

Dr Fumiaki Imamura

MRC Epidemiology Unit, Cambridge University

Stephen Sharp

MRC Epidemiology Unit, Cambridge University

Dr Soumya Banerjee

MRC Epidemiology Unit, Cambridge University

Dr Libby Holden

School of Psychology, The University of Queensland

Emma Byrnes

Centre for Women's Health Research, The University of Newcastle

Lina Smythe

Centre for Women's Health Research, The University of Newcastle

Liana Green

Centre for Women's Health Research, The University of Newcastle

Dr Melissa Harris

Centre for Women's Health Research, The University of Newcastle

Anna Graves

Centre for Women's Health Research, The University of Newcastle

Dr Catherine Chojenta

Centre for Women's Health Research, The University of Newcastle

Dr Zaimin Wang

Faculty of Medicine, the University of Queensland

Dominic Cavenagh

Centre for Women's Health Research, The University of Newcastle

Dr Jennifer White

University of Newcastle

Dr Amy Anderson

Centre for Women's Health Research, The University of Newcastle

Isabelle Barnes

Centre for Women's Health Research, The University of Newcastle

Natalie Townsend

Centre for Women's Health Research, The University of Newcastle

Nick Egan

Centre for Women's Health Research, The University of Newcastle

Prof Rosa Alati

School of Public Health, Curtin University

Dr Tanmay Bagade

The University of Newcastle

Dr Erica Breuer

The University of Newcastle

Prof Elizabeth Sullivan

The University of Newcastle

Muluken Dessalegn Muluneh

Western Sydney University

A/Prof Mark McEvoy

La Trobe Rural Health School, La Trobe University

Zachary Hayward

University of Queensland

Dr Ellen Wessel

School of Public Health, The University of Queensland

Prof Jake Olivier

School of Mathematics and Statistics, University of New South Wales

Dr Kevin Herbert

Department of Public Health and Primary Care, University of Cambridge

Prof Cathie Sherrington

The University of Sydney

Dr Juliana Oliveira

University of Sydney

Dr Marina Pinheiro

University of Sydney

Dr Jamie Bryant

School of Medicine and Public Health, The University of Newcastle

A/Prof Liz Holliday

Clinical Research Design, Information Technology and Statistical Support (CReDITSS) Unit, The University of Newcastle

Prof Matthew Buman

Arizona State University

Joshua Dizon

CReDITSS, Hunter Medical Research Institute

A/Prof Lisa Moran

Monash Centre for Health Research and Implementation, Monash University

A/Prof Steven Bowe

Faculty of Health, Deakin University

Dr Binh Nguyen

The University of Sydney

Dr Lisette Pregelj

The University of Queensland

Prof Deborah Loxton

Centre for Women's Health Research, The University of Newcastle

Megan Ferguson

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

Dr Tazeen Majeed

School of Medicine and Public Health, University of Newcastle

Dr Seema Mihrshahi

School of Public Health, The University of Sydney

Dr Jessica Grieger

School of Paediatrics and Reproductive Health, The University of Adelaide

Prof Brenda Gannon

Centre for Business and Economics of Health, The University of Queensland

Thanya Flores

Federal University of Pelotas

Stuti Kapadia

The University of Queensland

Julie Phipps

The University of Queensland

Anne Cathrine Maqving Kjeldsen

University of Southern Denmark

Katja Albert Taastrom

University of Southern Denmark

Stefanie Ruediger

School of Human Movement and Nutrition Sciences, The University of Queensland

Prof Marianne Geleijnse

Wageningen University and Research

Dr Sabita Soedamah-Muthu

Department of Medical and Clinical Psychology, Tilburg University

Dr Julia Dray

The University of Newcastle

Dr Elizabeth Stojanovski

School of Mathematical & Physical Sciences, University of Newcastle

Prof Robyn Langham

School of Rural Health, Monash University

Dr Alicia Jones

School of Public Health and Preventative Medicine, Monash University

A/Prof Arul Earnest

Department of Epidemiology and Preventive Medicine, Monash University

Sarah Zaman

Monash University / Monash Health

Dr Joanne Bradbury

Southern Cross University

A/Prof Jacqui Yoxall

Southern Cross University

Sally Sargeant

Southern Cross University

Alexis Dennehy

The University of Queensland

Prof Helen Skouteris

Health and Social Care Unit, Monash University

Dr Siew Lim

Monash Centre for Health Research and Implementation (MCHRI), Monash University

Daniel Ryan

The University of Newcastle

Samin Uddin

The University of Newcastle

Prof Stephen Birch

Centre for Business and Economics of Health, The University of Queensland

Kieu My (Michelle) Tran

School of Economics, The University of Queensland

Prof Mandy Ryan

Health Economic Research Unit, University of Aberdeen

Dr Nicolas Krucien

Health Economic Research Unit, University of Aberdeen

Dr Richard Norman

School of Public Health, Curtin University

A/Prof Frances Milat

Metabolic Bones Services, Monash Health

Allison Hodge

Cancer Epidemiology Centre, Cancer Council Victoria

Prof Dallas English

The University of Melbourne

Dr Brigid Lynch

Cancer Council Victoria

Dr Pierre-Antoine Dugue

Cancer Council Victoria

Dr Lynda Ross

School of Exercise and Nutrition Sciences, Queensland University of Technology (QUT)

Mallory Devlin

Macquarie University

Prof Sarah Wild

The University of Edinburgh

Dr Caroline Jackson

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

Dr Regina Prigge

The University of Edinburgh

Dr Emma Beckman

School of Human Movement and Nutrition Studies, The University of Queensland

Tayla Lamerton

School of Human Movement and Nutrition Sciences, The University of Queensland

Dr Cheryce Harrison

Monash University

Julie Martin

Research Centre for Health Research and Implementation, Monash University

Elle McKenna

Griffith University

Prof Marion Haas

Centre for Health Economics Research and Evaluation, University of Technology Sydney

Dr Michael Wright

Health Economics Centre for Health Economics Research and Evaluation, University of Technology Sydney

Prof Flavia Cicuttini

Department of Epidemiology and Preventative Medicine, Monash University

Dr Sharmayne Brady

Monash University

Jia Yin Ooi

The University of Newcastle

Peta Forder

Centre for Women's Health Research, The University of Newcastle

Dr Parivash Eftekhari

Research Centre for Gender, Health & Ageing, The University of Newcastle

Prof Mike Jones

Psychology Department, Macquarie University

Prof Jennifer Hudson

Black Dog Institute, The University of New South Wales

Dr Sarah Stanford

Macquarie University

Dr Lesley MacDonald-Wicks

Nutrition & Dietetics, The University of Newcastle

Clare Daley

The University of Newcastle

Dr Ingrid Rowlands

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

Dr Melissa Johnstone

Institute for Social Science Research, The University of Queensland

Suzy Ladanyi

University of Technology Sydney

Dr Sophie Meredith

University of Technology Sydney

Dr Abhijit Chowdhury

Centre for Clinical Epidemiology and Biostatistics, The University of Newcastle

Stephanie Lithgow

The University of Newcastle

A/Prof Lisa Hall

School of Public Health, The University of Queensland

Megan McStea

The University of Queensland

A/Prof Therese Kairuz

The University of Newcastle

Dr Louise Koller-Smith

The University of Queensland

Putu Novi Arfirsta Dharmayani

Macquarie University

Aarushi Dhingra

The University of Queensland

Dr Nadira Kakoly

North South University

Dr Ellie D Arcy

Health Intelligence Unit, NSW Health

Sophie Lewandowski

University of Wollongong

Dr Mahnaz Bahri Khomami

Monash Centre for Health Research and Implementation, Monash University

Leona Phillips

School of Medicine and Public Health, The University of Newcastle

Julia Dixon

University of Wollongong

Koert de Waal

Department of Neonatology John Hunter Children's Hospital

Wing Kwok

University of Sydney

Dr Zanna Franks

The University of Newcastle

Lee Ting Yeo

The University of Newcastle

Dr Nanda Gopal Jayaraman

Centre for Women's Health Research, The University of Newcastle

Dr Katrina Moss

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

Dr Michael Waller

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

Dr Stina Oftedal

The University of Newcastle

Venise Y Hon

Monash University

Teagan Lindsay

University of Newcastle

Joseph Welsh

The University of Newcastle

Francesca Orchard-Hall

The University of Newcastle

Callum Sinclair

The University of Newcastle

Karina Ly

The University of Newcastle

Dr Marcin Sowa

The University of Queensland

Daniel Walton

University of Queensland

Dr Mijanur Rahman

University of Wollongong

Prof Virginia Stulz

School of Nursing and Midwifery, Western Sydney University

Tracey Oorschot

University of Technology Sydney

Emily Princehorn

Centre for Women's Health Research, The University of Newcastle

Dr Jillian (Chau Thien) Tay

Monash Centre for Health Research and Implementation, Monash University

Ke Pan

Tulane School of Public Health and Tropical Medicine

Dr Danusha Jayawardana

University of Queensland

Marie Ishida

Nossal Institute for Global Health, University of Melbourne

Dr Imaina Widagdo

Quality Use of Medicines and Pharmacy Research Centre, University of South Australia

A/Prof Meredith Harris

The University of Queensland

Dr Meredith Tavener

School of Medicine and Public Health, Health and Ageing, University of Newcastle

Dr Befikadu Wubishet

Faculty of Health and Medicine, The University of Newcastle

Kelly Hall

Adelaide Health Technology Assessment (AHTA), The University of Adelaide

Prof Clare Collins

College of Health, Medicine and Wellbeing, The University of Newcastle

Dr Alexis Hure

College of Health, Medicine and Wellbeing, The University of Newcastle

Dr Amanda Patterson

College of Health, Medicine and Wellbeing, The University of Newcastle

Dr Jennifer Baldwin

College of Health, Medicine and Wellbeing, The University of Newcastle

Dr Tracy Burrows

College of Health, Medicine and Wellbeing, University of Newcastle

Dr Rebecca Haslam

College of Health, Medicine and Wellbeing, The University of Newcastle

Dr Nicole Reilly

University of Wollongong

Dr Abdulbasit Seid

The University of Queensland

Dr Vinicius Andre do Rosario

University of Wollongong

A/Prof Luke Knibbs

Honorary Principal Fellow, The University of Queensland

Dr Treasure McGuire

School of Pharmacy, The University of Queensland

Dr Kylie Bailey

Psychology Department, University of Newcastle

Prof Michael Berk

School of Medicine, Deakin University

Prof Nigel Stocks

Adelaide Medical School, The University of Adelaide

Dr Anastasia Ejova

School of Psychology, The University of Adelaide

Dr Suzanne Robinson

School of Public Health, Curtin University

Prof Erica James

School of Medicine and Public Health, The University of Newcastle

Lana Mawass

Macquarie University

Prof Grant Montgomery

Institute for Molecular Biosciences, The University of Queensland

Dori Rosenberg

Kaiser Permanente Washington Health Research Institute

Prof Kaarin Anstey

Australian National University, Centre for Mental Health Research

Dr Donna Urquhart

Department of Epidemiology and Preventive Medicine, Monash University

Dr Yuanyuan Wang

Department of Epidemiology and Preventive Medicine, Monash University

Dr Monira Hussain

Department of Epidemiology and Preventive Medicine, Monash University

Dr Sally Mortlock

Institute for Molecular Biosciences, The University of Queensland

Chen Liang

School of Public Health, University of Queensland

A/Prof David Gonzalez-Chica

Adelaide Medical School, The University of Adelaide

Prof Corneel Vandelanotte

Appleton Institute and School of Health, Medical and Applied Sciences, Central Queensland University

Dr Saman Khalesi

Central Queensland University

Dr Charlotte Gupta

Appleton Institute and School of Health, Medical and Applied Sciences, Central Queensland University

Dr Christopher Irwin

Menzies Health Institute Queensland, School of Health Sciences and Social Work, Griffith University

Dr Terence Cheng

Harvard T.H. Chan School of Public Health

Dr Eleanor Pei Hua Thong

Monash Centre for Health Research and Implementation, Monash University

Prof Philip Burgess

The University of Queensland

Dr Beth Mah

St John of God

Prof Ajay Mahal

Nossal Institute for Global Health, The University of Melbourne

Teralynn Ludwick

Nossal Institute for Global Health, The University of Melbourne

Prof Gita Mishra

The University of Queensland

Dr Xenia Dolja-Gore

School of Medicine and Public Health, The University of Newcastle

Dr Philip Clare

Prevention Research Collaboration, The University of Sydney

Dr Joseph Van Buskirk

School of Public Health, The University of Sydney

Dr Long Le

Deakin University

Prof Cathy Mihalopoulos

Deakin University

Prof Jane Pirkis

School of Population Health, University of Melbourne

A/Prof Matthew Spittal

The University of Melbourne

Sara Dingle

Deakin University

Prof Robin Daly

Deakin University

Dr Catherine Milte

Deakin University

A/Prof Susan Torres

Deakin University

Joshua Bennetts

University of Newcastle

Tara Tolhurst

The University of Newcastle

Dr Karen Mate

School of Biomedical Sciences and Pharmacy (Human Physiology), The University of Newcastle

Dr Alice Campbell

Life Course Centre & Institute for Social Science Research, The University of Queensland

Dr Grace Vincent

Appleton Institute and School of Health, Medical and Applied Sciences, Central Queensland University

Dr Rhonda Garad

Monash Centre for Health Research and Implementation, Monash University

A/Prof Aaron Sverdlov

University of Newcastle

A/Prof Doan Ngo

University of Newcastle

Simone Marschner

Faculty of Medicine and Health, The University of Sydney

Dr Kristina Edvardsson

La Trobe University

Dr Kailash Thapaliya

Centre for Women's Health Research, The University of Newcastle

Dr Helena Menih

University of New England

Dr Suzie Cosh

University of New England

Prof Peter Ebeling

School of Clinical Sciences, Monash University

Dr Dianne Currier

The University of Melbourne

Dr Ang Li

The University of Melbourne

Dr Anthony Villani

University of the Sunshine Coast

Dr Evangeline Mantzioris

University of South Australia

Prof Julie Byles

Centre for Women's Health Research, The University of Newcastle

Mridula Shankar

Monash University

Prof Lisa McDaid

Institute for Social Science Research, The University of Queensland

Yunxi (Lucy) Hu

Actuarial Studies, Australian National University

Dr Jananie William

Australian National University

Prof Jenny Doust

School of Public Health, The University of Queensland

A/Prof Hugh Bainbridge

University of New South Wales

A/Prof Suzanne Chan-Serafin

University of New South Wales

A/Prof Sally Hunt

The University of Newcastle

A/Prof Penny Buykx

University of Newcastle

Rebecca Fellowes

University of Newcastle

Dr Tessa Copp

School of Public Health, The University of Sydney

A/Prof Leigh Tooth

School of Public Health, The University of Queensland

Hannah Wetzler

Centre for Women's Health Research, The University of Newcastle

Dr Geeske Peeters

Radboud University Medical Centre (Radboudumc)

Neta HaGani

University of Sydney

Dr Melody Ding

The University of Sydney

# Current Students

## PhD STUDENTS

|  |  |
| --- | --- |
| **Dr Shazia Abbas** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Prof Kichu Nair and Dr Tazeen Majeed |
|  |  |
| **Salma Mohamed Ahmed** | The University of Queensland |
| Supervisors | Prof Gita Mishra, A/Prof Luke Knibbs and Prof Ian Yang |
|  |  |
| **Mamaru Awoke** | Monash University |
| Supervisors | A/Prof Lisa Moran, A/Prof Arul Earnest and Prof Helen Skouteris |
|  |  |
| **Asres Bedaso** | University Technology Sydney |
| Supervisors | Prof Jon Adams, Prof David Sibbritt and Dr WenBo (Penny) Peng |
|  |  |
| **Eline van Bennekom** | Wageningen University |
| Supervisors | Dr Sabita Soedamah-Muthu, Prof Marianne Geleijnse and Prof Gita Mishra |
|  |  |
| **Habtamu Bizuayehu** | The University of Newcastle |
| Supervisors | Prof Deborah Loxton, Dr Catherine Chojenta and Dr Melissa Harris |
|  |  |
| **Suzannah Bownes** | University of Notre Dame |
| Supervisors | Dr Craig Smith, Dr Alexa Seal and A/Prof Catherine Harding |
|  |  |
| **Meredith Burgess** | The University of Queensland |
| Supervisor | Prof Janeen Baxter |
|  |  |
| **Sophie Callen** | The University of Queensland |
| Supervisors | Dr Ingrid Rowlands and Dr Melissa Johnstone |
|  |  |
| **Alice Campbell** | The University of Queensland |
| Supervisors | Dr Franciso Perales and Prof Janeen Baxter |
|  |  |
| **Sifan Cao** | The University of Queensland |
| Supervisors | Prof Gita Mishra, Dr Mark Jones, and A/Prof Leigh Tooth |
|  |  |
| **Siobhan Dickinson** | University Technology Sydney |
| Supervisors | Prof Jane Hall, Prof Kees Van Gool and Dr Maryam Naghsh Nejad |
|  |  |
| **Vladylena Farion** | Macquarie University |
| Supervisors | Dr Roger Engel and Dr Petra Graham |
|  |  |
| **Ni Gao** | University of Aberdeen |
| Supervisors | Prof Mandy Ryan, Dr Nicolas Krucien, Dr Richard Norman and Dr Suzanne Robinson |
|  |  |

|  |  |
| --- | --- |
| **Dereje Gedle Gete** | The University of Queensland |
| Supervisors | Prof Gita Mishra and Dr Michael Waller |
|  |  |
| **Sarah Gribbin** | Monash University |
| Supervisors | Dr Anju Joham and Dr Sarah Zaman |
|  |  |
| **Mitiku Teshome Hambisa** | The University of Newcastle |
| Supervisors | Prof Julie Byles and Dr Xenia Dolja-Gore |
|  |  |
| **Chris Harrington** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Dr Peter Saul, Dr Charles Douglas and Dr Daniel Barker |
|  |  |
| **Tahir Ahmen Hassen** | The University of Newcastle |
| Supervisors | Prof Deborah Loxton, Dr Catherine Chojenta and Koert de Waal |
|  |  |
| **Hlaing Hlaing Hlaing** | The University of Newcastle |
| Supervisors | A/Prof Alexis Hure, Dr Meredith Tavener and Prof Erica James |
|  |  |
| **Mahnaz Bahri Khomami** | Monash University |
| Supervisors | Dr Anju Joham, A/Prof Lisa Moran and Prof Helena Teede |
|  |  |
| **Sylvia Kiconco** | Monash University |
| Supervisors | Prof Helena Teede, Dr Anju Joham and A/Prof Arul Earnest |
|  |  |
| **Wing Kwok** | The University of Sydney |
| Supervisors | Prof Cathie Sherrington,Dr Marina Pinheiro, Dr Juliana Oliveira and Prof Julie Byles |
|  |  |
| **Megan Lee** | Southern Cross University |
| Supervisors | Dr Joanne Bradbury, A/Prof Jacqui Yoxall and Sally Sargeant |
|  |  |
| **Stephanie Lithgow** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Prof Deborah Loxton and Dr Elizabeth Spencer |
|  |  |
| **Maureen Makama** | Monash University |
| Supervisors | A/Prof Lisa Moran, Prof Helen Skouteris and Dr Siew Lim |
|  |  |
| **Dr Alemu Sufa Melka** | The University of Newcastle |
| Supervisors | Dr Catherine Chojenta, Prof Deborah Loxton and A/Prof Liz Holliday |
|  |  |
| **Gabriela Mena** | The University of Queensland |
| Supervisor | Prof Wendy Brown |
|  |  |
| **Gabrielle Menolotto** | University of Southern Queensland |
| Supervisors | Dr Enamul Kabir and Dr Rachel King |
|  |  |
| **Sophie Meredith** | University Technology Sydney |
| Supervisors | Prof David Sibbritt, Prof Jon Adams and Dr Jane Frawley |
|  |  |
| **Dr Tafzila Akter Mouly** | The University of Queensland |
| Supervisors | Prof Gita Mishra and A/Prof Luke Knibbs |
|  |  |
| **Melissa Sherrel Pereira** | The University of Newcastle |
| Supervisors | Dr Catherine Chojenta, Prof Deborah Loxton and Dr Nicole Reilly |
|  |  |
| **Edgar Poon** | The University of Queensland |
| Supervisor | Dr Treasure McGuire |
|  |  |
| **Sarwoko Andi Pramono** | The University of Newcastle |
| Supervisors | Prof Julie Byles and Dr Xenia Dolja-Gore |
|  |  |
| **Dinberu Shebeshi** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Dr Xenia Dolja-Gore and Prof Jimmy T Efird |
|  |  |
| **Natalie Sinclair** | The University of Newcastle |
| Supervisors | Dr Kylie Bailey, Dr Elizabeth Stojanovski, Dr Julia Dray and Dr Beth Mah |
|  |  |
| **Kailash Thapaliya** | The University of Newcastle |
| Supervisors | Prof Julie Byles and Dr Melissa Harris |
|  |  |
| **Kaeshaelya Thiruchelvam** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Dr Syed Hasan and A/Prof Therese Kairuz |
|  |  |
| **Carla Sullivan-Myers** | Macquarie University |
| Supervisors | Prof Kerry Sherman and Dr Alissa Beath |
|  |  |
| **Dr Daniel Tollosa** | The University of Newcastle |
| Supervisors | Prof Erica James, Dr Meredith Tavener and Dr Alexis Hure |
|  |  |
| **Befikadu Wubishet** | The University of Newcastle |
| Supervisors | Prof Julie Byles, Dr Melissa Harris and Danielle Long |
|  |  |
| **Yi Yang** | The University of Melbourne |
| Supervisors | Allison Hodge, Prof Dallas English, Dr Brigid Lynch and Dr Pierre-Antoine Dugue |

## Masters Students

|  |  |
| --- | --- |
| **Dr Caley Tapp** | The University of Queensland |
| Supervisor | A/Prof Leigh Tooth |
|  |  |
| **Yufan Wang** | The University of Queensland |
| Supervisors | Dr Marcin Sowa and A/Prof Jeffrey Kline |

# Project Staff

## The University of Queensland

### ALSWH Director

Professor Gita Mishra

### Deputy Director/Principal Research Fellow

A/Professor Leigh Tooth

### Professorial Research Fellow

Professor Annette Dobson

### Research Officer (Cohort Refresh)

Dr Katrina Moss

### Senior Research Assistant

Dr Hsiu-Wen Chan

### Statistician

Richard Hockey

### Research Project Manager

Megan Ferguson

### Data Manager

David Fitzgerald

### Communication and Engagement Officer

Helen Gray

### Database Developer

Chamila Pathigoda

### Data Access and Liaison Officer

Leonie Gemmell

### Research Support Officer

Christine Coleman

## The University of Newcastle

### ALSWH Director

Professor Julie Byles

### Deputy Director

Professor Deborah Loxton

### Senior Research Manager

Natalie Townsend

### Senior Research Officer

Dr Amy Anderson

### Research Officers

Isabelle Barnes

Emma Byrnes

### Senior Statistician

Peta Forder

### Statisticians

Dominic Cavenagh

Nicholas Egan

### Operations Manager

Anna Graves

### Database Developer

Ryan Tuckerman

### Data Support Officer

Cathy Seberry

### Ethics Officer

Clare Thomson

### Administrative Officers

Katherine Tuckerman

Kacey Johnston

### Project Assistants

Brianna Barclay

Lara Creagan

Zoe Crittenden

Jemma Henderson

Megan Son Hing

Ursula Horton

Belinda Jackson

Zoe Jurd

Jasmyne Renes

# Publications

## Summary

During 2021, 66 papers were published or accepted for publication in peer reviewed academic journals. These publications covered a wide range of research themes, including:

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

# Published Papers

Abbas SS, Majeed T, Weaver N, Nair BR, Forder PM, Byles JE. (2021). **Utility estimations of health states of older Australian women with atrial fibrillation using SF-6D**. *Quality of Life Research*; 30(5): 1457-1466. <https://doi.org/10.1007/s11136-020-02748-3>

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Shebeshi DS, Dolja-Gore X & Byles J. (2021). **Charlson Comorbidity Index as a predictor of repeated hospital admission and mortality among older women diagnosed with cardiovascular disease.***Aging Clinical and Experimental Research*; <https://doi.org/10.1007/s40520-021-01805-2>

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Thapaliya K, Harris ML & Byles JE. (2021). **Polypharmacy trajectories among older women with and without dementia: A longitudinal cohort study.** *Exploratory Research in Clinical and Social Pharmacy*; <https://doi.org/10.1016/j.rcsop.2021.100053>

Thiruchelvam K, Byles J, Hasan SS, Egan N, Kairuz T. (2021). **Frailty and potentially inappropriate medications using the 2019 Beers Criteria: Findings from the Australian Longitudinal Study on Women’s Health (ALSWH).** *Aging Clinical and Experimental Research*; <https://doi.org/10.1007/s40520-020-01772-0>

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**Accepted papers**

Abbas SS, Majeed T, Nair K, Forder P, Weaver N & Byles J. **Utility estimations of health states of older Australian women with atrial fibrillation using SF-36**. *Quality of Life Research*.

# Reports

[Reproductive health: Contraception, conception and change of life – Findings from the Australian Longitudinal Study on Women’s Health](https://alswh.org.au/post-outcomes/2021-major-report-reproductive-health-contraception-conception-change-of-life/).Loxton D, Byles J, Tooth L, Barnes I, Byrnes E, Cavenagh D, Chung H-F, Egan N, Forder P, Harris M, Hockey R, Moss K, Townsend N & Mishra GD. Report prepared for the Australian Government Department of Health, May 2021.

[Australian women’s mental health and wellbeing in the context of the COVID-19 pandemic in 2020.](https://alswh.org.au/post-outcomes/australian-womens-mental-health-and-wellbeing-in-the-context-of-the-covid-19-pandemic-in-2020/) Deborah Loxton, Natalie Townsend, Peta Forder, Isabelle Barnes, Emma Byrnes, Amy Anderson, Dominic Cavenagh, Nicholas Egan, Katherine Tuckerman & Julie Byles. Report prepared by the Centre for Women’s Health Research, The University of Newcastle, for the National Mental Health Commission, August 2021.

# Conference Presentations

In 2021, ALSWH data were used in 45 conference presentations.

Awoke MA, Ernest A, Joham A, Hodge A, Brown W, Teede H & Moran L. **Longitudinal weight gain and lifestyle factors in women with and without polycystic ovary syndrome** (Oral presentation). *Androgen Excess and PCOS Society (AE-PCOS), 18th Annual Virtual Meeting*, 7– 8 November 2020.

Ahmed S, Knibbs LD & Mishra GD. **Roadway proximity and children’s behaviour and psychomotor development: A cross-sectional study among Mothers and their Children’s Health study in Australia (poster presentation)**. *Queensland Women's Health Forum 2021*, Brisbane, QLD, 27-28 May 2021.

Ahmed S. **Residential proximity to roadways and children’s behaviour and psychomotor development: Findings from the Mothers and their Children’s Health study.** *International Society for Environmental Epidemiolog*y, Virtual Event, 23-26 August 2021.

Awoke MA, Ernest A, Joham A, Hodge A, Brown W, Teede H, & Moran LJ. **Longitudinal weight gain and lifestyle factors in women with and without Polycystic Ovary Syndrome (e-Poster presentation).** *Endocrine Society Annual Meeting*, Virtual Event, 20-23 March 2021.

Awoke MA, Ernest A, Joham A, Hodge A, Brown W, Teede H, & Moran LJ. **Longitudinal weight gain and lifestyle factors in women with and without Polycystic Ovary Syndrome (oral presentation).** *World Congress of Epidemiology,* Virtual Event, 3– 6 September 2021.

Baneshi RM, Waller M, McElwee P & Dobson A. **Relative survival for women with a record of dementia (poster presentation).** *Australian Dementia Forum 2021,* Virtual Meeting, 31 May-1 June 2021.

Beetham K, Spathis J, Hoffmann S, Brown W, Clifton V & Mielke G. **Longitudinal association between physical activity in pregnancy with maternal and infant outcomes: Findings from the Australian Longitudinal Study of Women’s Health.** *Queensland Women's Health Forum 2021*, Brisbane, QLD, 27-28 May 2021.

Brown WJ, Flores TR, Keating SE & Mielke G. **What’s happening to young women’s weight? Data from the Australian Longitudinal Study on Women’s Health (ALSWH).** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Byles J. **The year of living bravely.** *2021 Australian Association of Gerontology Conference*, Virtual Event, 11 November 2021.

Byles J, Anstey K, Bandara P, D’Este C, Erlangsen A, Page A, Redman S, Cresswell A, Metcalfe K, Frommer M & Nai V. **Accessing cohort data for mental health research**. *Sax Forum – EMCR Initiative*, Virtual Event, 20 September 2021.

Byles J, Bramble M, Dowling D & Piper M. Can we die of Old Age. President’s Symposium, *2021 Australian Association of Gerontology Conference*, Virtual Event, 10 November 2021.

Chung H-F & Mishra G. **Early menstruation and risk of vasomotor symptoms: A pooled analysis of six studies (poster presentation).** *Queensland Women's Health Forum 2021*, Brisbane, QLD, 27-28 May 2021.

Chung H-F, Anderson D, Mishra D. **Smoking, body mass index, and risk of vasomotor symptoms: A pooled analysis of eight studies (oral presentation).** *World Congress of Epidemiology*, Virtual Event, 3-6 September 2021.

Dharmayani PNA. **Association between fruit and vegetable intake and depressive symptoms over 15 years in young women.** *World Congress of Epidemiology,* Virtual Event, 3–6 September 2021.

Dhingra A. **Measuring inequity in less utilised health services.** 2021 International Health *Economics Association (iHEA) World Congress,* Virtual Event, July 2021.

Dobson A, Hockey R, McElwee P & Waller M. **Accuracy of death certificates as a source of information on dementia.** *Australian Dementia Forum 2021,* Virtual Event, 31 May-1 June 2021.

Ferguson JA, Oldmeadow C, Mishra G & Garg ML. **Plant-based dietary patterns are associated with lower body weight, BMI and waist circumference in older Australian women.** *Sustainable Food Future Conference 2021,* Newcastle, NSW, 17-18 June 2021.

Francis L, Stulz V, (presenters) Dessalegn M, & Loxton, D. **Finding a life without domestic violence: Analysing free text data from the Australian Longitudinal Study of Women’s Health (ALSWH)**. *Stop Domestic Violence Conference, Gold Coast,* Virtual Event, 2 December 2021.

Francis L,(presenter) Stulz V, Dessalegn M, & Loxton D. **Finding a life free of domestic violence: Findings from free text comments over time in the Australian Longitudinal Study of Women’s Health (ALSWH).** *Moving Forward in Unity: Nursing through the Covid-19 Year 2021, Mae Fah Luang University Thailand*, Virtual Event, 2 December 2021.

Francis L, Stulz V, (presenters) Dessalegn M & Loxton, D. **Finding a life free of domestic violence: Findings from free text comments over time in the Australian Longitudinal Study of Women’s Health (ALSWH).***Women’s Health Matters Symposium, Western Sydney University,*  9 Virtual Event, December 2021.

Gribbin S, Enticott J, Hodge A, Joham A & Zaman S. **Dietary carbohydrate and not saturated fat is associated with cardiovascular disease in a cohort of Australian women.** 69th *Annual Scientific meeting of the Cardiac Society of Australia and New Zealand (CZANZ)* Adelaide, SA, 5-8 August 2021.

Hill B, Awoke M, Bergmeier H, Moran LJ, Mishra G & Skouteris H. **Preconception lifestyle and psychological factors of Australian women with pregnancy intentions who become pregnant.** *Australasian Society of Behavioural Health and Medicine annual conference,* Virtual Event, 3 February 2021.

Jayawardana D. **An economic framework for exploring the impact of non-communicable diseases on healthcare utilisation.** *International Health Economics Association (iHEA) World Congress,* Virtual Event, July 2021.

Jayawardana D. Excess **healthcare costs of depressive symptoms in late adolescence: Evidence from national Medicare claims data.** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Jayawardana D. **Excess healthcare costs of depressive symptoms in late adolescence: Evidence from national Medicare claims data.** *Econometric Society Australasian Meeting (ESAM),* Virtual Event, July 2021.

Ke P et al. **Data pooling and harmonization across pre-conception studies: The PrePARED Consortium** (speed talk). *The Society for Pediatric and Perinatal Epidemiologic Research (SPER),* Virtual Event, 26 May – 18 June 2021.

Kiconco S. **Menstrual regularity as a predictor for heart disease and diabetes: findings from a cohort study.** *Australian Public Health (PHAA) Conference 2021,* Canberra, ACT,23-24 September 2021.

Koller-Smith L, Medi A, March L, Mishra G, Tooth L & Thomas R. **Estimating the true prevalence of rheumatoid arthritis in Australian women** (poster presentation). *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Kwok WS, Byles JE, Pinheiro MB, Oliveira JS, Dolja-Gore X & Sherrington C**. Falls and physical activity in Australian older women** (oral presentation). *Emerging Researchers in Ageing,* Virtual Event, November 2021.

Kwok WS, Byles JE, Pinheiro MB, Oliveira JS, Dolja-Gore X & Sherrington C. **Are there any differences in falls, injurious falls and physical activity participation in Australian women between two different generations?** *Australian and New Zealand Falls Prevention Conference,* Virtual Event, 1-3 December 2021.

Laaksonen MA, Canfell K, MacInnis R, Arriaga ME, Hull P, Banks E, Giles G, Mitchell P, Cumming R, Byles J, Magliano DJ, Shaw J, Taylor A, Gill TK, Hirani V, Marker J, McCullough S, Klaes E, Connah D, Velentzis LS & Vajdic CM. **The preventable future burden of cancer in Australia.** *World Congress of Epidemiology,* Virtual Event, 3–6 September 2021.

Lamerton TJ, Mielke G & Brown WJ. **Associations of physical activity and body mass index with urinary incontinence in young, Australian women (poster presentation)**. Queensland *Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Makama M, Ernest A, Lim S, Hill B, Skouteris H, Teede H, Boyle J, Brown W, Hodge A & Moran L. **Patterns of change in lifestyle behaviours following childbirth** (On-demand oral presentation). *World Congress of Epidemiology (WCE),* Virtual Event, 3 – 6 September 2021.

Makama M, Lim S, Skouteris H, Harrison CL, Joham AE, Mishra GD, Teede H, Brown W, Martin J & Moran L**. Physical activity and sitting time across postpartum life stages: A cross-sectional analysis** (On-demand oral presentation). *World Congress of Epidemiology (WCE),* Virtual Event, 3 – 6 September 2021.

Makama M, Lim S, Skouteris H, Harrison CL, Joham AE, Mishra GD, Teede H, Brown W, Martin J & Moran L. **Physical activity and sitting time across postpartum life stages** (gallery presentation). *The Austral-Asia Obesity Research Update (ANZOS),* Virtual Event, 20 – 22 July 2021.

Mena GP, Mielke GI & Brown WJ. **Longitudinal associations between physical activity and BMI with menstrual symptoms: Data from a large population-based cohort study.** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Mena GP, Mielke GI & Brown WJ. **High levels of physical activity are associated with a lower occurrence of heavy menstrual bleeding: Data from a large population-based cohort study.** *2021 Sports Medicine Australia (SMA) Conference,* Melbourne, VIC, 6-9 October 2021.

Mielke G, Lamerton T, Keating S, Nunes B, Brady R & Brown W. **Associations of physical activity frequency and intensity with incidence of hypertension and obesity over 15 years in Australian women.** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Moss K, Reilly N, Dobson A, Loxton D, Tooth L & Mishra GD. **Changes in perinatal screening in Australia (2000-2017), and which women are missing out.** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

Mouly TA, Knibbs L & Mishra G. **Impact of Residential Greenspace on the Mental Health of Australian Women** (poster presentation). *Queensland Women's Health Forum* *2021*, Brisbane, QLD, 27-28 May 2021.

Oorschot T. **Women with diabetes and co-morbid depression or anxiety are using health services differently.** *Australian Diabetes Congress,* Virtual Event, 11-13 August 2021.

Wilson L. **Agreement between self-reported chlamydia infection and chlamydia infection ascertained using testing and medication administrative data**. *World Congress of Epidemiology 2021,* Virtual Event, 3-6 September 2021.

Wilson L, Xu Z, Mishra G, Doust J & Dobson A. **Modifiable factors and dentist visits: A comparison of three cohorts of women.** *Preventive Health Conference 2021,* Hybrid Conference, Perth, WA, 10-12 May 2021.

Wilson L, Xu Z, Mishra G, Dobson A & Doust J**. The impact of changing MBS criteria for vitamin D testing.** *Choosing Wisely National Meeting,* Virtual Event, 19 May 2021.

Xu Z, Doust JA, Wilson WF, Dobson AJ, Dharmage S & Mishra GD. **Impacts of asthma severity, exacerbations and medication use on perinatal outcomes: An updated systematic review and meta-analysis (poster presentation).** *Queensland Women's Health Forum 2021,* Brisbane, QLD, 27-28 May 2021.

# Seminars and Workshops

ALSWH data were used in 32 seminars and workshops during 2021.

Byles J. **Getting to 100 – an overview of the cohort born 1921-26.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 3 December 2021.

Byles J. **Prospects for health ageing in the 1946-51 cohort.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 3 December 2021.

Byles J. **ALSWH and the decade of healthy ageing.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 3 December 2021.

Byles J, Carmel S, Harding S, Kalula S, Bendien E & Hanson L. **Why gender matters – Exploring the impact of gender on health and wellbeing in an ageing world**. *International Longevity Centre - Global Alliance Webinar*. 2 June 2021.

Chung HF. **Reproductive health during menopause.** *UQ School of Public Health Seminar Series, Brisbane*, QLD (Webinar), 22 June 2021.

Dhingra A. **Measuring inequity in less utilised health services**. *Inequalities in Health and Healthcare Summer School by Tinbergen Institute Graduate School*, Online, 5-9 July 2021.

Dhingra A. **Measuring inequity in less utilised health services.** *10th Australian Health Economics Society Doctoral (AHED) Workshop,* 20 September 2021.

Dobson A. **Risk factors for health and well-being in mid-life.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 29 November 2021.

Doust J. **Trajectory of body weight in PCOS.** *UQ School of Public Health Seminar Series, Brisbane*, QLD (Webinar), 22 June 2021.

Forder P. **COVID-19 vaccine uptake and hesitancy: Results from COVID-19 Survey 15 (September 2021).** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 1 December 2021.

Forder P. **Quantitative findings on violence as a factor for health from Major Report Q: Health and wellbeing for women in midlife.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event*,* 2 December 2021.

Forder P. **Women’s safety during 2020: Results from COVID-19 surveys during 2020.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event,2 December 2021.

Jayawardana D. **Excess healthcare costs of depressive symptoms in late adolescence: Evidence from national Medicare claims data**. *2021 Queensland Economics Winter School*, Brisbane, QLD, July 2021.

Loxton D, Townsend N, Forder P. **A life course approach to determining the prevalence and impact of sexual violence in Australia: The Australian Longitudinal Study on Women’s Health.** *ANROWS Research Implications for Policy: Works in Progress Forum*, Sydney, NSW (via Zoom), 15-July 2021.

Loxton D. **From April to November 2020: Australian women and COVID-19.** *Hunter Medical Research Institute Women’s Health Community Seminar,* Newcastle, NSW, 24-March 2021.

Loxton D. **Women’s mental health during 2020 (ALSWH COVID-19 surveys).** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,*Virtual Event, 1 December 2021.

Loxton D. **Sexual violence over the life course (ANROWS funded study).** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,*Virtual Event, 2 December 2021.

Loxton D. **Policy contributions update.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,*Virtual Event, 2 December 2021.

Mishra G, Moss K, Doust J, Wilson L, Xu Z, Chung HF. **Women’s health research update.** *UQ School of Public Health Seminar Series,* Brisbane, QLD (Webinar), 22 June 2021.

Mishra G, Dobson A, Moss K, Wilson L & Loos C. **Australian Longitudinal Study on Women's Health: Linked data showcase.** Invited webinar presentation. *Population Health Research Network (PHRN),* 10 March 2021.

Mishra G. **Insights on endometriosis from the Australian Longitudinal Study on Women’s Health**. Invited presentation (virtual) to the *Australian Government Endometriosis Advisory Group (EAG)*, 2 November 2021.

Mishra G. **ALSWH Overview and update (including update on cohort refresh).** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium*, Virtual Event, 29 November 2021.

Mishra G. **Update on current data linkages and establishment of SERP.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 29 November 2021.

Mishra G. **Endometriosis prevalence, incidence, employment after diagnosis and BMI and timing of diagnosis**. *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium*, Virtual Event, 30 November 2021.

Moss K. **Generational differences in reproductive outcomes and assisted reproductive technology (ART).** *UQ School of Public Health Seminar Series, Brisbane*, QLD (Webinar), 22 June 2021.

Moss K. **Timing of endometriosis diagnosis and IVF outcomes.** *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 30 November 2021.

Peeters G. **Statistics workshop on life course modelling.** *Department of Geriatric Medicine, Radboud University Medical Centre,* Nijmegen, The Netherlands, 17 November 2021.

Tooth L. **Overview of postpartum depression findings**. *The Australian Longitudinal Study on Women's Health (ALSWH) 2021 Symposium,* Virtual Event, 1 December 2021.

Wilson L. **Hysterectomy and perceived physical function in midlife.** *UQ School of Public Health Seminar Series,* Brisbane, QLD, 22 June 2021.

Wilson L, Xu Z, Mishra G, Doust J & Dobson A. **Modifiable factors and dentist visits: A comparison of three cohorts of women.** Invited presentation. *School of Dentistry Dental Public Health Seminar,* Brisbane, QLD, 18 November 2021.

Wilson L, Xu Z, Mishra G, Dobson A & Doust J. **Women's use of health services - Three research snapshots from the Australian Longitudinal Study on Women's Health*.*** *School of Public Health Seminar Series,* Brisbane, QLD, 3 August 2021.

Xu Z. **Development of multimorbidity in Australian women across the lifespan**. *UQ School of Public Health Seminar Series,* Brisbane, QLD, 22 June 2021.

# Submissions to Government

**Queensland State Government 2021 Consultation for a new Queensland Women’s Strategy**

**Submitted**: October 2021

The ALSWH submission aimed to strengthen the policy links between social and economic factors and overall health, highlighting the need for cross-portfolio collaboration and strategies to address the social and economic determinants that have an impact on women’s health.

**Queensland State Government Inquiry into Social Isolation and Loneliness**

**Submitted:** August 2021

The ALSWH submission presented data and research specifically focused on loneliness and social isolation in Australian women. As a longitudinal study, ALSWH is uniquely positioned to provide insight into the causes and drivers of loneliness and social isolation, their impacts on women’s health and wellbeing and potential mitigating factors.

Full details of all submissions are available on the Study [website](https://alswh.org.au/outcomes/submissions/).

# Data Archiving

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

* Surveys 1 to 5 of the 1989-1995 cohort
* Surveys 1 to 8 of the 1973-1978 cohort
* Surveys 1 to 9 of the 1946-1951 cohort
* Surveys 1 to 6 of the 1921-1926 cohort, along with the incomplete data from the six-month follow up survey of the 1921-1926 cohort.

In 2021, data from Survey 9 of the 1946-51 cohort and recent data from the six-month follow up survey of the 1921-1926 cohort were archived.

# Enquiries

## University of Newcastle:

Professor Deborah Loxton

Deputy Director, ALSWH

Research Centre for Generational Health and Ageing

University of Newcastle, Callaghan NSW 2308, AUSTRALIA

Telephone: 02 4042 0690

Fax: 02 4042 0044

Email: [info@alswh.org.au](mailto:info@alswh.org.au)

## University of Queensland:

A/ Professor Leigh Tooth

Deputy Director, ALSWH

School of Public Health

University of Queensland, Herston QLD 4006 AUSTRALIA

Telephone: 07 3346 4691

Fax: 07 3365 5540

Email: [alswh@uq.edu.au](mailto:sph-wha@sph.uq.edu.au)

www.alswh.org.au

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