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## Thursday 24 October 2019

### Rapid Fire Presentations Round 1

Plaza Room P9 & P10, 10:00am - 10:20am

#### RF1.001- Disparities between Aboriginal and non-Aboriginal perinatal mortality rates in Western Australia

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#### Abstract:

**Background:** Perinatal mortality rates are, typically, higher in Aboriginal than non-Aboriginal populations of Australia. This study aimed to examine the pattern of stillbirth and neonatal mortality rate disparities over time in Western Australia, including an evaluation of these disparities across gestational age categories.

**Methods:** All singleton births ( $\geq 20$  weeks gestation) in Western Australia between 1980 and 2015 were included. Linked data were obtained from core population health datasets. Stillbirth and neonatal mortality rates and percentage changes in the rates over time were calculated by Aboriginal status and gestational age categories.

**Results:** From 1980-2015, data were available for 930,926 births (925,715 live births, 5,211 stillbirths and 2,476 neonatal deaths). Over the study period, there was a substantial reduction in both the Aboriginal (19.6%) and non-Aboriginal (32.3%) stillbirth rate. These reductions were evident in most gestational age categories among non-Aboriginal births and in Aboriginal term births. Concomitantly, neonatal mortality rates decreased in all gestational age windows for both populations, with reductions ranging from 36.5% to 77.8%. The overall stillbirth and neonatal mortality rate differences between Aboriginal and non-Aboriginal births decreased by 0.6/1,000 births and 3.9/1,000 live births, respectively, although the rate ratios (2.5 and 2.9, respectively) reflect a persistent excess of Aboriginal perinatal mortality across the study period.

**Conclusions:** Despite steady improvements in perinatal mortality rates in Western Australia over 3½ decades, the gap between Aboriginal and non-Aboriginal rates remains unchanged in relative terms. There is a continuing, pressing need to address modifiable risk factors for preventable early mortality in Aboriginal populations.

#### RF1.002- Aetiology and survival of cirrhosis admissions, Australia: Disparities by country of origin

**Authors:** Dr Belaynew Taye<sup>1,2</sup>, Dr Paul Clark<sup>1,3,4</sup>, Prof Elizabeth Powell<sup>4</sup>, AsPr Patricia Valery<sup>1,2</sup>

**Affiliations:** <sup>1</sup>The University of Queensland, Brisbane, Australia, <sup>2</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>3</sup>Department of Gastroenterology and Hepatology, Mater Hospitals, Brisbane, Australia, <sup>4</sup>Department of Gastroenterology and Hepatology, Princess Alexandra Hospital, Brisbane, Australia

#### Abstract:

**Background:** Cirrhosis-related hospital admissions in Queensland increased in the last decade. In a population-based study of patients with cirrhosis, we examined the aetiology, complications, and mortality from cirrhosis in African, Middle East or Asian born patients and compared with other patients.

**Methods:** Hospital data on 30,327 admissions for cirrhosis during 2008-2016 in Queensland were obtained. We selected the first hospitalisation record of each patient to avoid duplicate counting. Data for 10,177 patients were analysed, 533 (5.2%) were born in Africa, Middle East or Asia. Cumulative overall survival (Kaplan–Meier) by country of birth was calculated.

**Results:** In African, Middle East or Asian-born patients, the leading aetiologies for cirrhosis were cryptogenic (42.8%) and chronic hepatitis B (28.1%), while alcohol-related cirrhosis (50.9%) is predominant in the other group (mostly Australian-born). The overall survival in African, Middle East or Asian-born patients, 53.5% (95%CI: 47.16-58.78), was significantly higher than that in other patients, 33.96% (95%CI: 32.58-35.35;  $p < 0.0001$ ). There were differences in age, rurality of residence (major city, 84.8% Vs 57.6%), and SEIFA index (Q1 & Q2, 49.8% vs. 30.5%), rates of alcohol-related cirrhosis, heart failure (3.0% vs. 5.3%), drug use (0.8% vs. 2.5%), encephalopathy (2.6% vs. 4.7%), and hepatorenal syndrome (0.8% vs. 3.3%) between these populations.

**Conclusions:** Better survival among African, Middle East or Asian born patients may reflect differing aetiology of liver disease and other differing rates of socio-economic disadvantage, younger age, higher proportions living in metropolitan regions, and lower rates of comorbidities and concurrent drug and alcohol use.

### **RF1.003- Burden of acute gastroenteritis in the first two years of life**

**Authors:** Gabor Mihala Gabor Mihala<sup>1,2</sup>, Prof Keith Grimwood<sup>1,2,3</sup>, A/Prof Stephen Lambert<sup>4</sup>, Prof Robert Ware<sup>1,2</sup>

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#### **Abstract:**

**Background:** Acute gastroenteritis (AGE) is common in young children, but the current community-level burden in Australian children in the first 2-years of life is uncertain. Using data from the Observational Research in Childhood Infectious Diseases (ORChID) birth cohort, we described the incidence and duration of AGE episodes, their risk factors, and healthcare utilisation.

**Methods:** The ORChID study was conducted in Brisbane between 2010-2014. Parents completed a daily symptom diary and recorded healthcare utilisation during AGE episodes until the child's second birthday. AGE was defined as  $\geq 3$  liquid stools in 24-hours. Episodes were separated by  $\geq 3$ -days of normal stools. Incidence of AGE, and associations between risk factors and AGE episodes were calculated using logistic, Poisson and negative binomial regression models.

**Results:** The 154 participants returned symptom data for 87,641 days. Two-hundred and fifty-two episodes were recorded on 1,586 (1.8%) days at an incidence rate of 1.07 (95% CI 0.94-1.21) per child-year-at-risk. Episodes had a median duration of 3.5 days (IQR 2.0-7.0). One-hundred and fourteen episodes were linked to healthcare-utilisation data: 37% led to primary-care consultations, 9% to emergency department presentations, and 4% to hospitalisations. Longer episodes were associated with more primary-care visits. AGE was more likely in first-born children attending formal childcare (incidence rate ratio, IRR=2.5). Children of households with income above the 75th percentile had more frequent (IRR=2.1) and longer episodes.

**Discussion:** The burden of AGE in the first <2-years of life in the post-rotavirus-vaccination era remained considerable, encouraging research into the impact of other pathogens causing AGE.

### **RF1.004- Changing epidemiology of invasive pneumococcal disease following introduction of PCV13, Victoria, 2008-2018**

**Authors:** Dr Sophia Bowman-derrick<sup>1,2,3</sup>, Dr Emma Field<sup>1</sup>, Ms Marion Easton<sup>2</sup>, Ms Janet Strachan<sup>2</sup>, Professor Benjamin Howden<sup>3</sup>

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#### **Abstract:**

**Introduction:** The 13-valent pneumococcal conjugate vaccine (PCV13) replaced the 7-valent vaccine (PCV7) on the National Immunisation Program in July 2011. We assessed changes in pneumococcal serotypes and antimicrobial resistance (AMR) profiles for invasive pneumococcal disease (IPD) in Victoria in the period following PCV13 introduction.

**Methods:** IPD data for 1 January 2008 to 30 June 2018 were extracted from the Victorian Hospital Pathogen Surveillance Scheme, a voluntary laboratory-based system for invasive isolates. Cases were divided into three equal periods (Pre-PCV13: 1 January 2008-30 June 2011; Transition: 1 July 2011-31 December 2014; Post-PCV13: 1 January 2015-30 June 2018). Antimicrobial susceptibility data were assessed using clinical breakpoints as interpreted by diagnostic laboratories. Using poisson regression, the incidence of serotypes and penicillin and third-generation cephalosporins (3GC) susceptibilities were compared between periods.

**Results:** There were 3865 IPD cases with available serotype data. The pre-PCV13 period included 1215 cases; of which 99% had penicillin susceptibilities and 95% had 3GC susceptibilities. The post-PCV13 period included 1277 cases; of which 100% had penicillin susceptibilities and 91% had 3GC susceptibilities. Univariate regression found that the incidence risk ratio (IRR) for PCV13 serotypes decreased (IRR 0.54,  $p < 0.001$ ), notably serotype 19A (IRR 0.23,  $p < 0.001$ ), after the PCV13 was introduced. Levels of penicillin non-susceptibility decreased (IRR 0.75  $p = 0.02$ ) while 3GC non-susceptibility did not change (IRR 1.1,  $p = 0.8$ ).

**Conclusion:** There was a significant decrease in the incidence of vaccine serotypes following introduction of PCV13. Levels of AMR did not increase however ongoing surveillance is essential to identify emerging changes.

### **RF1.005- Sedentary Behaviour is Associated with Poorer Physical Function: A Meta-Analysis**

**Authors:** Dr Natasha Reid<sup>1</sup>, Dr Nga Nguyen<sup>2</sup>, Dr Brigid Lynch<sup>2</sup>, Dr Steve Johnston<sup>3</sup>, Dr Dori Rosenberg<sup>4</sup>, Professor Jeff Vallance<sup>3</sup>, Dr Paul Gardiner<sup>1</sup>

**Affiliations:** <sup>1</sup>University of Queensland, Brisbane, Australia, <sup>2</sup>Cancer Council Victoria, Melbourne, Australia, <sup>3</sup>Athabasca University, Athabasca County, Canada, <sup>4</sup>Kaiser Permanente Washington Health Research Institute, Seattle, United States

#### **Abstract:**

**Background:** Physical function loss is associated with decreased independence, disability, and hospitalization. Sedentary behaviour levels are higher among older adults. Thus, we aimed to review the literature to examine whether there are associations of sedentary behaviour with physical function.

**Methods:** Medline, EMBASE, and CINAHL were searched using medical subject headings and key words related to sedentary behaviour and physical function for articles to October 2018. Information on study characteristics and results were extracted. Random effects meta-analyses using Pearson's correlation coefficients were employed to examine the magnitude of effect for the association between sedentary time (h/day) and physical function (global score and individual physical function tests).

**Results:** 49 studies were identified for inclusion in a systematic review with 24 cross-sectional studies (N=8,462) meeting inclusion criteria for the meta-analysis. Sedentary behaviour was detrimentally associated with global physical function,  $r = -0.15$  (-0.20, -0.09), lower body function [k=13; N=5,197;  $r = -0.22$  (-0.39, -0.04)], and gait speed [k=6; N=1,167;  $r = -0.33$  (-0.48, -0.16)]. There was no evidence of an effect of sedentary behaviour measurement (device-measured vs self-report). Meta-regression results showed a negative correlation of sedentary behaviour with global function with increasing age of participants ( $\beta = -0.007$ , 95%CI = -0.013 to -0.001,  $p = 0.02$ ).

**Conclusions:** This meta-analysis found consistent associations of sedentary behaviour with global physical function, lower body function and gait speed, with stronger relationships in older people. More work is needed to understand the behavioural and physiological mechanisms underpinning this relationship. Interventions targeting reductions in sedentary behaviour may be useful in addressing declines in physical function for older people.

### **RF1.006- The association between BMI and weight perception among adolescents in the ACT**

**Authors:** Ms Sommer Sherwood<sup>1</sup>, Dr Ann-Maree Hughes<sup>1</sup>, Dr Oscar Yang<sup>1</sup>, Dr Hai Phung<sup>1</sup>

**Affiliations:** <sup>1</sup>ACT Health, Canberra, Australia

#### **Abstract:**

**Background:** Adolescence is an important period for developing healthy behaviours that track into adulthood. We examined the association between body mass index (BMI) and body weight perception in a sample of adolescents.

**Methods:** The analyses are based on a multi-year dataset comprising 13,372 ACT secondary school students aged 12-17 years (51.9% males) who participated in the triennial Australian Secondary Students' Alcohol and Drug Survey (ASSAD) between 2008 and 2017. BMI was calculated from self-reported height and weight and body weight perception and satisfaction with weight were assessed using single questionnaire items.

**Results:** Overall, 16% (n=915) of adolescents perceived themselves as underweight, 57.3% (n=3303) as 'about right' and 26.6% (n=1703) as overweight. In reality, 8.9% (n=296) were underweight, 72% (n=2,248) were healthy weight and 19.2% (n=589) were overweight/obese. While boys (OR: 1.59; 95% CI 1.16-2.18) were significantly more likely than girls to be classified as overweight/obese based on self-reported BMI, they were less likely to perceive themselves as overweight (OR=0.61; 95% CI: 0.50-0.75) and significantly less likely to be unhappy with their weight (OR 0.57; 95% CI: 0.46-0.70). There were no significant differences by age group.

**Conclusions:** A mismatch exists between BMI and body weight perception among adolescents. Distinct differences between sexes were also found, whereby more boys were overweight/obese and more girls were unhappy with their weight. These results emphasize the need for targeted sex-specific school-based initiatives to improve body image and knowledge about healthy weight management.

### **RF1.007- Nutrient pattern and depressive symptoms among Australian adults**

**Authors:** Mr Prem Raj Shakya<sup>1,2</sup>, Dr Yohannes Adama Melaku<sup>1,3</sup>, Prof. Amanda Page<sup>1,2</sup>, Dr Tiffany Gill<sup>1,2</sup>

**Affiliations:** <sup>1</sup>University of Adelaide, Adelaide, Australia, <sup>2</sup>South Australian Health and Medical Research Institute, Adelaide, Australia, <sup>3</sup>Flinders University, Bedford Park, Australia

#### **Abstract:**

**Background:** There is limited evidence about nutrient patterns [(NP(s))] in the context of diet-depression associations. This study aimed to investigate the association between NP(s) and risk of depression in the Australian adult population.

**Methods:** Two stages from the North West Adelaide Health Study (Stage 3: n=1743, 49.9% males; NW15: n=1,017, 46.5% males) were analysed. Depressive symptoms were assessed using the Center for Epidemiological Studies-Depression (CES-D) scale. Dietary data were collected using a food frequency questionnaire (FFQ). Principal component analysis was used to identify NP(s) as well as the factor structure of the CES-D. Log-binomial regression and negative-binomial regression analysis were used to assess the association between NP(s) and depressive symptoms. Linear regression analysis was carried out between the factor structure of the CES-D score and NP(s).

**Results:** Three NP(s) (from FFQ) and two-factor structures (from CES-D score) were obtained. After adjusting for known confounders, the 'plant-sourced' ( $\beta$ -carotene, fibre, vitamin-C, potassium and  $\alpha$ -carotene) NP were inversely associated with depressive symptoms in both Stage 3 [IRRQ4VsQ1, 0.78; 95% CI, 0.66-0.92;  $p = 0.003$ ] and in NW15 [IRRQ4vsQ1, 0.81; 95% CI, 0.65-1.00;  $p = 0.270$ ]. 'Animal-sourced' ( $\omega$ 3-fatty acid, monounsaturated-fat, vitamin-E and cholesterol) and 'mixed-source' (phosphorous, protein, vitamin-B2, iodine and zinc) NP(s) were not associated with depressive symptoms. There was an inverse relationship between 'plant-sourced' NP and '(the absence of) Positive-affect' factor from the CES-D in both stages but was attenuated in the fully adjusted model.

**Conclusions:** The 'plant-sourced' NP(s) is consistently and inversely associated with depressive symptoms. However, longitudinal studies are recommended to confirm these results.

#### **RF1.008- Should we risk-adjust for frailty in health outcome models for older people?**

**Authors:** Dr Lara Harvey<sup>1,2</sup>, Ms Barbara Toson<sup>1</sup>, Dr Christina Norris<sup>1</sup>, Professor Ian Harris<sup>3,4</sup>, Dr Robert Gandy<sup>5</sup>, Professor Jacqueline Close<sup>1,5</sup>

**Affiliations:** <sup>1</sup>Neuroscience Research Australia, Randwick, Australia, <sup>2</sup>School of Public Health and Community Medicine, UNSW, Randwick, Australia, <sup>3</sup>South Western Sydney Clinical School, UNSW, Liverpool, Australia, <sup>4</sup>Ingham Institute of Applied Medical Research, Liverpool, Australia, <sup>5</sup>Prince of Wales Hospital, Randwick, Australia, <sup>6</sup>Prince of Wales Clinical School, Randwick, Australia

#### **Abstract:**

**Background:** Frailty is a major contributor to poor health outcomes in older people, separate from age, sex and comorbidities. This study evaluated the performance of a hospital frailty risk score (HFRS) in the prediction of adverse outcomes in an older surgical population, and compared its performance against the Charlson Comorbidity Index (CCI).

**Methods:** Hospitalisation and death data for individuals aged >50 admitted for a surgical admission to a NSW hospital (2013-2017) were linked. HFRS (Gilbert algorithm) and CCI (Quan algorithm) scores were calculated using both 2 and 5-year lookback periods. Several logistic regression models were fitted for each outcome (30-day mortality, prolonged LOS, and 28-day readmission): 1) base model (age and sex); 2) base + CCI; 3) base + HFRS; 4) base + CCI+ HFRS. Area under the receiving operator curve (AUC) and Akaike information criterion were assessed.

**Results:** Of the 487,197 patients, 6.8% were classified as high HFR, and 18.3% as high CCI. Whilst all models performed better than base model for prediction of 30-day mortality; adjusting for CCI (AUC 0.76) provided better prediction than adjusting for frailty (AUC 0.75). Adjustment for both HFRS and CCI did not significantly improve model performance. All models had poor ability to predict prolonged LOS (AUC range 0.62-0.63) or readmission (AUC range 0.62-0.65). Using a 5-year lookback period did not improve model discrimination.

**Conclusions:** Adjusting for frailty did not improve prediction of 30-mortality over that achieved by the CCI. Neither frailty nor CCI were useful for predicting prolonged LOS or 28-day unplanned readmission.

#### **RF1.009- Applying a latent variable mixture modelling approach to understanding snack eating occasions**

**Authors:** Dr Rebecca Leech<sup>1</sup>, Associate Professor Carol Boushey<sup>2</sup>, Professor Sarah McNaughton<sup>1</sup>

**Affiliations:** <sup>1</sup>Institute for Physical Activity and Nutrition (IPAN), Deakin University, Melbourne, Australia, <sup>2</sup>Epidemiology Program, University of Hawaii Cancer Center, Honolulu, United States of America

#### **Abstract:**

**Background:** Understanding food intake at eating occasions (EO) such as snacks may provide novel insights into eating behaviour. However, analysis of EO is challenging due to the highly skewed and semi-continuous nature of the data. We applied a latent variable mixture modelling approach to examine food profiles at snack EO.

**Methods:** Dietary intake at snack EO (n=17191) was assessed via 24-h recall during the 2011-12 National Nutrition and Physical Activity Survey (n=7646 adults, ≥19 years). Two-part latent variable mixture modelling was used to determine distinct snack food profiles using 29 energy-adjusted food and beverage intake groups as input variables.

**Results:** Four distinct profiles were identified. Two profiles were similar among men and women and were labelled: "Coffee/tea, milks and sweet cereal products" and "Breads/crispbreads and spreads". Among men, an "Alcohol" profile and a "Mixed" profile (including fruit and/or unhealthy foods/beverages) were also identified. Two profiles unique to women were characterised by "Fruit" and "Unhealthy foods/beverages", respectively. Snack profiles varied according to time-of-day and socio-demographic factors. For example, profiles characterised by unhealthy foods or alcohol were mostly consumed in the afternoon or evening. Men consumers of an "Alcohol" profile were more likely to be smokers, whereas women consumers of a "Fruit" profile were more likely to be never smokers (both p<0.001), when compared to the other profiles.

**Conclusions:** We identified four snack profiles that varied by time-of-day of consumption and socio-demographic factors. Latent variable mixture modelling is a useful approach to capture the complexity of food combinations at EO.

### **RF1.010- Performance of methods for estimating the non-linear health effects of correlated-chemical mixtures**

**Authors:** **Ms. Nina Lazarevic**<sup>1</sup>, A/Prof. Luke D. Knibbs<sup>1</sup>, Prof. Peter D. Sly<sup>2</sup>, Prof. Adrian G. Barnett<sup>3</sup>

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#### **Abstract:**

**Background:** Statistical methods for identifying harmful chemicals in a correlated mixture often assume linearity in exposure–response relationships. Non-monotonic relationships are increasingly recognised (e.g., for endocrine-disrupting chemicals); however, the impact of non-monotonicity on exposure selection has not been evaluated. In a simulation study, we assessed the performance of Bayesian kernel machine regression (BKMR), Bayesian additive regression trees (BART), Bayesian structured additive regression with spike–slab priors (BSTARSS), and lasso penalised regression.

**Methods:** We used data on exposure to phthalates and phenols in pregnant women from the U.S. National Health and Nutrition Examination Survey to simulate realistic exposure data using a multivariate copula. We simulated datasets of size  $N = 250$  and compared methods across 32 scenarios, varying by model size and sparsity, signal-to-noise ratio, correlation structure, and shape of exposure–response relationships. We compared methods in terms of their sensitivity, specificity, and estimation accuracy.

**Results:** BKMR and BSTARSS achieved moderate to high specificity (0.56–0.91 and 0.57–0.96, respectively) and sensitivity (0.49–0.98 and 0.25–0.97, respectively) in most scenarios. BART achieved high specificity ( $\geq 0.96$ ), but low to moderate sensitivity (0.13–0.66). Lasso was highly sensitive (0.75–0.99), except when exposure–response relationships were symmetric inverse-U-shaped ( $\leq 0.2$ ). Performance was affected by the signal-to-noise ratio, but not substantially by the correlation structure.

**Conclusions:** Penalised regression methods that assume linearity, such as lasso, may not be suitable for studies of environmental chemicals hypothesised to have non-monotonic relationships with outcomes. Instead, BKMR and BSTARSS are attractive methods for flexibly estimating the shapes of exposure–response relationships and selecting among correlated exposures.

### **RF1.011- Spatial Distribution and Factors of Anemia among women: Multilevel and Spatial Analysis**

**Authors:** **Mr Kelemu Kibret**<sup>1</sup>, Dr Catherine Chojenta<sup>1</sup>, Professor Deborah Loxton<sup>1</sup>, Dr Ellie D'Arcy<sup>2</sup>

**Affiliations:** <sup>1</sup>*The University of Newcastle, Newcastle, Australia*, <sup>2</sup>*Western NSW Local Health District, Bathurst, Australia*

#### **Abstract:**

**Introduction:** Anemia remains a priority issue in resource-limited settings. In Ethiopia, varied prevalence rates of anaemia have been reported at different parts of the country, but no spatial analysis has been conducted so far. The aim of this study was to assess the spatial distribution and predictors of anaemia among women in Ethiopia.

**Methods:** A multilevel logistic regression model was used to identify factors of anaemia using the 2016 Ethiopian Demographic and Health Survey data. Getis-Ord  $G_i^*$  statistics were used to identify the hot and cold spot areas for anaemia.

**Results:** Statistically high hotspots of anemia were observed in the eastern and north-eastern parts of Ethiopia. Older age (adjusted odds ratio (AOR) = 0.75; 95% CI: 0.64, 0.96), having no education (AOR = 1.37; 95% CI: 1.102–1.72), lowest wealth quantile (AOR = 1.29; 95 % CI: 1.014-1.60), currently breastfeeding (AOR = 1.09; 95% CI: 1.025, 1.28), high gravidity (AOR = 1.39; 95% CI: 1.13, 1.69), having HIV infection (AOR = 2.11; 95% CI: 1.59, 2.79), rural residency (AOR = 1.29; 95% CI: 1.02, 1.63), unimproved latrine at home (AOR = 1.18; 95 % CI: 1.01, 1.39) were factors significantly associated with higher odds of anemia.

**Conclusion:** The prevalence rate of anaemia among women of varied across the country. Significantly high prevalence of anaemia was observed in the eastern and north-eastern parts of Ethiopia. Anaemia prevention strategies need to be targeted on rural residents, women with limited education, women who are breastfeeding and HIV positive, areas with poor latrine facilities.

### **RF1.012- Exploring medicines prescribing using MedicinesInsight data from routinely collected electronic health records**

**Authors:** Ms Josephine Belcher<sup>1</sup>, Ms Kendal Chidwick<sup>1</sup>, Dr Sarah Norman<sup>1</sup>, Dr Doreen Busingye<sup>1</sup>, Dr Allan Pollack<sup>1</sup>, Dr Suzanne Blogg<sup>1</sup>

**Affiliations:** <sup>1</sup>*NPS MedicineWise, Sydney, Australia*

#### **Abstract:**

**Background:** Routinely collected general practice data is an alternative source of national prescribing information. It complements PBS data but can also provide insight into non-PBS prescribing. We explored primary care prescribing data.

**Methods:** This was a descriptive cross-sectional study, using MedicinesInsight data – a large-scale primary care database of longitudinal de-identified Australian electronic health records – from 2.7 million patients attending 474 general practice sites during financial year 2017–18. Patients with a valid age, sex and at least one clinical GP encounter during the year were eligible. Prescriptions were categorised by ATC codes and PBS status.

**Results:** Approximately 11 million original prescriptions were written by GPs at included practices during 2017–18. Almost 70% of patients received at least one original prescription. The average number of original prescriptions per patient was 3.6, although this increased as patients got older and with socioeconomic disadvantage, consistent with higher disease burdens in these populations. Medicines for the nervous system (ATC N) were the most commonly prescribed original prescriptions but cardiovascular medicines (ATC C) were the most commonly prescribed original plus repeat medicines. PBS prescriptions accounted for 87.2% of prescribing. Private prescriptions were more common if the medicine was for migraine, a contraceptive, a hypnotic or sedative, for topical skin conditions or infections of the eye or ear.

**Conclusions:** MedicinesInsight is a valuable additional source of information on medicines, including those prescribed privately. In conjunction with information on conditions and pathology tests, MedicinesInsight data can be used to explore condition management in primary care.

### **RF1.013- Evaluation of optimal methods for incidence projections using cancer registry data**

**Authors:** Dr Cynthia Xinting Lu<sup>1</sup>, Professor Peter Baade<sup>1,2,3</sup>, Mr Danny Young<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*Cancer Council Queensland, Brisbane, Australia*, <sup>2</sup>*Menzies Health Institute Queensland, Griffith University, Brisbane, Australia*, <sup>3</sup>*School of Mathematical Sciences, Queensland University of Technology, Brisbane, Australia*

#### **Abstract:**

**Background:** A variety of statistical models are available to generate cancer projections. However, it is not clear which models are most effective, nor the impact model selection has on the final projected estimates.

**Objective:** To identify the key modelling methods for incidence projections from cancer registry data and compare the accuracy of the modelled projections.

**Material and Methods:** A literature review of studies on cancer incidence projections was conducted. Incidence data for five invasive cancers (melanoma, lung, colorectal, female breast and prostate) were extracted from the Queensland Cancer Registry. Statistical models based on the findings of the literature review were fitted using observed data from 1982-2001 to retrospectively estimate the projected cancer incidence to 2015. Accuracy was assessed by comparing these projections with the observed data from 2002-2015 ( $|\text{observed} - \text{predicted}|/\text{observed}$ ) for all age groups combined for the different prediction models.

**Results:** The three most commonly used models for cancer projection identified in the review were classical age-period-cohort models (Poisson); age-period-cohort models fitted with natural cubic splines (“apcspline” function in Stata); and age-period-cohort models with a fixed power-link function (Nordpred software). Across the five cancer types and statistical models, differences between the observed and projected estimates ranged from 1.7% (age-period-cohort spline model for melanoma) to 63.6% (Nordpred model for prostate cancer), with the age-period-cohort splines generally outperforming the alternative methods.

**Conclusion:** Implications of the different modelling methods for the projection estimates and quantifying the uncertainty associated with model selection need to be considered when interpreting published projections.

### **RF1.014- Asthma Risk from Environmental Conditions and Pollen Flow**

**Authors:** Mrs. Charlotte Waudby<sup>1</sup>, Associate Professor. Nicholas Osborne<sup>2</sup>, Professor. Steven Sherwood<sup>1</sup>, Dr. David Muscatello<sup>1</sup>

**Affiliations:** <sup>1</sup>University New South Wales, Coogee, Australia, <sup>2</sup>University of Queensland, Brisbane, Australia

**Abstract:**

**Background:** In 2018, asthma affected 11% of Australia's population. In the financial year 2015-16 it resulted in 39,448 hospitalisations in Australia at an estimated cost of \$28 billion in 2015. It accounts for an average 2% of all GP encounters per year and exacerbations may be triggered by atmospheric conditions, respiratory infections, dust mites, mould, dust and pollen.

A devastating thunderstorm asthma event occurred in Melbourne on the 21st November 2016, during which approximately 10,000 people presented to emergency departments (ED) with acute asthma onset (only 28% had a previous asthma diagnosis) and ten people died. The cause was the interaction of environmental conditions with ryegrass pollen. To enhance our understanding of the thunderstorm asthma risk, we aim to model the flow of grass pollen across Australia during flowering season.

**Methods:** We used a weather research forecasting (WRF) model to simulate a 3-dimensional atmosphere in which the pollen may travel and use a Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) model, to simulate grass pollen flow and dispersion over complex topography.

**Results:** Preliminary results indicate Sydney's atmospheric pollen concentrations have multiple peaks in spring and autumn. Both the WRF and HYSPLIT back-trajectory simulations have indicated a westerly cold front and wind flow across Southern Australia on high pollen days.

**Conclusions:** Cool dense air associated with cold fronts and low-pressure systems may keep pollen close to the ground, reducing vertical mixing and horizontal dispersion within the atmosphere and increasing population exposure and asthma risk.

### **RF1.015- Unplanned readmission in 28 days of hospital discharge in a longitudinal population-based cohort of older Australian women**

**Authors:** Dr Dinberu Shebeshi<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Newcastle, Newcastle, Australia

**Abstract:**

**Background:** Unplanned readmission within a few weeks of hospital discharge is costly for the patient and healthcare system. It is deemed also as an indicator of the quality and safety of the health service.

**Objective:** This study aimed to estimate the incidence of unplanned readmission and associated factors among older patients aged 75 years and over. **Methods and materials:** This study used data from the 1921-1926 birth cohort of the Australian Longitudinal Study on Women's Health (ALSWH). Linkage of ALSWH self-reported survey data with administrative data from the Admitted Patient Data Collection (APDC) allowed identification of the women's hospital admission history and the corresponding baseline characteristics. Proportional hazard models were performed to assess factors contributing to unplanned readmission.

**Results:** Overall, a total of 2056 women had at least one unplanned overnight hospital admission (and discharged alive) in 2001-2016. Of these women, 363 (17.5%) had unplanned readmission within 28 days of discharge. Among women with unplanned readmission, nearly 27% were readmitted with the same condition as for the index hospitalisation. Cardiovascular diseases were the main diagnoses for unplanned index admission and unplanned readmission. Risk of unplanned readmission was higher among women who were not partnered (Hazard Ratio (HR) =1.36, 95%CI: 1.05-1.75), of non-English speaking background (HR=1.67%, 95%CI: 1.15-2.44), and those with chronic disease (HR=1.40, 95%CI: 1.02-1.92).

**Conclusion:** More than one in ten women had an unplanned readmission at some time between ages 75-95. Women who were not partnered, not principally English language speakers, and those with chronic disease may need further support during their stay and on discharge to mitigate the risk of unplanned readmission.

## 1A Mental Health

Plaza Room P9, 10:45am - 12:15pm

### Mortality associated with mental disorders: results based on 6.6 million Danish persons

**Authors:** [Dr Oleguer Plana-Ripoll](#)<sup>1</sup>, Professor Per K Andersen<sup>2</sup>, Professor Harvey A Whiteford<sup>3,4,5</sup>, Professor John J McGrath<sup>1,3,6</sup>

**Affiliations:** <sup>1</sup>National Centre for Register-based Research, Aarhus University, Aarhus V, Denmark, <sup>2</sup>Section of Biostatistics, University of Copenhagen, Copenhagen, Denmark, <sup>3</sup>Queensland Centre for Mental Health Research, The Park Centre for Mental Health, Queensland, Australia, <sup>4</sup>School of Public Health, Faculty of Medicine, The University of Queensland, Brisbane, Australia, <sup>5</sup>Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA, <sup>6</sup>Queensland Brain Institute, University of Queensland, St Lucia, Australia

#### Abstract:

**Background:** People with mental disorders have an increased risk of premature mortality. Traditionally, this evidence has been based on mortality rate ratios (MMRs) or estimates of life expectancy that do not incorporate variation in the age of onset of the disorder. The aim of this study was to perform a comprehensive analysis of mortality-related health metrics associated with mental disorders, including sex- and age-specific MRRs and Life Years Lost (LYLs), which takes into account the observed age-of-onset distribution.

**Methods:** Population-based cohort including all Danish residents in 1995-2015 (N=6,619,045). Information on mental disorders was obtained from the Psychiatric Research Register, while date and cause of death was obtained from the Registry of Causes of Death.

**Results:** All types of mental disorders were associated with higher mortality rates (MRRs ranging from 1.9 [95%CI; 1.9-1.9] for mood disorders to 3.9 [95%CI; 3.8-3.9] for substance use disorders) and shorter life expectancy (LYLs ranging from 5.2 years for organic disorders in women to 14.7 years for substance use disorders in men). Men with all types of mental disorder lost a smaller amount of years due to neoplasm-related deaths compared to the general population, although their mortality rates were systematically higher.

**Conclusions:** We provide a comprehensive analysis of mortality by different types of mental disorders, displayed by age, sex and cause of death. Our new methods provide more accurate estimates of premature mortality incorporating age of onset of the disorder. In order to facilitate fine-grained interrogation of the data, we provide an interactive data visualization website.

### Breadwinners and losers: mental health effects of household employment arrangements

**Authors:** [Dr Tania King](#)<sup>1</sup>, Ms Marissa Shields<sup>1</sup>, Dr Sean Byars<sup>1</sup>, Professor Anne Kavanagh<sup>1</sup>, Professor Lyn Craig<sup>1</sup>, Associate Professor Allison Milner<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Melbourne, Carlton, Australia

#### Abstract:

**Background:** The past 50 years have been marked by the increasing participation of women in the labour force. It is popularly speculated that this imposes a mental-health burden on women and that children are also adversely affected. This analysis examined associations between household employment configuration and parental and child mental-health.

**Methods:** Seven waves of data from the Longitudinal Study of Australian Children were used (2004-2016, child ages 4/5-16/17 years). A five-category measure of household employment configuration was derived from parental reports. Categories were: dual full-time, male-breadwinner, female-breadwinner, shared employment (both part-time); father full-time/mother part-time (1.5-earner). Mundlak models were used to compare within- and between-person effects after controlling for confounders (reference category: 1.5-earner). Models were restricted to those households in which household employment configuration changed.

**Results:** Women in a male-breadwinner household had poorer mental-health than women in 1.5-earner households (between-effects,  $\beta=0.79$ , 95% CI 0.18-1.41). Within-person results also showed that poorer mental-health for women was associated with change between 1.5-earner and male-breadwinner ( $\beta=0.14$ , 95%CI 0.00-0.28), and shared households ( $\beta=0.26$ , 95%CI 0.01-0.52). Men in female-breadwinner households had poorer mental-health than those in 1.5-earner configuration ( $\beta=3.61$ , 95%CI 0.85-6.37), however no within-person effects were observed. No associations were observed for children/adolescents.

**Conclusions:** These results demonstrate that children are not adversely affected by their parent's labour force participation, nor the extent of this. For women, 'male-breadwinner' arrangements were associated with poorer mental-health compared to 1.5-earners, and there were no mental-health effects when working full-time. Between-person effects for men were potentially driven by confounding by indication.

## **Predicting Cardiovascular Risk Among People with Severe Mental Illness**

**Authors:** Dr Ruth Cunningham<sup>1</sup>, Dr Katrina Poppe<sup>2</sup>

**Affiliations:** <sup>1</sup>University of Otago Wellington, Wellington, New Zealand, <sup>2</sup>University of Auckland, Auckland, New Zealand

### **Abstract:**

**Aim:** To determine the accuracy of the new PREDICT CVD risk prediction algorithm in predicting cardiovascular outcomes for those with a history of mental illness.

**Methods:** A cohort of adults who had a cardiovascular risk assessment between Jan 2006 and Dec 2015 were identified from the PREDICT primary care database, and linked to the Programme for Integration of Mental Health Data (PRIMHD) (to establish mental health service use history over the five years prior to risk assessment) and followed up for cardiovascular outcomes to Dec 2015. Cox regression was used to compare cardiovascular outcomes by history of mental health problems over up to ten years following initial assessment. Observed CVD event rates were compared to rates predicted by the PREDICT CVD risk model.

**Results:** Cardiovascular event rates were higher in those with a history of mental health service contact or antipsychotic prescription compared to those without, particularly for women. The observed risk of CVD events was 30% greater than the predicted risk for men and 60% greater for women.

**Conclusion:** Clinicians should be aware that the PREDICT algorithm under predicts the risk of cardiovascular disease in people with a history of mental health service use, particularly those with a diagnosis of schizophrenia or bipolar disorder. An adapted algorithm is therefore being developed.

## **Genetic epidemiology of back pain: Examining causality with Complex Traits Virtual Lab**

**Authors:** Dr Trung Thanh Ngo<sup>1</sup>, Mischa Lundberg<sup>1</sup>, Adrián Campos-González<sup>2</sup>, Pik Fang Kho<sup>3</sup>, Shannon D'Urso<sup>1</sup>, Dr Liang-Dar Hwang<sup>1</sup>, Dr Miguel Rentería<sup>2</sup>, Dr Gabriel Cuéllar-Partida<sup>1</sup>

**Affiliations:** <sup>1</sup>UQ Diamantina Institute, Faculty of Medicine & Translational Research Institute, Woolloongabba, Brisbane, Australia, <sup>2</sup>Genetic Epidemiology Laboratory, Herston, Brisbane, Australia, <sup>3</sup>Molecular Cancer Epidemiology Laboratory, Herston, Brisbane, Australia

### **Abstract:**

**Background:** Lower back pain is the leading cause of disability worldwide (GBD 2015, Lancet 2016). In Australia its high prevalence and mistreatment contributes to musculoskeletal disorders having the highest health expenditure (2015–16) across all disease groups (AIHW 2019). Observational studies have identified risk factors (e.g., depression, obesity) and pathological causes (e.g., vertebral fracture, spondylitis) for low back pain (Hartvigsen et al., Lancet 2018), however the underlying genetic causal pathways remain unclear.

**Methods:** We addressed this question using an open web platform — the Complex-Traits Genetics Virtual Lab (CTG-VL) <https://genoma.io> — to analyse back pain data (N=509,070) from genome-wide association study summary statistics (Freiden et al., Pain 2019). Causal direction between back pain and 1,340 other complex traits was examined with genetic causality proportion (GCP±s.e.) (O'Connor & Price, Nat Genet 2018), and the direction of genetic association (+ve/-ve) was determined with genetic correlations (ρg±s.e.).

**Results:** Positive genetic correlations were found between obesity, severe recurrent major depression, spondylitis, osteoporosis and back pain (ρg = 0.33±0.12, 0.39±0.09; 0.84±0.18, 0.23±0.09; respectively), indicating the genes involved in these particular complex traits are also involved in back pain. Furthermore, a proportion of the genetic variants (SNPs) affecting back pain may be causally mediated through these complex traits (GCP = -0.71±0.19, -0.49±0.22, 0.93±0.07, 0.93±0.15; respectively).

**Conclusions:** These results provide the first evidence for a genetic causal component underlying associations between back pain with particular chronic diseases and mental health conditions. CTG-VL can be utilised for further large-scale phenome-wide analyses concerning other major burdens of illness.

## **The impact of the disability support pension on mental health**

**Authors:** Associate Professor Allison Milner<sup>1</sup>, Dr Ashley McAllister<sup>2</sup>, Ms Zoe Aitken<sup>1</sup>, Professor Anne Kavanagh<sup>1,3</sup>

**Affiliations:** <sup>1</sup>University Of Melbourne, Carlton, Australia, <sup>2</sup>Equity and Health Policy Unit, Department of Public Health Sciences, Karolinska Institutet, Stockholm, Sweden, <sup>3</sup>Melbourne Disability Institute, Melbourne, Australia

### **Abstract:**

The Disability Support Pension (DSP) represents a substantial proportion of government's social welfare expenditure. Previous research suggests that DSP recipients experience stigma and report problems in accessing social welfare. This paper aims to assess the effect of the DSP on symptomology of depression and anxiety over and above the effects of reporting a disability itself.

**Methods:** Data was drawn from the Household, Income and Labour Dynamics in Australia (HILDA) survey over the period 2004 to 2017. A fixed-effects regression approach was used to understand mental health differences (using the Mental Health Inventory-5 (MHI-5)) when a person reported: 1) a disability, or; 2) a disability and being in receipt of the DSP compared to (3) when they reported no disability. The analytic models estimated within-person effects on mental health of changing exposure groups controlling for time-varying changes in the severity of disability and other time varying and time invariant confounders.

**Results:** There was a 2.97-point decline (95% CI -3.26 to -2.68) in the MHI-5 when a person reported a disability compared to waves in which they reported no disability, and 4.48-point decline (95% CI -5.75 to -3.22) when a person reported both a disability and being on the DSP compared to waves in which they reported neither. Results also suggest that worsening in core functioning also impacted mental health.

**Conclusions:** These results suggest that DSP is harmful to mental health and policy-makers should focus more on the unintended adverse consequences of accessing governmental support in already vulnerable populations.

### **Persistent psychological distress and risk of incident cardiovascular disease**

**Authors:** Ms Jenny Welsh<sup>1</sup>, Professor Emily Banks<sup>1,2</sup>, Dr Grace Joshy<sup>1</sup>, Professor Peter Butterworth<sup>1,3</sup>, Professor Lyndall Strazdins<sup>1</sup>, Associate Professor Rosemary Korda<sup>1</sup>

**Affiliations:** <sup>1</sup>Australian National University, Canberra, Australia, <sup>2</sup>The Sax Institute, Ultimo, Sydney, Australia, <sup>3</sup>University of Melbourne, Parkville, Australia

#### **Abstract:**

**Background:** Incident cardiovascular disease (CVD) is elevated among people with psychological distress. Whether the association varies with duration of symptoms - and is causal - is unclear. We quantified the association between incident CVD and three measures of distress, including two indicating persistent distress, and assessed the extent to which associations were accounted for by personal, behavioural and physical health-related factors.

**Methods:** Baseline (2006-2009) and follow-up (2010-2015) questionnaire data from 45 and Up Study participants free from CVD and cancer were linked to hospitalisation and death records (to Dec 2015). Measures of distress were: high (K10 score: 22-50) compared to low (10-<12) distress at one time-point (follow-up); high compared to low distress at two time-points (baseline and follow-up); and, early onset (diagnosed before age 30years) depression/anxiety compared to no diagnosis. Using Cox regression, we quantified the association between measures of distress (assessed separately) and hospitalisation/ death due to major CVD, adjusting for personal and behavioural characteristics, and physical functional limitations.

**Results:** Among 80,638 respondents, 3358 incident major CVD events occurred over 260,572 follow-up years (median:3.2yrs, rate:12.9/1000person-years). High versus low distress was associated with a 30-40% elevated risk of CVD, for all three measures. However, risks attenuated with adjustment for personal and behaviour-related risk factors, and were no longer significantly elevated when functional limitations were taken into account.

**Conclusion:** Associations between distress and CVD are similar for one-off and persistent measures of distress, and are substantively explained by personal, behavioural and physical health-related factors.

### **Psychosocial work stressors and mortality in Australia: analyses using HILDA survey**

**Authors:** Ms Yamna Taouk<sup>1</sup>, Professor Anthony LaMontagne<sup>2</sup>, Associate Professor Matthew Spittal<sup>1</sup>, Associate Professor Allison Milner<sup>1</sup>

**Affiliations:** <sup>1</sup>Melbourne School of Population and Global Health, The University of Melbourne, Parkville, Australia, <sup>2</sup>Centre for Population Health Research, Deakin University, Burwood, Australia

#### **Abstract:**

**Objectives:** To examine the association between exposures to psychosocial work stressors and mortality in a nationally-representative Australian working population sample.

**Methods:** Over 18,000 respondents from the Household Income and Labour Dynamics in Australia (HILDA) Survey with self-reported job demands, job control, job security and fair pay psychosocial work stressors exposures at baseline were followed for up to 15 waves. Cox proportional hazards regression models were used to examine the association between psychosocial work stressors and mortality. Models were serially adjusted for each subgroup of demographic, socioeconomic, health and behavioural risk factors.

**Results:** Low job control was associated with a 38% increase in the risk of all-cause mortality (HR 1.38; 95% CI: 1.08, 1.77) controlling for demographic, socioeconomic, health and behavioural factors. A decreased risk of mortality was observed for workers with exposure to high job demands (HR 0.78; 95% CI: 0.59, 1.02 adjusted for demographic, socioeconomic, health and behavioural factors). There did not appear to be an association between exposure to job insecurity (HR 1.02; 95% CI: 0.79, 1.32) and mortality or unfair pay and mortality (HR 1.03; 95% CI: 0.79, 1.33) after adjusting for demographic, socioeconomic, health and behavioural factors.

**Conclusions:** Our results suggest that low job control and low job demands are associated with increased risk of all-cause mortality. Policy and practice interventions that reduce the adverse impact of low job control and high job demands in stressful work environments should be implemented to improve health and decrease risk of mortality.

## **Integrated workplace mental health intervention in Victoria Police: results of a cluster-RCT**

**Authors:** Professor Anthony LaMontagne<sup>1,2</sup>, Associate Professor Allison Milner<sup>2</sup>, Professor Angela Martin<sup>3</sup>, Dr Kathryn Page<sup>1</sup>, Dr Nicola Reavley<sup>2</sup>, Associate Professor Andrew Noblet<sup>7</sup>, Dr Tessa Keegel<sup>4</sup>, Dr Amanda Allisey<sup>7</sup>, Dr Alicia Papas<sup>1</sup>, Dr Katrina Witt<sup>5</sup>, Dr Peter Smith<sup>6</sup>

**Affiliations:** <sup>1</sup>Centre for Population Health Research, Deakin University, Burwood, Australia, <sup>2</sup>Melbourne School of Population and Global Health University of Melbourne, Parkville, Australia, <sup>3</sup>University of Tasmania, Hobart, Australia, <sup>4</sup>Latrobe University, Bundoora, Australia, <sup>5</sup>Monash University, Clayton, Australia, <sup>6</sup>Institute for Work & Health, Toronto, Canada, <sup>7</sup>Deakin Graduate School of Business, Deakin University, Burwood, Australia

### **Abstract:**

**Background:** We developed, implemented, and evaluated an integrated workplace mental health intervention in an Australian police context. The primary aims were to improve psychosocial working conditions, develop supportive leadership skills among police station leaders, and promote mental health literacy for all officers.

**Study Design & Methods:** Two-arm cluster-randomised trial design following CONSORT guidelines, with 12 police stations randomly assigned to the intervention and 12 to non-intervention control. Data were collected from all police members in each station (n = 828 at baseline [response rate of 75.1%] and 736 at follow-up [response rate of 69.1%]). Psychosocial working conditions (e.g., supervisory support, job control, job demands) and mental health literacy (e.g., knowledge, confidence in assisting someone who may have a mental health problem) were assessed using established measures. Effectiveness was evaluated using generalised estimating equations, controlling for station level characteristics. We also conducted a mixed method process evaluation.

**Results & Discussion:** Twenty-three stations completed the trial. Intervention activities were only partially implemented (~50% implementation). Some challenges were organisational (e.g., high mobility of police members) and some station level (e.g., operational demands limiting police member availability). There was no improvement in the outcomes measured in intervention versus control groups

**Conclusions:** The multiple barriers to intervention implementation limit the ability to draw effectiveness conclusions. For such an intervention to have the intended impacts, additional resources, a longer intervention period, and system-wide implementation may be needed in order to embed supportive leadership practices, and then for those practices to flow through to improve working conditions.

## 1B Epidemiological research and practice in child and maternal health

Plaza Room P10, 10:45am - 12:15pm

### Autism Spectrum Disorder according to maternal ethnicity and country of birth

**Authors:** Ifrah Abdullahi<sup>1,2</sup>, Dr Kingsley Wong<sup>2</sup>, Dr Keely Bebbington, Dr Raewyn Mutch<sup>1,2,3</sup>, Dr Nicholas de Klerk<sup>2</sup>, Dr Sarah Cherian<sup>1,3</sup>, Dr Jenny Downs<sup>2,4</sup>, Helen Leonard<sup>2</sup>, Emma J Glasson<sup>2</sup>

**Affiliations:** <sup>1</sup>*School of Paediatrics and Child Health, Faculty of Medical Sciences, The University of Western Australia, Nedlands, Australia*, <sup>2</sup>*Telethon Kids Institute, The University of Western Australia, Nedlands, Australia*, <sup>3</sup>*Department of General Paediatrics, Perth Children's Hospital, Nedlands, Australia*, <sup>4</sup>*School of Physiotherapy and Exercise Science, Curtin University, Perth, Australia*

#### Abstract:

**Background:** Increased prevalence of autism spectrum disorder has been observed internationally in children of immigrant and refugee backgrounds. However, very little is known about the clinical profiles and symptomatology in these children and what role maternal migration plays. To evaluate the clinical profiles and disease symptomatology in Western Australian children diagnosed with autism spectrum disorder according to maternal-race ethnicity and maternal country of birth.

**Methods:** A prospective cohort study of 4,776 children aged between 0 to 18 years of age notified to the Western Australian Register for Autism Spectrum Disorders from 1999 to 2017.

**Results:** The mean age at diagnosis was younger for children of immigrant mothers, particularly for children whose mothers were of African descent or were foreign-born from low-income countries. Compared to children whose mothers were Australian-born, children born to immigrant mothers had an increased risk of comorbid intellectual disability and a more severe clinical presentation in their assessed autistic symptomatology. Children of foreign-born mothers from low-income countries were overall more severe in their presentation, were twice as likely to also have an intellectual disability and 2-11 times more likely to have social and communication deficits as assessed using the DSM-IV.

**Conclusion:** Maternal migration was associated with a more severe clinical presentation of autism spectrum disorder and specifically was younger at the time of diagnosis, more severe in the number and severity ratings of assessed criteria, and more likely to have a comorbid intellectual disability. Further research is required to improve the monitoring and early assessments of children born to immigrant mothers.

### Probiotics to treat childhood functional constipation: critical appraisal of the evidence base

**Authors:** Miss Rebecca Harris<sup>1</sup>, Dr Elizabeth Neale<sup>1</sup>, Professor Isabel Ferreira<sup>1</sup>

**Affiliations:** <sup>1</sup>*University Of Wollongong, Wollongong, Australia*

#### Abstract:

**Background:** Recent systematic reviews and meta-analyses on the efficacy of probiotics in the treatment of childhood functional constipation (FC) have yielded conflicting results. We critically reviewed and updated the evidence in this field in an attempt to understand the nature of these conflicting results [registered as CRD42019119109 with PROSPERO].

**Methods:** Literature databases, trial registries, and citations were searched through December 2018. We included RCTs that assessed the effects of probiotics vs. placebo or treatment as usual on defecation frequency [bowel movements (BMs)/wk] or treatment success rates in children with FC. Data were pooled with (inverse variance) random-effects models.

**Results:** We identified 17 RCTs, of which 14 and 11 provided sufficient data to enable meta-analysis of the effects of probiotics on defecation frequency (n=965) or treatment success (n=835), respectively. When compared to (any) control intervention, probiotics did not significantly increase defecation frequency (WMD: 0.28 BMs/wk; 95%CI: -0.12, 0.69) but seemed more efficacious in achieving treatment success (RR:1.24; 95%CI: 1.03, 1.50). These effects did not differ by type of control (active vs. inactive) intervention. However, in analyses confined to RCTs that were free of high-risk of bias (only 5), probiotics did not confer any beneficial effects on defecation frequency (WMD: -0.55 BMs/wk; 95%CI: -1.37, 0.26) or treatment success rates (RR:1.01; 95% CI: 0.90, 1.13), compared with control interventions.

**Conclusions:** The current evidence does not support the use of probiotics as a single or co-adjuvant therapy for treatment of FC in children and refutes recently published, but poorly conducted reviews reporting favourable effects of probiotics.

## Deriving lifestyle patterns in children: A comparison of multivariate methods

**Authors:** Ms Ninoshka Dsouza<sup>1</sup>, Dr Katherine Downing<sup>1</sup>, Dr Gavin Abbott<sup>1</sup>, Associate Professor Liliana Orellana<sup>2</sup>, Dr Sandrine Lioret<sup>3,4</sup>, Professor Karen Campbell<sup>1</sup>, Associate Professor Kylie Hesketh<sup>1</sup>

**Affiliations:** <sup>1</sup>Institute of Physical Activity and Nutrition, Deakin University, Melbourne, Australia, <sup>2</sup>Biostatistics Unit, Deakin University, Melbourne, Australia, <sup>3</sup>INSERM, UMR1153 Centre for Research in Epidemiology and Statistics (CRESS), Research team on EARly life Origins of Health (EAROH), Paris, France, <sup>4</sup>Université de Paris, Paris, France

### Abstract:

**Background:** Lifestyle patterns are typically derived using multivariate methods such as principal component analysis (PCA), latent class analysis (LCA) and cluster analysis (CA). Comparability has not been previously investigated to establish if concordance exists between the methods. This study aims to compare the similarity of lifestyle patterns derived from PCA, LCA and CA.

**Methods:** Parent-report data from the second wave (2011/12; child age 6-8y, n=542) of the HAPPY cohort study (Melbourne, Australia) were used to derive lifestyle patterns, using PCA, LCA and CA. Standardized variables assessing diet (fruit, vegetable, sweet, and savoury non-core food intake), physical activity (organised sport and outdoor play), sedentary behaviour (screen, videogame, and quiet play time) and sleep (duration) were included in the analyses. For each method, commonly used, robust criteria for pattern retention were applied.

**Results:** Preliminary results for PCA indicated four components (using Horn's parallel analysis) should be retained. LCA indicated a four class model (using Bayesian information criteria) and CA revealed three patterns (using Ward's method and plot of the dendrogram) as most optimal. Despite lifestyle patterns derived being non-identical, three underlying themes emerged across the methods: 1) High fruit and vegetable intake and high outdoor play; 2) Snacking (non-core foods) and high screen time; and 3) Low sleep and low physical activity.

**Conclusions:** For this cohort study, despite differences in the number of patterns derived, some concordance was found between the methods. Direct comparison of studies utilising different methods should therefore be made with caution.

## Special health care needs during childhood and academic achievement in secondary school

**Authors:** Ms Anita Van Zwieten<sup>1,2</sup>, A/Prof Armando Teixeira-Pinto<sup>1,2</sup>, Prof Jonathan Craig<sup>3</sup>, A/Prof Germaine Wong<sup>1,2,4</sup>

**Affiliations:** <sup>1</sup>Sydney School of Public Health, University of Sydney, Sydney, Australia, <sup>2</sup>Centre for Kidney Research, The Children's Hospital at Westmead, Westmead, Australia, <sup>3</sup>College of Medicine and Health, Flinders University, Adelaide, Australia, <sup>4</sup>Department of Renal Medicine, Westmead, Australia

### Abstract:

**Background:** Secondary education has lifelong implications for health. Having special health care needs (SHCN) in secondary school is associated with poorer academic achievement, but associations with the duration and timing of SHCN across childhood are understudied.

**Methods:** Cohort design using the Longitudinal Study of Australian Children dataset. Structured modelling approach used to evaluate life-course models for associations between the duration and timing of SHCN (across 4-5, 6-7, 8-9, 10-11 years old) and Grade 7 reading and numeracy achievement. Linear regressions fitted for each life-course model: four critical period (each including SHCN in one period), one sensitive period (including SHCN in all periods), and two strict accumulation (including the duration of SHCN in linear then in categorical form) models. Model with the highest likelihood-ratio p-value (compared to a fully saturated model) and lowest AIC selected as best-fitting for that outcome. Interactions of SHCN with sex and socioeconomic status (SES) were examined.

**Results:** Of 3734 children, 1845 were female. For both outcomes, the linear strict accumulation model fitted best (reading p=.46, AIC=2670.84; numeracy p=.48, AIC=2676.56), and interactions of SHCN with sex (reading p=.76; numeracy p=.64) and SES (reading p=.07; numeracy p=.31) were non-significant. The coefficient (95% confidence interval) per period of having SHCN was -0.04 (-0.07 to -0.02) for reading z-score and -0.08 (-0.11 to -0.05) for numeracy z-score.

**Conclusions:** A longer duration of SHCN between 4-5 and 10-11 years of age has cumulative associations with poorer Grade 7 reading and numeracy achievement. These associations do not differ across sex or SES.

## **Infant, maternal and demographic predictors of delayed vaccination: a population-based cohort study**

**Authors:** **A/Prof Heather Gidding**<sup>1,2,3</sup>, Mr Lloyd Flack<sup>3</sup>, Dr Sarah Sheridan<sup>1,2,3</sup>, A/Prof Bette Liu<sup>3</sup>, Ms Parveen Fathima<sup>4</sup>, Dr Vicky Sheppard<sup>5</sup>, Prof Peter Richmond<sup>4,6,7</sup>, Mr Brynley Hull<sup>2</sup>, A/Prof Christopher Blyth<sup>4,6,7,8</sup>, Prof Ross Andrews<sup>9,10</sup>, A/Prof Thomas Snelling<sup>4,6,9,11</sup>, Prof Nicholas de Klerk<sup>4</sup>, Prof Peter McIntyre<sup>2</sup>, Dr Hannah Moore<sup>4</sup>

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### **Abstract:**

**Background:** Vaccination timeliness is a key measure of program performance, but studies comprehensively examining predictors of delayed infant vaccination are lacking. We aimed to identify predictors of short and longer-term delays in diphtheria-tetanus-pertussis (DTP) vaccination by dose number for Aboriginal and non-Aboriginal children.

**Methods:** Perinatal, notification, death and immunisation databases were linked for 1.3 million births in 2000-11 in Western Australia (WA) or New South Wales (NSW), with follow-up data until 2013. Ordinal logistic regression was used to estimate adjusted relative risks (RR) by degree of delay.

**Results:** Each dose-specific cohort included at least 49,000 Aboriginal and 1.1 million non-Aboriginal children. Risk factors for delayed vaccination were strongest for the first dose of DTP (DTP1), and delayed receipt of DTP1 was a key driver of subsequent delays; every week DTP1 was delayed was associated with a 1.6 to 2-fold increased risk of delayed DTP2 receipt. For DTP1,  $\geq 3$  previous pregnancies (the only factor more strongly associated with longer than shorter delays; RR  $\geq 5$  compared to no previous pregnancies), and children born to mothers  $< 20$  years of age (RR  $\geq 2$  compared to  $\geq 35$  years) were at highest risk of delay. Other independent predictors were prematurity, maternal smoking during pregnancy, and being born in Western Australia (if Aboriginal) or another country in the Oceania region.

**Conclusion:** We have been able to identify key population sub-groups at risk of delayed vaccination. Measures to improve vaccine initiation in these children are likely to have significant flow-on benefits for timeliness of later doses.

## **Understanding intergenerational health: methodology of the Mothers and their Children's Health Study**

**Authors:** **Ms Colleen Loos**<sup>1</sup>, **Dr Katrina Moss**<sup>1</sup>, Associate Professor Leigh Tooth<sup>1</sup>, Professor Annette Dobson<sup>1</sup>, Professor Deborah Loxton<sup>2</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>School of Public Health, Faculty of Medicine, The University of Queensland, Herston, Australia, <sup>2</sup>Faculty of Health and Medicine, The University of Newcastle, Newcastle, Australia

### **Abstract:**

**Background:** understanding the intergenerational determinants of health and health behaviours can inform more effective public health interventions, but this requires comprehensive prospective longitudinal data.

**Methods:** In a cohort-within-a-cohort design, the Mothers and their Children's Health (MatCH) study is nested within the Australian Longitudinal Study on Women's Health (ALSWH). Women in the 1973-78 ALSWH cohort were randomly sampled and nationally representative and have completed up to 7 surveys between 1996 and 2015. In 2016, the MatCH study asked mothers (N=3039) to provide data on their three youngest children aged under 13 (N=5799, 0-12 years, 48% female), and for permission to access national linked datasets (Australian Early Development Census and the National Assessment Program – Literacy and Numeracy). This enables MatCH to combine 20 years of maternal data from ALSWH with maternal-reported and externally linked child data. This includes unique maternal data (e.g. reproductive health, educational mobility, social support, adverse childhood experiences, depression), unique child data (e.g. screen time, temperament, motor and language development), overlapping data (e.g. physical activity, diet, health service utilisation, health conditions, sleep), and shared environmental exposures (e.g. geocoded green space, household exposures). This design enables investigation of the life course determinants of child outcomes, including pre-conception, early and late childhood, and within- and between-family influences on child health and wellbeing.

**Conclusion:** MatCH offers an unprecedented opportunity to understand the maternal factors that shape child health and development across the life course, and to ask and answer complex questions that can inform public health interventions and policy.

## **Mothers and their Children's Health (MatCH) study: is pregnancy a sensitive period?**

**Authors:** Dr Katrina Moss<sup>1</sup>, Professor Annette Dobson<sup>1</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, University of Queensland, Herston, Australia*

### **Abstract:**

**Background:** There is debate regarding whether the timing or chronicity of maternal depressive symptoms (MDS) explains associations with child outcomes. Traditional research designs cannot answer this question. We used a longitudinal dataset with pre-conception data to test whether critical/ sensitive periods or accumulation provided the best explanation for the association between MDS and children's behavior and development.

**Methods:** Children (N = 978, 2-12 years) were from the Mothers and their Children's Health study, and mothers (N = 892) were from the Australian Longitudinal Study on Women's Health. Mothers were categorized into groups according to whether they reported MDS ( $\geq 10$  on the CESD-10) before pregnancy, during pregnancy and/or in early childhood. Child outcomes were maternal-rated behavior (Strengths and Difficulties Questionnaire; SDQ) and teacher-rated development (Australian Early Development Census; AEDC). We used a life course approach to rigorously test critical period, sensitive period and accumulation by comparing the fit of a series of nested multilevel models.

**Results:** An accumulation model was the best fit, with each period of MDS associated with an increase of 1.71 points (95% CI, 1.26 to 2.17) on the SDQ, and decreases of 0.31 (95% CI, -0.50 to -0.12) and 0.29 (95% CI, -0.49 to -0.08) points on AEDC social competence and emotional maturity respectively.

**Conclusion:** Chronic MDS were associated with poorer child outcomes than MDS at any single time. Sensitive and critical period models were not supported, suggesting pregnancy was not a sensitive period. Screening and intervention for MDS should begin pre-conception and continue throughout early childhood.

## **Understanding maternal preconception weight trajectories and child outcomes using a cohort-within-cohort study design**

**Authors:** Associate Professor Leigh Tooth<sup>1</sup>, Dr Akilew Adane<sup>2</sup>, Professor Gita Mishra<sup>1</sup>, Professor Annette Dobson<sup>1</sup>

**Affiliations:** <sup>1</sup>*The University of Queensland, Brisbane, Australia*, <sup>2</sup>*Telethon Kids Institute, Perth, Australia*

### **Abstract:**

**Background:** This presentation showcases the utility of a 'cohort-within-a-cohort' study design to understand associations between maternal preconception body mass index (BMI) trajectories and aspects of child development.

**Methods:** The Mothers and their Children's Health (MatCH) study is nested within the Australian Longitudinal Study on Women's Health (ALSWH). In MatCH, 3039 mothers from the 1973-78 ALSWH cohort provided data on their three youngest children aged 0-12 years (N=5799). The exposure was mother's preconception BMI trajectories over 6-7 years. The outcomes were children's physical and cognitive development (up to average age of 5), and children's BMI based on sex-specific BMI cut-offs. Fully adjusted general estimating equations and multinomial and binary logistic regressions were used.

**Results:** Three preconception BMI trajectories were identified: 'normative', 'chronically overweight', and 'chronically obese'. Children born to 'chronically obese' women had higher risk of being developmentally vulnerable on gross and fine motor skills (RR (95% CI) 1.64 (1.04, 2.68)) and communication skills and general knowledge (RR 1.71 (1.09, 2.61)). Children born to chronically 'overweight' (RRR 1.75 (1.33, 2.31)) and 'obese' (RRR 2.48 (1.65, 3.73)) women had increased risk of having obese children versus normal weight children. Second-born children of mothers with high interpregnancy weight gain ( $\geq 4$  BMI units) were at higher risk of being overweight or obese versus children of mothers with stable interpregnancy weight (OR 2.20 (1.02, 4.75)).

**Conclusions:** Identifying an earlier and longer 'at risk' preconception weight exposure time period allows for public health interventions to prevent poorer childhood BMI and developmental outcomes.

## 1C Methods in epidemiological research and practice

Plaza Room P11, 10:45am - 12:15pm

### Factors explaining socio-economic inequalities in colon cancer survival: a causal mediation analysis

**Authors:** Ms Nina Afshar<sup>1,2</sup>, Dr Ghazaleh Dashti<sup>2</sup>, Dr Luc te Marvelde<sup>1,5</sup>, Ms Vicky Thursfield<sup>4</sup>, Dr Andrew Haydon<sup>6</sup>, Ms Kathryn Whitfield<sup>5</sup>, Professor Graham Giles<sup>1,2</sup>, Professor Dallas English<sup>1,2</sup>, Associate professor Roger Milne<sup>1,2,3</sup>

**Affiliations:** <sup>1</sup>*Cancer Epidemiology Division, Cancer Council Victoria, Melbourne, Australia*, <sup>2</sup>*Centre for Epidemiology and Biostatistics, School of Population and Global Health, The University of Melbourne, Melbourne, Australia*, <sup>3</sup>*Precision Medicine, School of Clinical Sciences at Monash Health, Monash University, Clayton, Australia*, <sup>4</sup>*Victorian Cancer Registry, Cancer Council Victoria, Melbourne, Australia*, <sup>5</sup>*Cancer Strategy and Development, Department of Health and Human Services, Melbourne, Australia*, <sup>6</sup>*Department of Medical Oncology, Alfred Hospital, Melbourne, Australia*

#### Abstract:

**Background:** Socio-economic position is positively associated with survival following colon cancer diagnosis in high-income countries, but little is known about the mechanisms. We investigated the mediating roles of age at diagnosis, co-morbidities, surgery, chemotherapy, and emergency presentation.

**Methods:** We used Victorian Cancer Registry data to identify 1,148 individuals aged 15-79 years with first primary stage III or IV colon cancer diagnosed between 2008-2011. Clinical information was obtained from hospital admissions and deaths to the end of 2015 were identified from Victorian and national death registries. Socio-economic position was defined based on area of residence. We decomposed the total effect of socio-economic disadvantage on colon cancer survival into interventional direct (IDE) and indirect (IIE) effects.

**Results:** For stage III colon cancer, there were 109 (95%CI 36 to 181) additional deaths per 1,000 in the five years following diagnosis among the most disadvantaged relative to the least disadvantaged. The IIEs through age at diagnosis, co-morbidities and receiving chemotherapy within 6 months post-diagnosis explained 22 (95%CI 3 to 42) of these additional deaths. For stage IV disease, there were 132 (95%CI 55 to 209) additional deaths per 1,000 in the first year following diagnosis, which was partly explained by emergency presentation prior to diagnosis [19 (95%CI 3 to 36) additional deaths per 1,000]. Other potential mediators did not explain the excess deaths.

**Conclusions:** Worse survival from colon cancer among disadvantaged patients is only partly explained by differential age at diagnosis, co-morbidities, treatment and emergency presentation; further research is required to identify underlying reasons.

### The automated extraction of diagnostic information for keratinocyte cancers from pathology reports

**Authors:** Dr Bridie Thompson<sup>1</sup>, Associate Professor Nirmala Pandeya<sup>1</sup>, Dr Jean Claude Dusingize<sup>1</sup>, Professor Adele Green<sup>1</sup>, Associate Professor Catherine Olsen<sup>1</sup>, Professor David Whiteman<sup>1</sup>

**Affiliations:** <sup>1</sup>*Qimr Berghofer Medical Research Institute, Herston, Australia*

#### Abstract:

**Background:** Keratinocyte cancers are very common and are not routinely registered. Thus, estimates of incidence are derived from administrative data that don't discriminate between basal- or squamous cell carcinomas (BCC, SCC), or other diagnoses.

**Aim:** To develop and validate a web application capable of automated extraction of diagnosis for keratinocyte cancers from free-text pathology reports.

**Methods:** The QSkin cohort comprises a random sample of 43,794 Queensland residents recruited in 2011. Staff manually reviewed individual pathology reports for participants having skin cancer procedures between 2011 and 2014, and entered diagnostic information into a database. This provided a training dataset for supervised learning methods to develop an algorithm capable of determining diagnosis for each reported skin lesion from free-text pathology reports. Algorithm derived diagnosis was validated against three datasets.

**Results:** The web application successfully separated multiple lesions within a single report and was highly accurate at classifying a histological diagnosis within a report. For two validation datasets, kappa scores showed almost perfect agreement for BCCs (0.97 and 0.96) and SCCs (both 0.93), but were slightly lower for a third (0.82 and 0.90, respectively). Kappa scores for total counts of each diagnosis were high (>0.8). Results were similar for other related diagnoses.

**Conclusions:** Supervised learning methods have been used to successfully develop a web application capable of extracting diagnosis for large numbers of pathology reports for keratinocyte cancers and related diagnoses. In the absence of population-based registration, this provides an important opportunity to accurately measure diagnosis-specific incidence which is essential for healthcare planning.

## **Sparse data bias in influenza vaccine effectiveness estimates for the elderly**

**Authors:** Olivia Price<sup>1</sup>, Febbie Tambala<sup>2</sup>, Sheena Sullivan<sup>1,2</sup>

**Affiliations:** <sup>1</sup>WHO Collaborating Centre for Reference And Research On Influenza at the Peter Doherty Institute, Melbourne, Australia, <sup>2</sup>School of Global and Population Health, University of Melbourne, Melbourne, Australia

### **Abstract:**

**Background:** Sparse data bias (SDB) occurs when there are inadequate participant numbers for important combinations of exposure, outcome and covariates, and may lead to bias towards the null and unhelpfully wide confidence intervals. We reviewed studies of influenza vaccine effectiveness (VE) to assess their vulnerability to SDB and its potential impact on estimates. We focused on the elderly because their high vaccine uptake may make data collected more vulnerable to SDB.

**Methods:** We searched for studies that published VE estimates for the elderly stratified by influenza season and subtype and included 45 studies containing 101 estimates. We diagnosed SDB by calculating events per variable (number of cases divided by number of model parameters) and considering cell numbers in 2x2 tables and prevalence of vaccination. We pooled estimates by subtype and, in sensitivity analyses, estimates at serious risk of SDB were excluded to ascertain the impact of sparse data on pooled estimates.

**Results:** Of 101 estimates, 65.3% (n=66) were at serious risk of SDB. Excluding these estimates did not affect pooled estimates. Only two studies used statistical methods to mitigate sparse data, while five referred to it as a limitation.

**Conclusions:** Sparse data is a prevalent yet generally unacknowledged source of bias in studies estimating VE. While pooled estimates were little influenced by SDB, the interpretation of individual studies, particularly those at high risk of bias due to sparse data should be done with caution.

## **Flexible age-period-cohort modelling illustrated using obesity prevalence data**

**Authors:** Professor Annette Dobson<sup>1</sup>, Richard Hockey<sup>1</sup>, Dr Hsiu-Wen Chan<sup>1</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Queensland, Brisbane, Australia

### **Abstract:**

**Background:** Recent advances in statistical modelling and computing make it possible to estimate age, period, and cohort effects that are readily interpretable, reliable and easily displayed graphically. To demonstrate the methods we use data on the prevalence of obesity among Australian women from two independent data sources obtained using different study designs.

**Methods:** We used data from six cross-sectional Australian National Health Surveys conducted between 1995 and 2014-15, each involving about 6,000 women, and from the Australian Longitudinal Study on Women's Health which started in 1996 and involves more than 57,000 women in four age cohorts who are re-surveyed at three-yearly intervals or annually. Age-period-cohort analysis was conducted using generalized linear models with splines to describe non-linear continuous effects.

**Results:** When analysed in the same way both data sets showed similar patterns. Prevalence of obesity increased with age until late middle age and then declined. There was also evidence of increases in both cohort and period effects.

**Conclusions:** Modern statistical methods and software make the estimation and visualisation of age, period and cohort effects highly accessible. Regardless of how the data are collected (from repeated cross-sectional surveys or longitudinal cohort studies), it is clear that younger generations of Australian women are becoming heavier at younger ages. Analyses of trends in obesity should include a cohort, in addition to age and period, effects in order to focus preventive strategies appropriately.

## **Examining bias and reporting in prediction modelling studies in oral health research**

**Authors:** Miss Mi Du<sup>1</sup>, Dr Dandara Haag<sup>1</sup>, Mr Youngha Song<sup>1</sup>, Professor John Lynch<sup>1</sup>, Dr Murthy Mittinty<sup>1</sup>

**Affiliations:** <sup>1</sup>The University of Adelaide, Adelaide, Australia

### **Abstract:**

**Background:** Uncertainties regarding bias and insufficient reporting in prediction modelling studies represent challenges to the reproducibility and implementation of these prediction models. Recent tools such as; PROBAST (Prediction model Risk Of Bias Assessment Tool) and TRIPOD (Transparent Reporting of a multivariable prediction model for Individual Prognosis Or Diagnosis) have been developed to guide researchers on the quality assessment of these studies. Following these tools, we aim to assess bias and completeness of reporting in the existing prediction modelling studies in oral health.

**Methods:** Prediction modelling studies published in oral health, epidemiological, and biostatistical journals were searched. Key information including study design, participants, setting, sample size, predictors, outcome, missing data, model development, performance, and validation were extracted. PROBAST and TRIPOD criteria were used in assessing the presence of bias and completeness of reporting.

**Results:** Among the 2,881 papers identified, 34 studies containing 58 models were included. 75% of the studies were susceptible to at least four (out of 20) sources of bias; including measurement error (n=19), omitting samples with missing data (n=10), selecting variables based on univariate analyses (n=9), overfitting/optimism (n=13), and lack of model performance assessment (n=24). Based on TRIPOD, at least five (out of 31) items were inadequately reported in 95% of the studies, especially regarding sampling approaches (n=15), eligibility criteria (n=6), and model-building procedures (n=16).

**Conclusion:** Presence of bias and poor completeness of reporting was identified across all included studies. Recommendations in these tools can benefit future research and improve the applicability of prediction models in oral health.

### **Contextualising epidemiology for policy development for mortality review**

**Authors:** Pauline Gulliver<sup>1</sup>, Carlene McLean<sup>1</sup>, Anna-Marie Frost<sup>1</sup>

**Affiliations:** <sup>1</sup>Health Quality and Safety Commission, Auckland, New Zealand, <sup>2</sup>Health Quality and Safety Commission, Wellington, New Zealand, <sup>3</sup>Health Quality and Safety Commission, Auckland, New Zealand

#### **Abstract:**

**Context:** The New Zealand Health Quality and Safety Commission's mortality review committees are statutory committees that review deaths with the intention to prevent similar deaths occurring in the future. While epidemiology has been at the heart of report writing and recommendation development, this is becoming increasingly contextualised to consider the people behind the data, their entire life-course, episodic events and social contexts within which they live.

**Process:** The committee structure bring together those with a lived experience, researchers, inter-sectorial providers and clinicians to discuss and debate findings. Report writing is a collaborative undertaking, supported by policy advisors and topic area specialists within the Commission, acting as a secretariat.

**Analysis:** This presentation will explore the development of the process over time, including:

1. Acknowledging that the data-sets on which reports are dependent are not value-free;
2. Incorporate the voice of families and whānau impacted by deaths;
3. Incorporating Maatouranga Maori, using Maori cultural practices and principles to critique, examine, analyse and understand the world
4. The development of a supportive environment to allow effective lived experience involvement and engagement.

**Outcome:** Social disparities lie at the heart of the majority pre-mature deaths. Administrative data sets, while informative for exploring disparities across sub-groups within a population, are largely de-contextualised and deficits focused, especially when comparing across ethnicities. Contextualisation, including an acknowledgement of current and historic structural inequities, and an examination of the life-course instead of focusing solely on the death event, allow for the development of effective and responsive policy recommendations.

### **Inference about causation from twin pairs in real-world linked administrative datasets**

**Authors:** Professor John Hopper<sup>1</sup>, Dr Shuai Li<sup>1</sup>, Dr Minh Bui<sup>1</sup>, Dr Enes Makalic<sup>1</sup>, Mr Lucas Ferreira<sup>1</sup>, Dr Tuong Linh (Kevin) Nguyen<sup>1</sup>, Dr Gillian Dite<sup>1</sup>, Dr Katrina Scurrah<sup>1</sup>

**Affiliations:** <sup>1</sup>Centre for Epidemiology & Biostatistics, Melbourne School of Population & Global Health, University of Melbourne, Carlton South, Australia

#### **Abstract:**

**Background:** Knowing if a risk factor is causal is critical for epidemiology to produce population health benefits. New approaches to address causation are being developed such as Mendelian Randomisation which uses genetic variants to create an instrumental variable. We have developed a statistical approach that makes inference about causation from examination of familial confounding (ICE FALCON) using data from related individuals, such as twin pairs, where the exposure of the co-twin acts as a proxy instrumental variable. Knowing the zygosity of twin pairs improves ICE FALCON. Large linked administrative population-wide datasets that include twin pairs are becoming increasingly accessible for research.

**Aim and Method:** To demonstrate the potential for applying ICE FALCON to linked datasets, we applied ICE FALCON to a large long-term cohort of male World War II US veteran twin pairs.

**Results:** We found evidence consistent with BMI in early adulthood having a causal effect on BMI in mid-life. We also found evidence consistent with the change in BMI between early adulthood and mid-life having a causal effect on the diagnosis of Type II diabetes in mid-life, and with reverse causation in later life. We created and validated learning and agnostic algorithms for predicting zygosity from large twin datasets by analysing absolute within-pair differences and means using machine learning.

**Conclusion:** Given twin pairs can be identified in a linked administrative dataset, their data could be used to help identify causal, and non-causal, exposure-outcome relationships. This would help inform potential population health interventions and exclude interventions doomed to failure.

## Point and click population health analytics - new tools for non-epidemiologists.

**Authors:** Andrew Sporle <sup>1,2</sup>, Daniel Barnett <sup>2</sup>

**Affiliations:** <sup>1</sup>*iNZight Analytics, Auckland New Zealand*, <sup>2</sup>*The University of Auckland, Auckland, New Zealand*

### Abstract:

The access to and application of population health is often limited by the lack of suitable software or a shortage of skills required to undertake the analysis. In response to this need, we have created a software tool that reduces the cost, security and skill restrictions affecting the use of population health data. This simple to use tool can work in an online or standalone environment to create and compare age-standardised rates (with confidence intervals) for population outcomes by user-defined selections of population and reference (standard) population, then present the results in a range of table, graph and map formats. It also can compare, graph and map population outcomes over time and place, including absolute and relative rate differences with statistically robust confidence intervals using multiple methods. All results are exportable into other formats. This software works with both count data and microdata. Additional outcome data, population denominators, reference populations and maps can be added to the software, making it capable of working with population data for any region where the demographic information is available. The data behind the tools is not visible and the software can sit on the user's computer, meaning that control of the data can be maintained. Learning to use the tool takes a few minutes of instruction as all controls are pull down menus or mouse click functions. These tools provide flexible, low or no-cost solutions to the software and skill limitations that currently restrict the potential access to and application of population health data.

## Poster Presentations – P1

Plaza Room P9 - P11 Foyer, 12:15pm - 1:15pm

### P1.001- Prevalence of anxiety and depression in patients with endometrial cancer: Before surgery to 6-month post-surgery

**Authors:** Mrs Saira Sanjida<sup>1</sup>, Professor Monika Janda<sup>1</sup>

**Affiliations:** <sup>1</sup>*chool of Public Health and Social Work, Institute for Health and Biomedical Innovation, Queensland University of Technology., Brisbane, Australia*

### Abstract:

**Backgrounds:** Patients face psychological distresses after cancer diagnosis as well as throughout the treatment procedures. The aims were to determine the prevalence of anxiety and depression in patients with endometrial cancer underwent for surgical treatment and, treatments received for clinically diagnosed anxiety and depression.

**Methods:** Patients aged >18 years, histologically confirmed stage I endometrial cancer, and underwent for surgery were included in this study. Secondary data were collected in detail during before surgery and then one-week, four-week, three-month and six-month post-surgery. Hospital anxiety and depression scale (0-21) screening tool was used to determine clinical level of anxiety and depression ( $\geq 11$ ).

**Results:** 334 sample data were included in this analyses. The overall prevalence of clinical level of anxiety and depression was 22.7% (n= 76/334) and 9.0% (n= 30/334), respectively during perioperative to 6-month post-surgery. Among them, 7.2% (n= 24/334) patients were diagnosed with both anxiety and depression. Only 9 patients visited mental health professionals for anxiety, depression and both, respectively. Considering pharmacological treatment, 16 patients received antidepressants and anxiolytics for anxiety only, and both anxiety and depression. However, no patients did not receive any treatment for clinically diagnosed depression only.

**Conclusions:** One in four patients were diagnosed with anxiety and/or depression, however only half of them received psychological or pharmacological treatment during early stage cancer survivorship. Qualitative analysis could be used in future research to explore the psychological treatment received during cancer survivorship.

### P1.002- What sociodemographic factors and types of contact predict attitudes toward disabled people?

**Authors:** Anne-Marie Bollier<sup>1</sup>, A/Prof Naomi Priest<sup>2</sup>, Ms Lauren Krnjacki<sup>1</sup>, Ms Georgia Katsikis<sup>1</sup>, Ms Vasiliky Kasidis<sup>1</sup>, Ms Jasmine Ozge<sup>1</sup>, A/Prof Allison Milner<sup>1</sup>, Prof Anne Kavanagh<sup>1</sup>

**Affiliations:** <sup>1</sup>*The University of Melbourne, Carlton, Australia*, <sup>2</sup>*Australian National University, Canberra, Australia*

### Abstract:

**Background:** There have been many studies on attitudes to disability, but few are nationally representative.

**Methods:** We used data from 2,000 members of an Australian probability panel who completed a survey on disability-related attitudes. Attitudes were measured with the Prospects sub-scale of the Attitudes to Disability Scale. Raw scores were standardized (mean 0, SD 1), with higher scores representing more positive attitudes. We examined sociodemographic

predictors of attitudes using linear regression. Then, we fitted 8 measures of lifetime contact with disabled people in separate, adjusted models (excluding carers and disabled participants) to examine associations with attitudes.

**Results:** Female (versus male) gender predicted more positive attitudes ( $\beta=0.36$ , 95% CI 0.23, 0.49), as did overseas English-speaking origin ( $\beta=0.20$ , 95% CI 0.02, 0.39) versus Australian, and year 12+ educational attainment ( $\beta=0.41$ , 95% CI 0.21, 0.60) versus <year 12. People with disability (versus non-disabled non-carers) had more negative attitudes ( $\beta=-0.15$ , 95% CI -0.30, -0.01), as did members of the oldest age group versus the youngest ( $\beta=-0.37$ , 95% CI -0.62, -0.12). 4 contact variables were associated with more positive attitudes: ever having a disabled colleague ( $\beta=0.29$ , 95% CI 0.13, 0.45); classmate ( $\beta=0.26$ , 95% CI 0.09, 0.43); close friend ( $\beta=0.25$ , 95% CI 0.07, 0.42); and teacher/boss ( $\beta=0.27$ , 95% CI 0.02, 0.52).

**Conclusions:** This is the first Australian population-based study of predictors of attitudes to disability. We do not know the direction of the relationship between having disabled friends and positive attitudes, but findings suggest that peer relationships and contact in work/education settings promote positive attitudes.

### **P1.003- Risk of developmental disorders in children of immigrant mothers: population data-linkage evaluation**

**Authors:** Mrs Ifrah Abdullahi<sup>1,2</sup>, Dr Kingsley Wong<sup>2</sup>, Dr Raewyn Mutch<sup>1,2,3</sup>, Dr Emma Glasson<sup>2</sup>, Dr Nicholas de Klerk<sup>1,4</sup>, Dr Sarah Cherian<sup>1,3</sup>, Dr Jenny Downs<sup>2,5</sup>, Helen Lenoard<sup>2</sup>

**Affiliations:** <sup>1</sup>*School of Paediatrics and Child Health, Faculty of Medical Sciences, The University of Western Australia, Nedlands, Australia,* <sup>2</sup>*Telethon Kids Institute, Nedlands, Australia,* <sup>3</sup>*Department of General Paediatrics, Perth Children`s Hospital, Nedlands, Australia,* <sup>4</sup>*The University of Western Australia, , Perth, Australia,* <sup>5</sup>*School of Physiotherapy and Exercise Science, Curtin University, Perth, Western Australia, Australia, Perth, Australia*

#### **Abstract:**

**Background:** To evaluate the prevalence and risks of developmental disability (autism spectrum disorder (ASD), intellectual disability (ID), and cerebral palsy (CP)) in Western Australian children of different groups of foreign-born women.

**Method:** Western Australian population-based linked data of 764,749 singleton live births from 1980 to 2010 were used to compare disability outcomes among children of foreign-born women, Australian-born non-Indigenous and Indigenous women. Risk of disability was assessed using multinomial logistic regression.

**Results:** The prevalence of any disability was lowest for the children of foreign-born mothers. During 1980 to 1996 but not 1997 to 2010 children born to mothers from foreign-born low-income countries had increased relative risk of ASD with ID and children born to foreign-born mothers from upper-middle-income countries had increased risk of CP with ID. After adjusting for smoking, the relative risks of ID and CP with ID were markedly reduced in children of Australian-born Indigenous mothers.

**Conclusion:** While our findings did not mirror recent research in that we did not see an increased prevalence across all the measured developmental outcomes, we observed an increased risk of ASD with ID and CP with ID for mothers of some foreign-born groups. Our findings related to smoking in the Indigenous population underscore its role on the causal pathway to ID. Maternal migration is considered a factor on the causal pathway to developmental disabilities. However, migration is both a risk or a protective factor, and its direct role is inconclusive in our Australian study.

### **P1.004- Hospitalisation rates of children from minority backgrounds with developmental disabilities**

**Authors:** Mrs Ifrah Abdullahi<sup>1,2</sup>, Dr Kingsley Wong<sup>2</sup>, Professor Nicholas de Klerk<sup>2</sup>, Dr Raewyn Mutch<sup>1,2,3</sup>, Dr Emma J Glasson<sup>2</sup>, Dr Jenny Downs<sup>2,4</sup>, Dr Sarah Cherian<sup>1,3</sup>, Helen Leonard<sup>2</sup>

**Affiliations:** <sup>1</sup>*School of Paediatrics and Child Health, Faculty of Medical Sciences, The University of Western Australia, Nedlands, Australia,* <sup>2</sup>*Telethon Kids Institute, Nedlands, Australia,* <sup>3</sup>*Department of General Paediatrics, Perth Children`s Hospital, Nedlands, Australia,* <sup>4</sup>*School of Physiotherapy and Exercise Science, Curtin University, Perth, Australia*

#### **Abstract:**

**Background:** To assess hospitalisation patterns after the first year of life in children with developmental disabilities compared to children with no disability, according to the maternal country of birth. Retrospective cohort study using linked data across health, disability and hospitalisation databases.

**Methods:** This study investigated 664,529 children born in Western Australia between 1983 and 2008 with a total of 1,518,486 records of hospital admissions.

**Results:** Children with no disability born to Indigenous mothers had the highest rate of hospitalisation compared to children of non-Indigenous mothers. Children of foreign-born mothers from low-income countries had the highest rate of hospitalisation if the disability was present. Children with cerebral palsy with or without associated intellectual disability had the highest rate of hospitalisations among children with a developmental disability, especially when their mother was foreign-born. Children with cerebral palsy and intellectual disability, particularly from minority backgrounds (Indigenous Australian and foreign-born mothers) were at higher risk of hospitalisation after the first year of life.

**Conclusion:** More research is required to further explore the relationship between developmental disabilities, maternal country of birth and increased hospitalisation rates.

### **P1.005- The Risk of Neurodevelopmental Disabilities in Children of Immigrant and Refugee Parents**

**Authors:** Ms Ifrah Abdullahi, Prof Helen Leonard<sup>2</sup>, Dr Sarah Cherian<sup>1,3</sup>, Dr Raewyn Mutch<sup>1,2,3</sup>, Dr Emma Glasson<sup>2</sup>, Prof Nicholas de Klerk<sup>2</sup>, Dr Jenny Downs

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**Abstract:**

This paper systematically reviewed the literature from 2002 to 2016 describing the risks of autism spectrum disorder, intellectual disability and attention deficit hyperactivity disorder in children of immigrant and refugee backgrounds. Compared to children of non-immigrant mothers, 10 studies found an increased risk of autism and intellectual disability and four studies found an increased risk of autism without identifying a concomitant intellectual disability. Very high risks were observed if the mother's country of birth was a developing country or region. One study found a higher risk of attention deficit hyperactivity disorder in a sample of children who were refugees. Children of immigrant and refugee backgrounds from developing countries had greater risks of a neurodevelopmental disorder compared to their peers whose mother was locally born

**P1.006- Monitoring outcomes of Human Parechovirus admissions to Queensland Children's Hospital.**

**Authors:** Ms Rebecca Doyle<sup>1,3</sup>, A/Professor Julia Clark<sup>1,2</sup>, Dr Anne Bernard<sup>4</sup>, Dr Marion Thomas<sup>1</sup>, Dr Anne Kynaston<sup>1,2</sup>, A/Professor Meryta May<sup>1,2,5</sup>

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**Abstract:**

**Background:** Human Parechoviruses (HPeV) particularly HpeV-3 are an emerging cause of infection in young infants. Identified internationally in 2004, Queensland outbreaks of HPeV-3 have been occurring bi-annually since 2013. The most recent occurred in 2017. Long-term developmental concerns have been described in a subset of children, but incidence, prognostic indicators and risk factors remain uncertain. 1,2

**Methods:** Children presenting or transferred to the Queensland Children's Hospital with laboratory confirmed HPeV infection during the 2017 outbreak were included. Data was collected pertaining to clinical symptoms, management, severity, laboratory results, diagnostic imaging and developmental follow-up from electronic medical records (N=67). Data was compared to published data from combined Qld cohorts of HpeV in 2013 and 2015 (N=145). 1

**Results:** Data from 67 children were collected and described for 44. Median age was 26.5 days (IQR 17.25-54) and median duration of admission was 4 days (IQR 4-6). Seizures and apnoea were recorded in 18.2% (n=8) and 9.1% (n=4) of children respectively. A higher proportion needed PICU admission than previous cohorts (34.1% (n=15) vs 22.7% (n=33)). More children from 2017 received developmental follow up 86.4% (n=27) vs 53.1% (n=77) and MRI was performed more frequently (61.4% (n=27) vs 13.7% (n=20)).

**Conclusions:** HPeV continues to cause severe infection in some Queensland infants. These results have informed the development of a management guideline for Queensland paediatricians to improve consistency in management and follow up. Comparison with previous cohorts suggests improved awareness of potential for neurological sequelae.

**References:**

1. Joseph et al. *Pediatric Infectious Disease Journal*. 2019
2. Britton et al. *Pediatrics*. 2016

**P1.007- Community Gastroenteritis Surveillance during the 2018 Commonwealth Games**

**Authors:** Dr Satyamurthy Anuradha<sup>1</sup>, Ms Deena Malloy<sup>1</sup>, Mr Ian Hunter<sup>1</sup>

**Affiliations:** <sup>1</sup>Gold Coast Public Health Unit, Gold Coast Health, Australia

**Abstract:**

**Background:** Potential outbreaks of community gastroenteritis (gastro) illness were anticipated during the 2018 Gold Coast Commonwealth Games (GC2018). A combined real-time syndromic and sentinel surveillance system was established to provide data on gastro presentations covering the Gold Coast using multiple health care providers between the 20th of March and 18th of April 2018.

**Methods:** During this enhanced surveillance period, a dashboard that provided real-time syndromic data on gastro presentations to the Public Emergency Departments (EDs) was examined daily. Private emergency departments (3), general practices (19), telehealth (13 HEALTH) and a home visiting doctor service (13 SICK) were recruited to provide gastro data. This was received, processed, analysed and interpreted on a daily basis.

**Results:** There were 339 gastro presentations to the public EDs and 840 reported presentations to sentinel sites during this time. The most presentations were recorded for the home visiting doctor service and 19 general practices (39% respectively), followed by the telehealth service (12%) and the three private emergency departments (9%). The strong partnerships built by epidemiologists with clinicians also helped in identification and reporting of isolated games-related gastro presentations thereby enabling prompt and appropriate public health action.

**Conclusions:** The use of multiple health care providers in both the public and the private sector of the Gold Coast region enabled successful surveillance of gastro illness during the Games period. This data was used to provide situational awareness for decision making. It enabled a successful GC2018 without community gastro outbreaks.

### **P1.008- Determinants of HIV transmission among men who inject drugs in Pokhara**

**Authors:** Sam Hogan<sup>1</sup>, Dr Andrew Page<sup>1</sup>, Dr Felix Ogbo<sup>1</sup>, Dr Sameer Dixit<sup>2</sup>, Rajesh Rajbhandari<sup>2</sup>, Bir Rawal<sup>3</sup>, Dr Keshab Deuba<sup>4</sup>

**Affiliations:** <sup>1</sup>Western Sydney University, Cambelltown, Australia, <sup>2</sup>Center For Molecular Dynamics, Kathmandu, Nepal, <sup>3</sup>National Center for AIDS and STD Control, Kathmandu, Nepal, <sup>4</sup>Department of Public Health Sciences, Centre for Global Health

#### **Abstract:**

**Background:** HIV is a disease of interest around the world, especially in developing countries. Although nationally Nepal has relatively low prevalence of HIV there are certain at-risk groups, such as drug-users, who have a higher chance of becoming infected.

**Methods:** The study used a series of 7 cross-sectional survey datasets, collected between 2003 and 2017 (N=2,235) to investigate trends in HIV prevalence among male IDUs by key socio-demographic and behavioural and knowledge-based risk factors. A series of logistic regression models were conducted to investigate the association between study factors and HIV in the Pokhara valley, Nepal.

**Results:** A lower risk of HIV was associated with younger age ( $\leq 24$  years compared to  $>24$  years, OR = 0.17, 95% CI = 0.10, 0.31), not being married (OR = 0.51, 95% CI = 0.33, 0.80) and shorter duration of drug use ( $\leq 4$  years compared to  $>4$  years, OR = 0.16, 95% CI = 0.09, 0.29). A higher risk of HIV was associated with low (compared to secondary or higher) education level (OR = 2.76, 95% CI = 1.75, 4.36), a lack of addiction treatment (OR = 2.59, 95% CI = 1.64, 4.08), and recent use of unsterilized injection equipment (OR = 2.22, 95% CI = 1.20, 4.11).

**Conclusion:** Although knowledge of HIV is high among male IDUs, the prevalence of individuals with comprehensive knowledge and the number of individuals who have received treatment for drug addiction has decreased. This may indicate that addiction treatment and HIV education programs need to be strengthened.

### **P1.009- 25-hydroxyvitaminD concentration and acute respiratory tract infection: a systematic review and meta-analysis**

**Authors:** Mrs Hai Pham<sup>1,2</sup>, Dr Aninda Rahman<sup>1</sup>, Ms Azam Majidi<sup>1</sup>, Dr Mary Waterhouse<sup>1</sup>, Dr Rachel E Neale<sup>1,2</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>University of Queensland, Herston, Australia

#### **Abstract:**

**Objective:** Randomised controlled trials (RCTs) of vitamin D and acute respiratory tract infection have generated inconsistent findings (ARTI). A recent meta-analysis of RCTs found a significantly stronger effect of vitamin D supplementation in people with vitamin D deficiency, yet the optimal level of serum 25-hydroxyvitamin D (25(OH)D) concentration remains unclear. This study aimed to review the link between 25(OH)D concentration and ARTI.

**Methods:** We searched PubMed and EMBASE databases to identify observational studies reporting the association between 25(OH)D concentration and risk or severity of ARTI. We included in the meta-analysis studies that reported risk of ARTI or severe ARTI between the highest and lowest categories of 25(OH)D concentration, or provided data to enable this calculation. We also estimated the risk of ARTI per 10 nmol/L decrease in 25(OH)D concentration.

**Results:** Twenty six studies were included in the review, 14 were included in the meta-analysis of the risk of ARTI and 5 studies were included in the meta-analysis of severity. Serum 25(OH)D concentration was inversely associated with risk and severity of ARTI; pooled odds ratios (95% confidence interval) were 1.84 (1.42–2.37) and 2.30 (1.44–3.66) respectively, comparing the lowest and the highest 25(OH)D category. This association was stronger for studies with reported mean 25(OH)D  $< 60$  nmol/L than in those with mean 25(OH)D  $\geq 60$  nmol/L. For each ten nmol/L decrease in 25(OH)D concentration, the odds of ARTI increased by 1.03 (0.98–1.08).

**Conclusions:** There is an inverse association between 25(OH)D concentration and ARTI.

### **P1.010- Cruciferous vegetable intake is inversely associated with abdominal aortic calcification**

**Authors:** Dr Lauren Blekkenhorst<sup>1,2</sup>, Dr Marc Sim<sup>1,2</sup>, Adjunct Assistant Professor John Schousboe<sup>3,4</sup>, Professor Douglas Kiel<sup>5</sup>, Clinical Professor Wai Lim<sup>2</sup>, Professor Richard Woodman<sup>6</sup>, Professor Amanda Devine<sup>1</sup>, Professor Richard Prince<sup>2</sup>, Professor Jonathan Hodgson<sup>1,2</sup>, Dr Joshua Lewis<sup>1,2,7</sup>

**Affiliations:** <sup>1</sup>School of Medical and Health Sciences, Edith Cowan University, Joondalup, Australia, <sup>2</sup>Medical School, University of Western Australia, Perth, Australia, <sup>3</sup>Park Nicollet Osteoporosis Centre and HealthPartners Institute, HealthPartners, Minneapolis, USA, <sup>4</sup>Division of Health Policy and Management, University of Minnesota, Minneapolis, USA, <sup>5</sup>Hinda and Arthur Marcus Institute for Aging Research, Hebrew SeniorLife, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA, <sup>6</sup>Flinders Centre for Epidemiology and Biostatistics, Flinders University, Adelaide, Australia, <sup>7</sup>Centre for Kidney Research, Children's Hospital at Westmead School of Public Health, Sydney Medical School, The University of Sydney, Sydney, Australia

**Abstract:**

**Background:** Abdominal aortic calcification (AAC) is a stable marker of vascular disease that predicts cardiovascular disease (CVD) outcomes. Our previous work has identified benefit of cruciferous vegetables on lower carotid artery intima-media thickness in older Australian women. We now hypothesise that the intake of cruciferous vegetables may also be associated with a lower odds of severe AAC.

**Methods:** Dietary intake was assessed using a food frequency questionnaire. Cruciferous vegetables included cabbage, Brussels sprouts, cauliflower and broccoli. Other vegetable types investigated included allium, yellow/orange/red, leafy green and legumes. AAC was scored using the Kaupilla AAC 24 scale on bone density lateral spine images, and were categorised as “not severe” (0-5) and “severe” ( $\geq 6$ ). Data were analysed using logistic regression adjusting for lifestyle and CVD risk factors.

**Results:** Mean (SD) age and cruciferous vegetable intake was 74.9 (2.6) y and 32.2 (21.7) g/d, respectively; 161/904 (17.8%) women had severe AAC scores. Cruciferous vegetable intake (per SD, 21.7 g/d) was associated with a lower odds of having severe AAC (fully-adjusted OR=0.81, 95%CI 0.67, 0.99, P=0.035). This relationship remained after further adjustment for non-cruciferous vegetables (P=0.024). Total vegetable intake and other vegetable types were not related to severe AAC (P>0.05 for all).

**Conclusion:** Higher consumption of cruciferous vegetables was associated with a lower odds of having severe AAC. This study provides evidence of the potential benefits of cruciferous vegetables for improved cardiovascular health. Randomised controlled trials are needed to establish causal effects.

**P1.011- Collecting data online: Diet & cognition in the Healthy Brain Initiative**

**Authors:** Dr Edward Hill<sup>1,2</sup>, Dr Alexandra Gorelik<sup>1,2</sup>, Professor Cassandra Szoek<sup>1,2</sup>

**Affiliations:** <sup>1</sup>Healthy Brain Initiative, Melbourne, Australia, <sup>2</sup>Royal Melbourne Hospital-University of Melbourne, Melbourne, Australia

**Abstract:**

**Background:** There has been a global push towards collecting large scale epidemiological data through online platforms to promote healthy brain ageing. Online epidemiological methods enable greater diversity, scope and efficient data collection, catalysing large scale research endeavours investigating factors that may maintain brain health. A growing body of evidence suggests diet has an impact on cognition and may display therapeutic potential to minimise risk of neurodegenerative disease. This study aimed to analyse the relationship between diet and cognition in Australian adults, utilising data from the Healthy Brain Initiative (HBI).

**Methods:** As part of the HBI online protocol, participants completed demographic details, completed a dietary questionnaire and MemTrax cognitive testing. ‘Healthy diet’ scores were summed from food group medians for a total score of 0-10, whereby a 10 indicated the highest adherence to a ‘healthy diet’. Linear regression analyses were performed in R adjusting for sex, age in years and education in years.

**Results:** Participants (n=187) were aged 24-81 years (M = 57.7), 172 female (92%), reporting an average 12 years ( $\pm 1.08$  SD) of education. Twenty-seven (14.4%) reported adhering to a specialised diet (lactose/sugar/dairy free). Adherence to a ‘healthy diet’ was a significant predictor of correct responses (p<0.001\*) and correct response reaction times (p=0.001).

**Conclusions:** This study contributes to the growing body of knowledge relating dietary factors to cognition. Online methods of epidemiological data collection display great potential for answering questions relating to sex specific risk factors, age-windows for risk factor reduction and synergistic lifestyle factors for maintaining brain health.

**P1.012- A review of recent RCTs for the prevention of obesity in infancy**

**Authors:** Dr Seema Miharshahi<sup>1</sup>, Ms Kylie Hunter<sup>2</sup>

**Affiliations:** <sup>1</sup>University Of Sydney, Cammeray, Australia, <sup>2</sup>NHMRC Clinical Trials Centre, University of Sydney, Sydney, Australia

**Abstract:**

**Background:** So far there have been few effective interventions to prevent obesity in early life. Our objective was to critically review RCTs starting in late pregnancy and early infancy designed for the prevention of obesity in infancy and childhood.

**Methods:** Two registries were searched every 3-5 months from August 2016 to May 2019 to identify planned and ongoing trials that met pre-specified criteria [RCT for preventing childhood obesity, at least one outcome related to weight, starting in the first two years of childhood or prior, continue for at least 6 months postnatally, and include a component related to lifestyle (ie. early feeding, parenting, physical activity, sleep)].

**Results:** We identified 27 unique RCTs, with most being undertaken in high income countries (Australia, USA, The Netherlands and Sweden). Two trials have recently begun in low and middle income countries (Guatemala, China). Interventions ranged from advice on diet, interactive play, sleep, emotion regulation and parenting education through individual home visits, clinic based consultations or group education sessions. Eight trials have published outcome data on weight related outcomes but only one has shown a significant difference in BMI-z score. Most trials have shown significant improvements in practices such as breastfeeding, TV viewing time and physical activity in the intervention groups in comparison to the control groups.

**Conclusions:** Changes in weight related behaviours holds potential for reducing obesity in later childhood. Follow-up of ongoing trials is needed to assess long-term effects.

### **P1.013- A new method for investigating associations between play equipment and physical activity**

**Authors:** Dr Katrina Moss<sup>1</sup>, Professor Annette Dobson<sup>1</sup>, Kimberley Edwards<sup>2</sup>, Professor Kylie Hesketh<sup>3</sup>, Yung-Ting Chang<sup>1,2</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, University Of Queensland, Herston, Australia*, <sup>2</sup>*Faculty of Medicine and Health Sciences, University of Nottingham, Nottingham, United Kingdom*, <sup>3</sup>*School of Exercise and Nutrition Sciences, Deakin University, Burwood, Australia*

#### **Abstract:**

**Background:** Evidence of the association between play equipment at home and children's physical activity (PA) is mixed. Current methods investigate the overall variety of equipment or individual pieces of equipment, neither of which reflect children's lived experience. We investigated associations between combinations of equipment and PA.

**Methods:** Data were from the Mothers and their Children's Health study and the Australian Longitudinal Study on Women's Health. Mothers (N=2409) indicated the types of fixed active (e.g., trampolines), portable active (e.g., bicycles) and electronic (e.g., computers) equipment at home, and the number of days children (N=4092, aged 5-12 years, 51% boys) met PA guidelines. Latent class analysis (LCA) was used to identify combinations of equipment, and linear regressions to investigate associations with PA.

**Results:** LCA identified four combinations of equipment. "Plenties" had high active (fixed and portable; M=8.17) and medium electronic (M=1.97). "Sliders" had medium active (fixed; M=6.38) and low electronic (M=1.29). "Batters" had low active (portable; M=5.40) and medium electronic (M=1.88). "Techies" had medium active (portable; M=6.77) and high electronic (M=3.75). Compared to "Plenties", "Batters" (coefficient = -0.53, 95% CI = -0.72, -0.34) and "Techies" (coefficient = -0.58, 95% CI = -0.83, -0.33) met PA guidelines on fewer days. "Techies" had similar active (but more electronic equipment) than "Sliders", yet met PA guidelines on fewer days (mean difference = -0.51, SE = 0.14, p = .002).

**Conclusion:** The combination, rather than the amount, of play equipment at home is associated with children's physical activity. This could inform interventions and advice to parents.

### **P1.014- Activity of rural CBR and Physical Therapist (JICA Volunteer) in Timor-Leste**

**Authors:** Sachiko Miwa<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*Uma Ita Nian Clinic, Kabas Fatin, Malere, Aileu-vila, Timor-Leste*, <sup>2</sup>*Japan International Cooperation Agency (JICA) Timor-Leste, Avenida Luromata (Antiga Prai dos Coqueiros), No.3 Comoro, Dili, Timor-Leste*

#### **Abstract:**

**Background:** The literature describing community based rehabilitation (CBR) in rural Timor-Leste is unclear. The purpose of this study is to examine the current status of CBR in rural areas and the role of physical therapists.

**Method:** The subjects are those who were subject to CBR between 1996 and August 2018 in Aileu prefecture of the country. Information was collected from the past data of Uma Ita Nian Clinic, to which JICA volunteers are assigned.

In addition, questionnaires were used to investigate changes in the frequency of rehabilitation by CBR workers before and after volunteers were dispatched and anxiety points. After dispatching, individual rehabilitation instruction based on patient evaluation is provided on site.

**Result:** There are 15 areas in the target villages, and in August 2018, there are 201 subjects out of approximately 53,000 people in the prefecture. The most common diseases being stroke (about 15%) followed by mental illness (about 12%) and cerebral palsy (about 9%). Of the 201 people, 25 died (about 12%).

The frequency of rehabilitation by CBR workers increased from 14 to 30% for 2-3 times a month and 36 to 50% for 4 or more times a month.

Regarding anxiety, individual consultations such as patient's physical function and ADL were the most common results (64%).

**Conclusion:** I was able to grasp the current situation of rural CBR that had not been clarified until now. In addition, it turned out that a physical therapist is required for individual rehabilitation based on physical therapy evaluation in the field.

### **P1.015- Epidemiology and maintaining public health awareness of scabies in Australia**

**Authors:** Dr Harrison Edwards<sup>1</sup>

**Affiliations:** <sup>1</sup>*University Of Queensland, Brisbane, Australia*

**Abstract:**

**Background:** Scabies is one of the commonest skin diseases worldwide, estimated to affect more than 200 million people annually. However, its distribution is not uniform.

**Results:** Prevalence ranges from 0.2 to 71 percent with extreme prevalence in some tropical resource-poor regions, such as northern Australian indigenous communities. Scabies disproportionately affects the most vulnerable of these underserved populations; children, elderly, and the immunocompromised.

*Sarcoptes scabiei* is invisible to the naked eye, and transmission is by close person-to-person contact. The mite burrows into skin, and mite protein and faeces trigger the host immune response leading to intense itching.

Symptoms appear in 2-6 weeks in initial infestation and 1-4 days in reinfestation.

Scabies infestation presents as two types: classical scabies is caused by infestation of 5 to 15 mites, and the main symptom is an intensely itching rash, worse at night. Crusted scabies is a more severe form, caused by thousands of mites on susceptible people resulting in weeping thick skin crusts that may not itch, and often leads to superinfection, exhaustion, disfigurement, septicaemia, and heart and kidney complications, which cause a significant public health burden.

**Conclusion:** In 2012, with considerable Australian expertise, the International Alliance for Control of Scabies was formed, increasing awareness and advancement of scabies control, leading to scabies' inclusion in the WHO listing of Neglected Tropical Diseases. This helps coordinate international funding, research and planning the most effective community-based control efforts. This is an ongoing process requiring high awareness of scabies as an important public health initiative in Australia.

### **P1.016- Factors associated with parents managing their child's diet**

**Authors:** Douglas Lincoln<sup>1</sup>, Susan Clemens<sup>1</sup>

**Affiliations:** <sup>1</sup>*Queensland Health, Herston, Australia*

**Abstract:**

**Introduction:** A stages of change (SoC) framework was used to investigate whether parents were taking actions to manage their child's diet and identify factors associated with change.

**Methods:** Additional questions about children's diets and whether parents managed their child's diet were added to an annual general population survey of Queensland children's health and lifestyle characteristics. Prevalence by SoC was calculated for sociodemographic factors, preventive health risk factors, and healthy diet risk factors. Multivariate population weighted logistic regression was used to identify factors significantly associated with change after adjusting for other covariate factors.

**Results:** Data was collected from 17 October–16 November 2018 and included 2,518 children aged between 5 and 17 years. Analysis showed: 47% of parents were taking no action and did not intend to in the next 12 months, 39% were currently taking actions to improve their child's diet, and 14% intended to start in the next 12 months. After adjusting for other factors, current action and intent to change were associated with greater concern about their child's weight and the parent's rating of the health of their child's diet compared to twelve months previously. Intent to change was also associated with higher numbers of dietary risk factors.

### **P1.017- Kura Kai Ora**

**Authors:** Mrs Kathryn Chapman<sup>1</sup>, Ko Awatea<sup>1</sup>, Maori NGO Health Providers<sup>3</sup>, Toi Tangata<sup>2</sup>

**Affiliations:** <sup>1</sup>*Ngaruahinerangi, Ngatiruanui, Tainui and Ngapuhi, Mangere, New Zealand*, <sup>2</sup>*Kaupapa Māori Health Organisation, Westgate, New Zealand*, <sup>3</sup>*National Hauora Coalition, Avondale, New Zealand*

**Abstract:**

**Background:** We wanted to develop key messages around healthy foods by rangatahi for rangatahi.

**Method:** We selected 20+ 10-12year olds from a local kura Kaupapa Māori and started working alongside those selected rangatahi.

We brainstormed around what their understanding of tipuna kai me nga atua that was responsible for those kai. We used cards that depicted the atua and the Tamariki had to figure out what kai was associated with that atua. The Tamariki then had to sort the kai into two categories of good kai and bad kai.

**Results:** From the 20+ children the selection was then cut in half to find 3 key messages that resonated with the Tamariki.

**Conclusion:** Three key messages were chosen and added to a poster and an animation was made.

**Context:** The posters and animation are done in Te Reo Māori.

**Process:** Consent gained from rangatahi and whānau to take part in the project. The workshops with the rangatahi had to be given in Te Reo as per Kura request.

The Rangatahi chose the key messages that resonated with them.

**Analysis:** Broke the procedure down bit by bit to get 3 key messages.

**Outcome:** The project has yet to be launched. Video is available online.

### **P1.018-**

#### **Authors: Analysis of diet quality in Uzbekistan**

**Affiliations:** <sup>1</sup>Queensland Department of Agriculture and Fisheries, Brisbane, Australia

#### **Abstract:**

##### **Dr Alisher Ergashev<sup>1</sup>**

**Background:** In Uzbekistan, the leading risk factor that accounts for the most disease burden is dietary risks. Dietary diversity has been conjectured to be a potentially useful indicator of diet quality, nutrient adequacy and nutritional status. This study aims to analyse diet quality via the dietary diversity concept and eventually aid in improving nutritional outcomes of the Uzbek population.

**Methods:** Data is drawn from a food consumption survey conducted purposely in Tashkent province. A total of 931 persons were interviewed twice: in summer 2014 and winter 2014/15. Dietary diversity score for each individual in one of three age categories was calculated separately, and then used as a dependent variable in the fixed effect Poisson regression model of dietary diversity.

**Results:** Regression results showed that in children (except infants) and adults, socioeconomic status was found to positively affect dietary diversity. Age increases dietary diversity for all population groups, except for adult men. The positive association between food knowledge and dietary diversity, found in adults, suggests the importance of raising awareness on healthy diet. Home availability of fruit and vegetables increases dietary diversity in children, which is confirmed by the positive association between rural dummy and diet diversity.

**Conclusions:** In order to improve the nutritional profile of the Uzbekistan population, state policies should combine such activities as food fortification, micronutrient supplementation, and dietary diversification. Public campaigns are also needed to increase awareness about the health benefits of dietary variety, increasing fruit and vegetable consumption and controlling energy intake.

### **P1.019- Accounting for neighbourhood self-selection in neighbourhoods and health research: a systematic review**

**Authors:** **Dr Karen Lamb<sup>1</sup>**, Dr Lukar Thornton<sup>1</sup>, Dr Tania King<sup>2</sup>, Prof Kylie Ball<sup>1</sup>, Dr Simon White<sup>3</sup>, A/Prof Rebecca Bentley<sup>2</sup>, A/Prof Neil Coffee<sup>4</sup>, Prof Mark Daniel<sup>4</sup>

**Affiliations:** <sup>1</sup>Deakin University, Burwood, Australia, <sup>2</sup>University of Melbourne, Parkville, Australia, <sup>3</sup>MRC Biostatistics Unit, Cambridge, UK, <sup>4</sup>Canberra University, Canberra, Australia

#### **Abstract:**

**Background:** Bias due to failure to account for self-selection into residential neighbourhoods is a widely acknowledged but under-studied phenomenon in research on neighbourhood influences on physical activity and diet.

**Objectives:** To assess how neighbourhood self-selection is accounted for in the literature and to examine the extent of variability in study findings after accounting for self-selection.

**Methods:** A systematic search of articles was conducted in July 2017. Two assessors independently screened articles. Articles were included if they examined associations between neighbourhood environment exposures and adult physical activity or diet. Exposures could include objective measures of the built (e.g., food outlets), natural (e.g., parks) or social (e.g., crime) environment. Articles had to explicitly state they accounted for neighbourhood self-selection.

**Results:** Thirty-one articles met the inclusion criteria. All but one considered a physical activity outcome (30/31). Very few articles examined diet (2/31). Methods to address neighbourhood self-selection varied. Most (23/31) accounted for items relating to participants' neighbourhood preferences using multi-variable adjustment in regression models (20/23) or propensity scores (3/23). Of 11 longitudinal studies, three used fixed effects regression to explicitly control for neighbourhood self-selection as an unmeasured confounder. Other articles (4/31) applied restrictions to the population under consideration to preclude self-selection issues.

**Discussion:** Most articles accounted for neighbourhood self-selection using model adjustment, assuming self-selection factors can be identified a priori and accurately measured to reduce residual confounding. Some longitudinal studies used fixed effects models to deal with unmeasured time-invariant confounders. However, these cannot account for time-varying self-selection, an important limitation.

### **P1.020- Reliability and validity of questions to assess accumulation of workplace sitting time**

**Authors:** Dr Bronwyn Clark<sup>1</sup>, Ms Samantha Stephens<sup>1</sup>, Mr Michael Norman<sup>1</sup>, A/Prof Genevieve Healy<sup>1,2,3</sup>, Dr Elisabeth Winkler<sup>1</sup>

**Affiliations:** <sup>1</sup>*School Of Public Health, The University Of Queensland, Herston, Australia*, <sup>2</sup>*Baker Heart & Diabetes Institute, Melbourne, Australia*, <sup>3</sup>*School of Physiotherapy and Exercise Science, Curtin University, Perth, Australia*

#### **Abstract:**

**Background:** Unlike for workplace sitting time, few self-report measures regarding workers' sitting time accumulation at work have been evaluated. This study assessed the test-retest reliability and criterion validity of a range of questions that may be suitable for this purpose.

**Methods:** Workers from a single office/call centre environment (n=28, mean age=47 years, 86% female) completed a questionnaire, before, and then immediately after wearing the activPAL3TM for 7 days (24-h protocol with diary-reported work hours; validity criterion). They reported typical behaviour at work in the past week: percentage sitting accumulated in bouts of  $\geq 30$  minutes [prolonged sitting %]; number of breaks per hour of sitting [n breaks]; and, number of strategies used to breakup sitting time [n strategies].

**Results:** Test-retest correlations (Spearman's rho) were good for prolonged sitting % (rho=0.74 95% confidence interval [CI]=0.51-0.87) and n strategies (rho=0.73 95% CI=0.49-0.87) but not n breaks (rho=0.11 95% CI =-0.27-0.46). Self-report prolonged sitting % was correlated with its criterion (rho=0.55 95%CI=0.21-0.77 vs activPAL work sitting % in bouts of  $\geq 30$  minutes). Both n breaks and n strategies were correlated with their criteria (rho=0.46 95%CI=0.10-0.72; rho=0.40 95%CI=0.02, 0.68 respectively vs activPAL sit-stand transitions per hour of sitting at work).

**Conclusions:** These questions show fair ability to rank individuals on how they accumulate sitting time at work. The validity correlations are comparable to those found for current measures of workplace sitting time and better than those previously seen for work sitting time accumulation questions.

### **P1.021- Observational dynamic treatment regimen studies: moving from methodology to real-world clinical applications.**

**Authors:** Robert Mahar<sup>1</sup>, Julie Simpson<sup>1</sup>, John Carlin<sup>1</sup>, Bibhas Chakraborty<sup>2</sup>, Maarten Izjerman<sup>1</sup>

**Affiliations:** <sup>1</sup>*University of Melbourne, Melbourne, Australia*, <sup>2</sup>*Duke-NUS Medical School, Singapore*

#### **Abstract:**

**Background:** Most treatments for chronic diseases are not provided to patients as static 'once-and-for-all' solutions, but are instead assigned dynamically to optimise some clinical outcome in response to the patient's changing condition. Dynamic treatment regimens (DTRs) are formalisations of such treatment dynamics. DTRs are ideally optimised using trial data, but appropriately designed trials are costly. A less common but more feasible alternative is to emulate some target trial with observational data using causal methods to adjust for time-varying treatment confounding. We aimed to provide an overview of how DTR methods have been applied in observational studies.

**Methods:** We systematically searched the PubMed database for publications where DTRs were optimised using observational data. After screening 165 abstracts, we identified 43 publications from which to extract information including study size, clinical area, outcome types, and methods used for confounder adjustment, outcome modelling, missing data, sensitivity analysis, and covariate selection.

**Results:** Our preliminary qualitative synthesis suggests that there is wide variation in the scope, intent, quality, and causal and statistical methodology of each study. Notably, few publications were primarily intended to address real-world clinical questions, but instead focused on methodological developments that included a demonstrative application.

**Conclusions:** As medicine becomes increasingly personalised the need will grow for DTR methods to estimate dynamic treatment effects. Because trials are expensive, observational DTR studies will be necessary, but very few clinically relevant examples exist. Understanding why there are so few clinically relevant examples may be key to bringing DTR methods into routine use for observational studies.

### **P1.022- Modifiable lifestyle factors and frailty in the Women's Healthy Ageing Project**

**Authors:** Mr Kevin Wang<sup>1</sup>, Mrs Alex Gorelik<sup>1,2</sup>, Mr Nathaniel Sage<sup>1</sup>, Professor Cassandra Szoek<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*The University of Melbourne, Melbourne, Australia*, <sup>2</sup>*Australian Catholic University, Melbourne, Australia*

#### **Abstract:**

**Background:** The frailty syndrome is defined as a state of lowered functional capacity and an inability to cope with the normal stresses in life. Modifiable lifestyle factors including diet, exercise, alcohol and smoking may be associated with improvements in frailty status. Given that chronic diseases take decades to develop, we need to look across several decades of exposure to determine the importance of timing and duration for modification targets. Epidemiologically sourced cohorts are essential to inform these knowledge gaps.

**Methods:** Participants were Australian women from the prospective longitudinal Women's Healthy Ageing Project (WHAP) which commenced in 1991. Participants responded to a series of questionnaires regarding their lifestyle, including physical activity (PA) and mid-life and late-life diet. Outcome measure was hand grip strength (HGS) at final followup (participant mean age = 72.5) as a pseudo measure of frailty.

**Results:** 263 participants recorded a HGS measure with mean 22.21kg (SD=5.74) and were included in this analysis. Increased vegetable intake in midlife was found to be associated with increased HGS in ageing ANOVA ( $F(7,11) = 2.329, p = .026$ ). PA levels in midlife were found to be positively associated with grip strength over 70 ( $F(1,223) = 7.932, p = .005$ ). Fruit intake, smoking status, and alcohol consumption were found not to be associated with HGS levels.

**Conclusions:** Our findings suggest that increased midlife PA levels and an increase in vegetable intake are associated with decades later better performance on HGS, a well established measure in the physical domain of frailty.

### **P1.023- Weight gain in Queensland patients after heart transplantation**

**Authors:** Miss Regina Yu<sup>1</sup>, Dr Scott McKenzie<sup>2</sup>, Dr Kyoko Miura<sup>1</sup>, Professor Adèle C Green<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer and Population Studies Group, QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>Advanced Heart Failure and Cardiac Transplant Unit, The Prince Charles Hospital, Chermside, Australia

#### **Abstract:**

**Background:** Evidence from various countries suggests that detrimental increases in body weight of heart transplant recipients (HTRs) occur within the first year after transplantation. We aimed to assess this in Australian HTRs.

**Methods:** Adult ( $\geq 18$  years) HTRs were identified from Queensland's thoracic transplant hospital. HTRs transplanted 1990–2017 who were alive  $\geq 1$  year post-transplantation were eligible for study. Patients' weight was measured at time of transplant and periodically during routine follow-up. These data were extracted directly from patients' hospital records at time of transplantation (study baseline) and 12 months after transplant, along with demographic information and measured height. Changes in weight and calculated body mass index (BMI) between baseline and at 12 months follow-up were assessed using non-parametric Wilcoxon signed-rank test and McNemar test.

**Results:** Of 317 HTRs transplanted, 130 (median age 53 years; male 79%) had weight measurements available at 1 year. This subset of 130 was similar to the overall source population in terms of age, sex and main reasons for heart transplantation (coronary artery disease and by dilated cardiomyopathy) ( $p > 0.05$ ). At baseline, median weight was 80 kg (range 45–120 kg) and median BMI was 26.0 kg/m<sup>2</sup> (range 17.4–37.6 kg/m<sup>2</sup>); 61% were overweight/obese. One year post-transplantation, median weight had increased to 83 kg (range 47–125 kg;  $p < 0.001$ ) and corresponding median BMI increased to 27.8 kg/m<sup>2</sup> (range 17.3–42.1 kg/m<sup>2</sup>;  $p < 0.001$ ), 71% overweight/obese ( $p = 0.024$ ).

**Conclusions:** These preliminary findings show that HTRs experience significant weight gain during the first 12 months post-transplantation, warranting further investigation.

### **P1.024- Trends in three lifestyle factors in Australian adults**

**Authors:** Mr Yang Peng<sup>1,2</sup>, Prof Zhiqiang Wang<sup>3</sup>

**Affiliations:** <sup>1</sup>Centre for Chronic Disease, The University of Queensland, Brisbane, Australia, <sup>2</sup>Queensland Centre for Gynaecological Cancer Research, The University of Queensland, Brisbane, Australia, <sup>3</sup>Menzies School of Health Research, Charles Darwin University, Darwin, Australia

#### **Abstract:**

**Background:** Chronic diseases are still major health burden in Australia and it has been reported that smoking, raised body mass index (BMI), and physical inactivity are significant modifiable risk factors of chronic diseases. However, the trends in the three factors in Australian adults are still unclear.

**Methods:** Our study analysed data from 2004-2005, 2007-2008, 2011-2012, and 2014-2015 National Health Survey, which are Australian nationally representative surveys. We calculated the weighted proportions and trends of the non-ideal status of the three lifestyle factors in the overall and age-sex specific populations using Stata, version 15.1.

**Results:** Physical activity has the highest proportion of non-ideal status (76.2%), followed by BMI (60.4%) and smoking (49.9%). The prevalence of physical inactivity has increased during 2004-2005 and 2007-2008, whereas it showed a declining trend afterwards ( $P$  trend  $< 0.01$ ). The proportion of high BMI has increased steadily from 53.5% (2004-2005) to 63.4% (2014-2015) ( $P$  trend  $< 0.01$ ). The proportion of smoking has declined from 53.3% (2004-2005) to 47.4% (2014-2015) ( $P$  trend  $< 0.01$ ). Trends of the three lifestyle factors were consistent across age-sex groups.

**Conclusions:** A great number of Australian adults are still suffering from physical inactivity, elevated BMI, and smoking. It is crucial to improve the status of the three lifestyle factors and reduce the burden of chronic diseases.

### **P1.025- Primary and specialist care amongst older Australian women with and without dementia**

**Authors:** Mr Dominic Cavenagh<sup>1</sup>, Professor Julie Byles<sup>1</sup>, Ms Peta Forder<sup>1</sup>

**Affiliations:** <sup>1</sup>*The Research Centre for Generational Health and Ageing - The University Of Newcastle, New Lambton Heights, Australia*

**Abstract:**

**Background:** Dementia is a common and chronic condition affecting over 20% of people over 70. Support from primary and specialist health care services are key to coordinating and providing care amongst people in their later lives. We hypothesised that dementia would increase unreferral attendances and decrease specialist attendances amongst Australian women over 75 years of age.

**Methods:** Survey data from the 1921-26 cohort of the Australian Longitudinal Study on Women's Health linked with MBS and NDI administrative datasets was used to model the use of GP and specialist attendances as well as seventy-five plus assessments and chronic disease management items offered by a GP through Medicare. GEE longitudinal models accounted for dementia and other comorbidities, as well as some predisposing, need and enabling factors.

**Results:** Women with dementia had higher GP use (~10% higher than those without dementia), lower specialist use (~10% lower than those without dementia) and had similar log-odds of having a seventy-five plus assessment or chronic disease management meeting in a year compared to those without dementia.

**Conclusion:** Dementia is a complicated chronic disease. Gaining deeper understanding into primary and specialist care utilisation amongst older women with dementia can assist with strategies aimed at providing better ongoing care to this section of society.

### **P1.026- Asking the question – missing Indigenous identification underestimates the impact of cancer**

**Authors:** Mr Nathan Dunn<sup>1</sup>, Dr Louise Mitchell<sup>2</sup>, Ms Danica Cossio<sup>1</sup>, Ms Julie Moore<sup>1</sup>, Mr Gary Francois<sup>1</sup>, Professor Peter Baade<sup>3</sup>, Mr Daniel Williamson<sup>2</sup>

**Affiliations:** <sup>1</sup>*Queensland Cancer Alliance, Queensland Health, Brisbane, Australia*, <sup>2</sup>*Aboriginal and Torres Strait Islander Health Branch, Queensland Health, Brisbane, Australia*, <sup>3</sup>*Cancer Council Queensland, Brisbane, Australia*

**Abstract:**

**Background:** Measuring cancer outcomes among Aboriginal and Torres Strait Islander Queenslanders relies on accurately capturing a person's Indigenous status. Data from the Queensland Cancer Register (QCR), highlighted 10% of new cases diagnosed between 2002–2014 had unknown Indigenous identification status.

**Methods:** The QCR was linked with other health administrative data collections and the multi-stage median (MSM) algorithm described by Christensen et al, (2016) was used to retrospectively determine the Indigenous status of Queenslanders diagnosed with cancer between 2002 – 2014. Changes in identification patterns were assessed across cancer type and by age, sex, remoteness of residence and socioeconomic status.

**Results:** The use of linked data to improve Indigenous identification has identified an increase of almost 50% in Aboriginal and Torres Strait Islander people diagnosed with cancer. Increases were most notable in melanoma and prostate cancer where the number of Aboriginal and Torres Strait Islanders diagnosed with cancer increased by 200% and 87% respectively.

When analysing by location, identification increases were highest in Major Cities (84%) compared with Remote and Very Remote areas (13%) and in Affluent (92%) compared with Disadvantaged socioeconomic status (30%).

**Conclusion:** Adoption of the MSM algorithm has highlighted areas for further research where under-identification of Aboriginal and Torres Strait Islanders with cancer may have been occurring. This is particularly evident in cancers such as melanoma, where diagnosis information is generally obtained from pathology notification which does not capture Indigenous status. Increases in identification in Major Cities areas are in accordance with previous knowledge regarding under-reporting of Indigenous status.

## 2A – Epidemiological research and practice in nutrition, obesity and physical activity

Plaza Room P9, 1:15pm - 2:45pm

### The Contribution of Body Mass Index Across the Life-course to Adult Atherosclerosis

**Authors:** **Jack Evans**<sup>1</sup>, Doctor Marie-Jeanne Buscot<sup>1</sup>, Professor Markus Juonala<sup>2,3</sup>, Associate Professor Matthew A. Sabin<sup>4</sup>, Professor Jorma S.A. Viikari<sup>2</sup>, Professor Olli T. Raitakari<sup>5,6,7</sup>, Doctor Costan Magnussen<sup>1,5</sup>

**Affiliations:** <sup>1</sup>*Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia*, <sup>2</sup>*Department of Medicine, University of Turku, Turku, Finland*, <sup>3</sup>*Division of Medicine, Turku University Hospital, Turku, Finland*, <sup>4</sup>*Murdoch Children's Research Institute, Royal Children's Hospital, and Department of Paediatrics, University of Melbourne, Melbourne, Australia*, <sup>5</sup>*Research Centre of Applied and Preventive Cardiovascular Medicine, Turku, Finland*, <sup>6</sup>*Centre for Population Health Research, University of Turku and Turku University Hospital, Turku, Finland*, <sup>7</sup>*Department of Clinical Physiology and Nuclear Medicine, Turku, Finland*

#### Abstract:

**Background:** Longitudinal data have shown both childhood and adulthood body mass index (BMI) to associate with adult carotid artery intima-media thickness (cIMT), a preclinical measure of atherosclerotic cardiovascular disease. However, the relative importance of BMI at different life stages on adult cIMT has not been quantified.

**Aim:** To determine the life-course model (cumulative exposure, sensitive or critical periods) that best explains the association of child, adolescent, and young adult BMI on high-risk adult cIMT.

**Methods:** BMI was collected at up to seven time-points from childhood to adulthood among 2652 participants in the Cardiovascular Risk in Young Finns Study. BMI measures were retrieved from sex-specific Individual Growth Curve models at three ages representative of childhood (9y), adolescence (18y) and young adulthood (30y). High-risk cIMT was defined as cIMT levels above adult age- and sex-specific 90th percentiles. Associations were evaluated using Bayesian relative life-course exposure modelling.

**Results:** Cumulative exposure to higher levels of BMI across the life-course was associated with a 13% (OR=1.13; 95% credible interval [CrI] = 1.09-1.18) increase in odds of developing high-risk cIMT. The posterior probability was 87.4% for the life-course hypothesis that young adulthood is a sensitive period for BMI exposure compared with earlier-life periods. On average, young adulthood BMI contributed 61% (95%CrI=38-85), childhood BMI contributed 23% (95%CrI=2-50), and adolescent BMI contributed 16% (95%CrI=1-41) to the risk of high adult cIMT.

**Conclusion:** Higher levels of BMI across the life-course was associated with increased odds of high-risk cIMT in adulthood, with evidence for a sensitive period in young adulthood.

### Trends in total, walking and vigorous physical activity, Queensland adults 2004–2018

**Authors:** Ms Alison Griffin<sup>1</sup>, **Mr Tim Roselli**<sup>1</sup>, Ms Susan Clemens<sup>1</sup>

**Affiliations:** <sup>1</sup>*Queensland Health, Herston, Australia*

#### Abstract:

**Background:** Physical activity (PA) is important for good health. Health benefits accrue with small increases in PA, with the greatest benefits for those transitioning from inactivity to any level of PA.

**Methods:** The Queensland Government conducts regular cross-sectional preventive health telephone surveys. Between 2004 and 2018, adults answered identical questions about weekly minutes of walking, moderate PA, vigorous PA and place-to-place walking. Distributions of PA time in the general population are typically strongly right skewed with a large proportion of zero values and can be considered to have both discrete (zero-versus-nonzero) and continuous (positive values) components. Hurdle regression, a two-part modelling technique combining a binary model for zero-versus-nonzero outcomes and an appropriate regression model for positive values, was used to estimate the average annual change in weekly minutes of PA overall and by activity type focusing on sociodemographic differences in trends.

**Results:** Unadjusted minutes of weekly PA increased by 10.0 minutes/year (95% confidence interval (CI) 8.8-11.1) overall with increases for most subgroups. Adjusted weekly PA increased by 10.5 minutes/year (95% CI 9.4-11.7). Trends differed by employment—employed adults and those not in the labour force increased by 14.3 (95% CI 12.8-15.8) and 2.2 minutes/year (95% CI 0.4-4.0) respectively with no increase for unemployed adults. Increases were due to both increased prevalence of doing any activity and increased average duration of activity for those who were active.

**Conclusions:** This study demonstrates that PA time has increased for Queensland adults since 2004 and that this has only varied substantially by employment.

## Effect of supplementation with high-dose vitamin D on risk of falling

**Authors:** Mary Waterhouse<sup>1</sup>, Emma Sanguineti<sup>1,2</sup>, Bruce Armstrong<sup>3</sup>, Catherine Baxter<sup>1</sup>, Briony Duarte Romero<sup>1</sup>, Peter Ebeling<sup>4</sup>, Dallas English<sup>5,6</sup>, Gunter Hartel<sup>1</sup>, Michael Kimlin<sup>7</sup>, Donald McLeod<sup>1</sup>, Rachel O'Connell<sup>8</sup>, Jolieke van der Pols<sup>9</sup>, Alison Venn<sup>10</sup>, Penelope Webb<sup>1</sup>, David Whiteman<sup>1</sup>, Rachel Neale<sup>1,2</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>School of Public Health, The University of Queensland, Brisbane, Australia, <sup>3</sup>School of Public Health, University of Sydney, Sydney, Australia, <sup>4</sup>Department of Medicine, School of Clinical Sciences, Monash University, Melbourne, Australia, <sup>5</sup>Melbourne School of Population Health, University of Melbourne, Melbourne, Australia, <sup>6</sup>Cancer Epidemiology Centre, Cancer Council Victoria, Melbourne, Australia, <sup>7</sup>Health Research Institute, University of Sunshine Coast, Sippy Downs, Australia, <sup>8</sup>NHMRC Clinical Trials Centre, University of Sydney, Sydney, Australia, <sup>9</sup>School of Exercise and Nutrition Sciences, Faculty of Health, Queensland University of Technology, Brisbane, Australia, <sup>10</sup>Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia

### Abstract:

**Background:** Falls cause considerable morbidity and mortality in older people. It is unclear how vitamin D supplementation affects risk of falling, particularly when taken at high doses.

**Methods:** The D-Health Trial is an on-going, double-blind, randomised, placebo-controlled trial of monthly high-dose (60,000 IU) vitamin D supplementation in 21,310 older Australians. Falls ( $\geq 1$  fall in previous month; number of falls in previous year) were ascertained using annual surveys. For this analysis we used a random sample of 8,000 people from each trial arm and excluded anyone missing outcome data at year one. We followed an intention-to-treat approach. We analysed binary and count outcomes using logistic and ordinal regression, respectively, and estimated incidence rates using Poisson regression.

**Results:** We remain blind to study group assignment. The analytic population comprised 15,261 people (49.9% in Group 0). Baseline characteristics were balanced between groups. Overall, there was no difference in risk of falling between randomisation groups (OR 0.96, 95% CI 0.89–1.05). However, there was a strong interaction between randomisation group and physical activity, and a suggestion of an interaction between randomisation group and predicted baseline vitamin D status. Being randomised to Group 1 reduced risk of falling amongst people who either did a low amount of physical activity (OR 0.79, 95% CI 0.68–0.91), or who were predicted to be vitamin D insufficient (OR 0.88, 95% CI 0.77–1.01). Little effect was seen in people who were more active or were vitamin D sufficient.

**Conclusion:** Vitamin D supplementation may alter risk of falling amongst some population subgroups.

## Trailing behind? -Socioeconomic disparity in vigorous leisure time physical activity

**Authors:** Dr Jessica Gugusheff<sup>1,2</sup>, Ms Bridget Foley<sup>1</sup>, Dr Katherine Owen<sup>1</sup>, Mr Bradley Drayton<sup>1</sup>, A/Prof Ding (Melody) Ding<sup>1</sup>, Professor Emmanuel Stamatakis<sup>1</sup>, Ms Charlotte Lund Rassmussen<sup>1,3,4</sup>, Professor Adrian Bauman<sup>1</sup>, Dr Margaret Thomas<sup>1</sup>

**Affiliations:** <sup>1</sup>Prevention Research Collaboration, University of Sydney, Camperdown, Australia, <sup>2</sup>Centre for Epidemiology and Evidence, NSW Ministry of Health, St Leonards, Australia, <sup>3</sup>The National Research Centre for the Working Environment, Copenhagen, Denmark, <sup>4</sup>Section of Social Medicine, Department of Public Health, University of Copenhagen, Copenhagen, Denmark

### Abstract:

**Background:** Leisure time physical activity (LTPA) plays an important role in achieving sufficient physical activity for health. Cross-sectional studies show a clear disparity in LTPA between those of high and low socioeconomic status, which is most pronounced for higher intensity vigorous LTPA (VLTPA). However, there is little information on whether this inequality is improving or worsening over time. This study aimed to investigate changes over time in population-level physical activity participation by intensity, and socio-economic status.

**Methods:** Physical activity data was sourced from the Adult NSW Population Health Survey 2002-2015. The analysis utilised age and sex adjusted multivariable linear and logistic models that accounted for survey design, with year as an ordinal variable. Education level was used an indicator of socioeconomic status.

**Results:** In 2002, the most educated spent 18.5 (95% CI 8.2, 28.8) minutes more per week being vigorously active compared to the least well-educated. By 2015, a steady increase in VLTPA among the most educated increased this gap to 41.4 (95% CI 27.6, 55.1) minutes per week. All education groups except the least well-educated increased their minutes of VLTPA over time. Conversely, from 2002-2015 there were no significant differences in minutes walking between education groups

**Conclusions:** Our findings suggest that the socioeconomic gap in VLTPA participation is widening. This inequality means that the most disadvantaged are missing out on the additional health benefits vigorous activity provides. Barriers which inhibit the least educated from engaging in VLTPA should be addressed urgently, likely led by sport and fitness industries.

### Is an inflammatory diet associated with mental health in childhood and mid-life?

**Authors:** Dr Kate Lycett<sup>1,2,3</sup>, Dr Disna Wijayawickrama<sup>2,3</sup>, Dr Jessica Kerr<sup>2,3</sup>, Dr Anneke Grobler<sup>2,3</sup>, Professor Louise Baur<sup>4</sup>, Ms Mengjiao Liu<sup>2,3</sup>, Professor David Burgner<sup>2,3,5</sup>, Professor Melissa Wake<sup>2,3</sup>

**Affiliations:** <sup>1</sup>Deakin University, Burwood, Australia, <sup>2</sup>Murdoch Children's Research Institute, Parkville, Australia, <sup>3</sup>University of Melbourne, Parkville, Australia, <sup>4</sup>The University of Sydney, Camperdown, Australia, <sup>5</sup>The Royal Children's Hospital, Parkville, Australia

#### Abstract:

**Background:** Inflammatory diet is a modifiable risk factor for mental illness, but whether this relationship is evident in the general population is unknown. In an Australian population-based cohort, we investigated associations between inflammatory diets and mental health in childhood and mid-life.

**Methods:** A cross-sectional study of 1,759 11-12 year-olds (49% girls) and 1,812 mid-life adults (87% female). Data from a 23-item dietary survey was used to derive two inflammatory diet scores based on associations with inflammatory markers 1) from published evidence, and 2) empirically. Mental health was assessed via well-validated measures of child psychosocial health, quality of life and life satisfaction, and adult overall mental health and quality of life. Each mental health score was dichotomised to identify a high-risk group (< 1 standard deviation (SD) below the mean). Analyses: Logistic regression models adjusted for age, sex, socioeconomic position and puberty (children) and additionally for BMI.

**Results:** In adults and children, both inflammatory diet scores were associated with poorer mental health in all models. In fully adjusted models (including BMI), children and adults with a one SD higher inflammatory diet score had a 1.2 to 1.5 (95% CI: 1.1 to 1.7) and 1.2 to 1.3 (1.1 to 1.5) higher odds of being in the worst mental health category respectively.

**Conclusions:** An inflammatory diet was consistently associated with poorer mental health in both age groups. Reducing inflammatory dietary components from childhood could offer novel opportunities for mental health prevention at a population level, but findings require replication within a casual framework.

### Does inflammation mediate the relationship between obesity and retinal vascular calibre?

**Authors:** Ms Mengjiao Liu<sup>1,2</sup>, Dr Kate Lycett<sup>1,2,3</sup>, Dr Margarita Moreno-Betancur<sup>1,2</sup>, Prof Melissa Wake<sup>1,2</sup>, Prof David Burgner<sup>1,2,4</sup>

**Affiliations:** <sup>1</sup>Murdoch Children's Research Institute, Melbourne, Australia, <sup>2</sup>The University of Melbourne, Melbourne, Australia, <sup>3</sup>Deakin University, Melbourne, Australia, <sup>4</sup>Monash University, Melbourne, Australia

#### Abstract:

**Background:** Obesity predicts adverse microvasculature from childhood, potentially via inflammatory pathways. In children and adults, we investigated whether inflammation mediates associations between obesity and microvascular parameters.

**Methods:** In 1054 11-12 year-olds (52% girls) and 1147 mid-life adults (87% female) taking part in a population-based cross-sectional study within the Longitudinal Study of Australian Children, we assessed: Body Mass Index (BMI), classified as normal, overweight and obese; Glycoprotein acetyls (GlycA), an inflammatory marker, and retinal arteriolar and venular calibre. We used causal mediation analysis, which decomposes a "total effect" (here, of obesity on adverse microvasculature) into "direct" and "indirect" components via a mediator (GlycA) and adjusting for potential confounders.

**Results:** Compared to children with a normal BMI, those with overweight/obese had narrower arteriolar calibre (total effects - 0.21 to -0.12 standard deviation (SD) unit) and wider venular calibre (total effects 0.25 to 0.35 SD). For arteriolar calibre, direct effects (not mediated via GlycA) were similar to total effects, but for venular calibre 20-25% was mediated via GlycA (indirect effect: overweight 0.05SD, 95% CI 0.0 to 0.10; obese 0.09SD, 95% CI 0.01 to 0.18). Retinal venular calibre was similar for adults with normal weight and overweight, but those with obesity had 0.07SD greater venular calibre, which was completely mediated by GlycA (indirect effect: 0.07SD, 95% CI -0.01 to 0.16).

**Conclusions:** Inflammation mediated associations between obesity and retinal venules, but not arterioles from mid-childhood, with higher mediation effects observed in adults. Interventions targeting inflammatory pathways may help mitigate adverse impacts of obesity on the microvasculature.

### Associations Between Physical Activity and Cognition in the Women's Healthy Ageing Project

**Authors:** Mr Nathaniel Sage<sup>1</sup>, Mr Kevin Wang<sup>1</sup>, Mrs Alex Gorelik<sup>1,2</sup>, Professor Cassandra Szoek<sup>1,2</sup>

**Affiliations:** <sup>1</sup>University Of Melbourne, Parkville, Australia, <sup>2</sup>Australian Catholic University, Melbourne, Australia

#### Abstract:

**Background:** In 2019, the World Health Organisation released public health guidelines to limit prevalence of dementia (1). Physical activity (PA) was strongly recommended for adults to reduce risk of developing cognitive decline. However, greater specificity is needed regarding how PA habits associate with cognitive ageing. Given the three-decade prodrome of dementia, only epidemiology can provide these insights.

**Methods:** The Women's Healthy Ageing Project is a longitudinal prospective epidemiological study. 331 women with cognition measured using the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) word list (mean age at baseline 56.7, SD=2.5) were included in analysis. Participants were grouped according to self-reported level of PA ( $\geq 2$  times/week 'active';  $< 2$  times/week 'inactive').

**Results:** Greater PA frequency at age 51 was associated with increased late-life cognition 21 years later: active persons compared to inactive ( $m=6.0$ ,  $SD=2.2$ ;  $m=4.7$ ,  $SD=2.2$ ),  $p=0.001$ . Vigorous PA participation at age 54 was also linked with increased CERAD scores in both mid- and late-life. A significant difference was seen between the active and inactive groups for baseline cognition at age 57 ( $m=8.0$   $SD=1.5$ ;  $m=7.5$ ,  $SD=1.5$ ),  $p=0.010$ , as well as at age 62 ( $p=0.048$ ) and age 70 ( $p=0.045$ ).

**Conclusions:** Our findings suggest undertaking PA more frequently and vigorously may be of immediate and sustained benefit for cognitive ageing. More research into the effect of intensity and type of activity on the PA-cognition relationship is needed.

1. World Health Organization. (2019). Risk reduction of cognitive decline and dementia: WHO guidelines. World Health Organization. <https://apps.who.int/iris/handle/10665/312180>. License: CC BY-NC-SA 3.0 IGO

## **Implementation of a co-designed, culturally-tailored childhood obesity prevention program targeting vulnerable populations**

**Authors:** Ms Jessica Hardt<sup>1</sup>, Mr Elkan Tanuvasa<sup>1</sup>

**Affiliations:** <sup>1</sup>Children's Health Queensland Hospital and Health Service, South Brisbane, Australia

### **Abstract:**

**Background:** The cross-cultural gap in health equity continues to expand, with Maori and Pacific Islander (MPI) populations exhibiting a higher prevalence of obesity and the life diminishing comorbidities. Multicomponent dietary, physical activity and behaviour change interventions are found to be most effective to address childhood obesity across the globe. Despite this, contextualisation of obesity prevention programs to ethnically diverse populations is currently lacking.

**Method:** A systematic and evidence-based co-design methodology was employed to develop Healthy Kids, Healthy Families Logan. Community members, health professionals and cultural-advisory members worked in partnership to co-design an 8-week culturally-tailored and evidence-based childhood obesity prevention program, targeting healthy eating, physical activity, screen time and positive parenting practices.

**Results:** The partnerships promoted have resulted in outstanding levels of engagement and trust, leading to acceptance, ownership and translation into significant satisfaction from the MPI community, "it's so great to have programs tailored to our way of living, empowering us to live healthier lives". Promoting health behaviours, "we try now to reserve treat drinks for special occasions" and "have incorporated more vegetables". Furthermore, anthropometric results indicate a reduction in BMI across 54% children and 52% adults.

**Conclusions:** Inclusion of community members within program design, delivery and quality improvement practices promotes a method to embed the program sustainably. Evaluation will contribute to an evidence-based framework adaptable to other vulnerable populations, maximising reach and reducing health inequity. The delivery of culturally-contextualised health care will significantly improve health outcomes and decrease obesity prevalence among all Australian children for many years to come.

## 2B – Cancer epidemiology - risk factors

Plaza Room P10, 1:15pm - 2:45pm

### Adult height and risk of cutaneous melanoma: A Mendelian randomisation analysis

**Authors:** Dr Jean Claude DUSINGIZE<sup>1,2</sup>, Assoc. Prof Catherine Olsen<sup>1,3</sup>, Dr Jiyuan An<sup>1</sup>, Dr Nirmala Pandeya<sup>1,2</sup>, Dr Matthew Law<sup>1</sup>, Dr Bridie Thompson<sup>1</sup>, Dr Alisa Goldstein<sup>4</sup>, Dr Mark Iles<sup>5</sup>, Prof Penelope Webb<sup>1,2</sup>, Assoc. Prof Rachel Neale<sup>1,2</sup>, Dr Jue-Sheng Ong<sup>1</sup>, Assoc. Prof Stuart MacGregor<sup>1,3</sup>, Prof David Whiteman<sup>1,2</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>2</sup>School of Public Health, University of Queensland, BRISBANE, Australia, <sup>3</sup>School of Medicine, University of Queensland, BRISBANE, Australia, <sup>4</sup>Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, USA, <sup>5</sup>Leeds Institute of Cancer and Pathology, University of Leeds, UK

#### Abstract:

**Background:** Height has been positively associated with melanoma risk, although findings have been inconsistent. It remains unclear, however, whether the reported association represent a true causal relationship or are explained by other factors simultaneously associated with height and melanoma risk. We re-evaluated this association using a two-sample Mendelian randomization (MR) approach.

**Methods:** We identified single nucleotide polymorphisms (SNPs) for height from the 2018 genome-wide association study (GWAS) meta-analysis of measured height in adulthood from the Genetic Investigation of ANthropometric Traits (GIANT) consortium. We obtained melanoma SNPs from the most recent melanoma GWAS meta-analysis comprising 12,874 cases and 23,203 controls. We used the inverse variance-weighted estimator to derive separate causal risk estimates across all SNP instruments for height.

**Results:** Based on a pooled estimate derived from 3,290 SNPs, we observed a positive association between genetically-predicted height and melanoma risk (OR 1.08, 95% CI: 1.02-1.13, per 1SD [9.27 cm] increase in height). Sensitivity analyses using two alternative MR methods yielded similar results.

**Conclusions:** This large-scale Mendelian randomisation analysis supports the findings of earlier observational studies and provides evidence that height is a risk factor for melanoma. Mechanisms through which greater height might lead to increased risk of melanoma remain unclear, and it is possible that the effect is mediated through various pathways, ranging from direct hormonal effects through to social class and sun exposure.

### Epigenetic scores for health risk factors and risk of cancer

**Authors:** Dr Pierre-Antoine Dugue<sup>1,2,3</sup>, Dr JiHoon Joo<sup>4</sup>, Dr Ee Ming Wong<sup>1</sup>, Dr Chol-Hee Jung<sup>5</sup>, A/Prof Allison Hodge<sup>1,2</sup>, Prof Dallas English<sup>1,2</sup>, Prof John Hopper<sup>3</sup>, A/Prof Roger Milne<sup>1,2,3</sup>, Prof Graham Giles<sup>1,2,3</sup>, Prof Melissa Southey<sup>1,2,4</sup>

**Affiliations:** <sup>1</sup>Precision Medicine, School of Clinical Sciences at Monash Health, Monash University, Clayton, Australia, <sup>2</sup>Cancer Epidemiology Division, Cancer Council Victoria, Melbourne, Australia, <sup>3</sup>Centre for Epidemiology and Biostatistics, The University of Melbourne, Melbourne, Australia, <sup>4</sup>Department of Clinical Pathology, The University of Melbourne, Melbourne, Australia, <sup>5</sup>Melbourne Bioinformatics, The University of Melbourne, Melbourne, Australia

#### Abstract:

**Background:** Exposure to health risk factors is associated with changes in blood DNA methylation at CpG sites. These methylation marks may be useful markers of cancer risk as they might better capture current and past exposures than questionnaires, or reflect different exposure susceptibility.

**Methods:** Eight prospective case-control studies nested within the Melbourne Collaborative Cohort Study were designed to study the association between peripheral blood DNA methylation and risk of breast (N=409 cases, post-menopausal: N=303), colorectal (N=835), gastric (N=170), kidney (N=143), lung (N=332), prostate (N=869) and urothelial cancer (N=428), and B-cell lymphoma (N=439). Methylation scores (MS) for maternal smoking, personal smoking, body mass index (BMI), and alcohol consumption were calculated using published data as weighted average of methylation values at 568, 233, 1109, and 450 CpGs, respectively, and expressed as Z-scores. Conditional logistic regression was used to estimate odds ratios (OR) per Z-score unit for association between cancer risk and MS, with all models adjusted for smoking (never/past/current, pack-years, age at starting and quitting), alcohol consumption and BMI.

**Results:** Associations were observed for: maternal-smoking MS with risk of bladder cancer (OR=1.36; P=8x10<sup>-4</sup>); personal-smoking MS with risk of lung (OR=1.74; P=2x10<sup>-5</sup>) and bladder cancer (OR=1.25; P=0.05); BMI MS with risk of post-menopausal breast (OR=1.28; P=0.007), colorectal (OR=1.12; P=0.05), kidney (OR=1.37; P=0.02) and gastric cancer (OR=1.25; P=0.09), and B-cell lymphoma (OR=0.85; P=0.05); and alcohol-consumption MS with risk of lung cancer (OR=1.42; P=4x10<sup>-4</sup>) and cancer overall (OR=1.08; P=0.04).

**Conclusions:** Our findings highlight the potential of blood DNA methylation markers to improve cancer risk prediction.

## Understanding the adiposity-endometrial cancer link: a causal sequential mediation analysis

**Authors:** Dr Ghazaleh Dashti<sup>1</sup>, Professor Dallas R English<sup>1</sup>, Dr Vivian Viallon<sup>2</sup>, Professor Julie A Simpson<sup>1</sup>, Dr Amalia Karahalios<sup>1</sup>, Dr Margarita Moreno-Betancur<sup>3</sup>, Ms Carine Biessy<sup>2</sup>, Dr Sabina Rinaldi<sup>2</sup>, Professor Rudolf Kaaks<sup>4</sup>, Dr Marc J Gunter<sup>2</sup>, Dr Laure Dossus<sup>2</sup>

**Affiliations:** <sup>1</sup>Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Australia, <sup>2</sup>Section of Nutrition and Metabolism, International Agency for Research on Cancer (IARC), Lyon, France, <sup>3</sup>Clinical Epidemiology and Biostatistics Unit, Murdoch Children's Research Institute, Melbourne, Australia, <sup>4</sup>Division of Cancer Epidemiology, German Cancer Research Centre, Heidelberg, Germany

### Abstract:

**Background:** Adiposity increases endometrial cancer (EC) risk, possibly through inducing inflammation, insulin resistance, and increased estrogen secretion. We aimed to quantify the mediating effects of these biomarkers on the adiposity-EC association in postmenopausal women: adiponectin, an anti-inflammatory adipokine; interleukin-6, interleukin-1 receptor antagonist, TNF- $\alpha$ , TNF-receptor-1 and 2, and C-reactive protein, as inflammatory biomarkers; C-peptide, an insulin resistance biomarker; and free estradiol and estrone, as estrogen pathway biomarkers.

**Methods:** We used data from a case-control study nested within the European Prospective Investigation into Cancer and Nutrition cohort. At blood collection, eligible women had no history of cancer diagnosis, hysterectomy, or diabetes, did not use oral contraceptives or hormone therapy, were postmenopausal, and had no missing data for confounders. Missing values for biomarkers were handled using multiple imputation. A regression-based sequential mediation analysis was used to estimate natural direct (NDE) and indirect (NIE) effects of BMI $\geq$ 30 kg/m<sup>2</sup> versus BMI $\geq$ 18.5-<25kg/m<sup>2</sup> on EC.

**Results:** 102 cases and 185 controls were included. The adjusted OR of endometrial cancer for BMI $\geq$ 30 versus  $\geq$ 18.5-<25kg/m<sup>2</sup> was 2.50 (95%CI;1.25-4.99). The OR-NDE not through the biomarkers was 1.24 (0.51-2.98). The OR-NIEs were 2.02 (1.03-3.96) through all biomarkers (77% proportion mediation (PM)), 1.37 (1.06-1.76) through pathways originating with adiponectin (34%PM), 1.15 (0.71-1.87) through inflammation beyond adiponectin (15%PM), 1.05 (0.87-1.26) through C-peptide beyond adiponectin and inflammation (5%PM), and 1.22 (0.88-1.69) through estrogens beyond adiponectin, inflammation, and C-peptide (22%PM).

**Conclusion:** Together, reduced adiponectin and increased inflammation, C-peptide, and estrogens had an important mediating effect adiposity-EC association. The largest mediating effect was through adiponectin-induced pathways

## Socioeconomic differences in the proportions of cancers attributable to overweight/obesity in Australia

**Authors:** Ms Louise Wilson<sup>1</sup>, Professor Adele Green<sup>1,2,3</sup>, Associate Professor Susan Jordan<sup>1,2</sup>, Professor Rachel Neale<sup>1,2</sup>, Professor Penny Webb<sup>1,2</sup>, Professor David Whiteman<sup>1,2</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>The University of Queensland, Faculty of Medicine, Herston, Australia, <sup>3</sup>Cancer Research UK Manchester Institute and Division of Musculoskeletal & Dermatological Science, University of Manchester, Manchester, United Kingdom

### Abstract:

**Background:** In Australia, cancer incidence (age-standardised) is highest in areas where socioeconomic disadvantage is greatest. The prevalence of overweight/obesity, an established risk factor for fourteen cancer types, is also higher in more disadvantaged areas, particularly among women. To better inform resource allocation and intervention programs it is useful to quantify how the proportion and numbers of cancers attributable to overweight/obesity vary with disadvantage, and the amount of cancer that could be prevented if the prevalence of overweight/obesity in all areas was equivalent to that in the least disadvantaged area.

**Methods:** We estimated the proportion of newly diagnosed cancer cases in Australia (2009-2013) attributable to overweight/obesity for each quintile of area-based Index of Relative Socioeconomic Disadvantage (IRSD). We used standard formulae to calculate population attributable fractions, incorporating exposure prevalence data and published relative risk estimates.

**Results:** The proportion of all cancer cases diagnosed in Australia (2009-2013) attributable to overweight/obesity ranged from 2.8% in the least disadvantaged quintile to 4.2% in the most disadvantaged quintile among men and from 6.3% to 8.9% among women. In total, 6,000 cancer cases (1,800 men; 4,200 women) might have been avoided over the period 2009 to 2013 if the prevalence of overweight/obesity in each of the four more disadvantaged quintiles was the same as that of the least disadvantaged quintile.

**Conclusions:** The proportion of cancer incidence attributable to overweight/obesity is higher in more disadvantaged than less disadvantaged areas. This differential is greater for women and points to the potential benefits of targeted interventions.

## Physical activity and the risk of non-Hodgkin lymphoma subtypes: a pooled analysis

**Authors:** Dr Terry Boyle<sup>1</sup>, Professor John Spinelli<sup>2</sup>

**Affiliations:** <sup>1</sup>University Of South Australia, Adelaide, Australia, <sup>2</sup>BC Cancer Agency, Vancouver, Canada

### Abstract:

**Background:** Studies to date on the association between physical activity and non-Hodgkin lymphoma (NHL) risk have not had large enough samples to investigate whether the association differs by NHL subtype.

**Methods:** We pooled data from eight case-control studies to examine the association between physical activity and risk of NHL overall and NHL subtypes. A total of 5553 cases and 8942 controls were included in the pooled analysis. Physical activity was harmonized across the eight studies and modelled as study-specific tertile groups. Multinomial logistic regression was used to estimate the association between physical activity and NHL subtypes, after adjusting for age, sex, study, ethnicity, education and body mass index.

**Results:** The risk of overall NHL was 13% lower among participants in the most active tertile group of MVPA compared to the least active tertile group (AOR = 0.87, 95% CI = 0.80, 0.95). Moderate-intensity physical activity alone was not associated with NHL risk. Vigorous-intensity physical activity was associated with a reduced risk of overall NHL, however the association appeared to differ between males and females. No large differences were observed between the NHL subtypes examined (diffuse large B-cell lymphoma, follicular lymphoma, chronic lymphocytic leukaemia/small lymphocytic lymphoma, marginal zone lymphoma and mature T-cell lymphoma).

**Conclusions:** Physical activity was associated with a modest risk reduction of overall NHL, which is consistent with recent meta-analyses and pooled cohort analyses. The association between physical activity and NHL does not appear to vary significantly between NHL subtypes

## Ultraviolet radiation exposure and melanoma: evidence for gene-environment interaction

**Authors:** Associate Professor Catherine Olsen<sup>1,2</sup>, Dr Nirmala Pandeya<sup>1,3</sup>, Associate Professor Matthew Law<sup>1</sup>, Professor Stuart MacGregor<sup>1</sup>, Dr Mark Iles<sup>4</sup>, Dr Bridie Thompson<sup>1</sup>, Professor Adele Green<sup>1,5</sup>, Associate Professor Rachel Neale<sup>1,3</sup>, Professor David Whiteman<sup>1,2</sup>

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### Abstract:

Melanoma develops as the result of complex interactions between sun exposure and genetic factors. Data on the relationship between sunlight and melanoma from prospective studies are scant, and the combination of ultraviolet exposure data collected before melanoma diagnosis and genetic information is rarer still. We aimed to quantify the association between ambient and personal UV exposure in relation to risk of incident melanoma (invasive; invasive+in situ) in a large population-based prospective study of men and women (n=38,833) residing in a high ambient UV setting, and to examine potential gene-environment interactions. During a median follow-up time of 4.4 years, 782 (1.5%) participants developed cutaneous melanoma (316 invasive, 466 in situ). Country of birth, age at migration and sunburns during all periods of life were significantly associated with melanoma risk. Histories of keratinocyte cancer and of other actinic lesions were both strongly associated with melanoma risk. An interaction with polygenic risk is possible; among people at low risk, markers of cumulative sun exposure were associated with melanoma. In contrast, among people at high polygenic risk, markers of high-level early life ambient exposure were associated with melanoma. Polygenic risk scores may be able to assist in identifying individuals for whom sunlight exposure is most relevant.

## Cardiovascular medications and breast cancer outcomes in New Zealand.

**Authors:** Mr Oliver Scott<sup>1</sup>, Professor Mark Elwood<sup>1</sup>, Dr Sandar TinTin<sup>1</sup>, Dr Alana Cavadino<sup>1</sup>

**Affiliations:** <sup>1</sup>University of Auckland, Auckland, New Zealand

### Abstract:

**Background:** The burden of cancer in NZ is high, and is one of the leading causes of death. Concurrently, there has been a high and increasing prevalence of NZ adults medicated for cardiovascular indications over the last few years. Beta blockers (BB), used for a range of cardiovascular indications, have been associated with improved cancer outcomes in overseas studies, but this association may not be directly applicable to NZ patients. Therefore, this study aims to examine the association between the use of BBs and breast cancer (BC) outcomes in NZ women.

**Methods:** Various regional and national databases were linked to establish a cohort of BC patients (9241 women) with their corresponding medication use, hospital records, and death records between 2007 and 2015. Cox proportional hazard models were used to assess the hazard of BC specific death (BCD) associated with BB use.

**Results:** 22% of patients used a BB after diagnosis. The unadjusted hazard ratio for the association between BB use and BCD was 1.41 (1.20-1.65), and 1.26 (1.06-1.50) after adjustment for confounding variables. When considering subgroups however, the increased risk only remained in those with at least one cardiac condition, in patients under 80 years of age, and in those who were dispensed a BB in the last periods of life.

**Conclusions:** The findings of our study do not support an association between the use of BBs and BCD. Future research should explore this association further in order to establish a potential role for BBs as an anti-cancer agent.

### **Binge drinking and cancer incidence in an Australian cohort of 226,162 participants.**

**Authors:** Dr Peter Sarich<sup>1,2</sup>, Prof Karen Canfell<sup>1,2,3</sup>, Mr Sam Egger<sup>1,2</sup>, Prof Emily Banks<sup>4,5</sup>, Dr Grace Joshy<sup>4</sup>, Mr Paul Grogan<sup>1,2</sup>, Dr Marianne Weber<sup>1,2</sup>

**Affiliations:** <sup>1</sup>Cancer Research Division, Cancer Council NSW, KINGS CROSS, Australia, <sup>2</sup>Sydney School of Public Health, The University of Sydney, THE UNIVERSITY OF SYDNEY, Australia, <sup>3</sup>Prince of Wales Clinical School, University of New South Wales, UNIVERSITY OF NEW SOUTH WALES, Australia, <sup>4</sup>National Centre for Epidemiology and Population Health, Australian National University, THE AUSTRALIAN NATIONAL UNIVERSITY, Australia, <sup>5</sup>Sax Institute, HAYMARKET, Australia

#### **Abstract:**

**Background:** Although overall alcohol consumption is known to increase risk of a number of cancers, evidence regarding cancer risk and binge drinking is limited.

**Methods:** Cox proportional hazards models were used to calculate hazard ratios (HR) for cancer risk in relation to overall alcohol consumption and patterns of drinking, accounting for overall alcohol consumption among 226,162 participants aged ≥45 years (2006-2009) in the 45 and Up Study.

**Results:** Over a median 5.4 years follow-up, 17,332 cancers were diagnosed. Increasing levels of overall alcohol consumption were associated with increased risk of any cancer (HR per seven drink increase in weekly alcohol consumption: 1.02; 95% confidence interval: 1.01-1.03), and cancers of the upper aerodigestive tract (1.12;1.07-1.17), mouth and pharynx (1.10;1.04-1.17), oesophagus (1.14;1.05-1.25), colorectum (1.07;1.04-1.10), colon (1.10;1.05-1.14), and melanoma (1.04;1.01-1.08); an inverse association was observed for thyroid cancer (0.82;0.68-0.98). Heavy drinking was associated with liver and breast cancer. Adjusting for overall alcohol intake, binge drinking (as measured by drinks per drinking-day) was independently associated with risk of any cancer (1.16;1.05-1.27 for >4 drinks/drinking-day vs. ≤1), and cancers of the mouth and pharynx (1.79;1.07-2.99), breast (1.63;1.15-2.32), stomach (2.15;1.03-4.50) and kidney (2.78;1.56-4.93). Significant trends of increased risk with increasing number of drinks consumed on drinking-days were also observed for thyroid and connective and soft tissue cancer.

**Conclusions:** Binge drinking increased cancer risk independent of the risk associated with overall alcohol consumption. Public health strategies that reduce binge-drinking as well as overall alcohol consumption over the life course have potential to reduce the burden of cancer.

## 2C – Epidemiological research and practice in infectious diseases

Plaza Room P11, 1:15pm - 2:45pm

### Corticosteroid use and risk of herpes zoster in a population-based cohort study

**Authors:** [Jiahui Qian](#)<sup>1</sup>, Dr Anita Elizabeth Heywood<sup>1</sup>, Dr Bette Liu<sup>1</sup>

**Affiliations:** <sup>1</sup>University of New South Wales, Sydney, Australia

#### Abstract:

**Background:** Herpes zoster (HZ) has been associated with corticosteroid use among patients with rheumatoid arthritis or inflammatory bowel diseases but details on different characteristics of use such as corticosteroid dose and duration of effect are lacking. We examined in detail the relation between cumulative corticosteroids dispensed and zoster risk in a cohort of older Australian adults.

**Methods:** Using data from adults with “concessional benefits” in the 45 and Up Study linked to pharmaceutical benefits scheme and hospital data (2004-2015), the association between corticosteroid use and HZ risk was analysed using Cox proportional hazards models, adjusting for age, sex and annual household income. Age and cumulative dose of corticosteroids were treated as time-varying covariates in analyses.

**Results:** There were 94677 participants, mean age 70.1 (±9.8) years included. 25873 (27.3%) had a history of corticosteroid use prior to study recruitment. During 184659 person-years follow-up, there were 6001 new corticosteroid users and 1847 incident HZ events. We found that the risk of HZ increased with more recent corticosteroid use. Compared to non-users, those who used corticosteroids within 1 year prior to recruitment and new users had 70% increased risk of HZ. The risk also increased with increasing cumulative dose. The risk of HZ for those who used over 500mg prednisolone equivalent dose was about 2 times of that in non-users.

**Conclusions:** High cumulative corticosteroid use was associated with a doubling of HZ risk. While the risk fell after use ceased, it was still increased up to 1 year after last use.

### Comparing general practice databases for monitoring influenza-like illness in Australia

**Authors:** [Dr Carla Bernardo](#)<sup>1</sup>, Dr David Gonzalez-Chica<sup>1,2</sup>, Ms Monique Chilver<sup>1</sup>, Dr Nigel Stocks<sup>1</sup>

**Affiliations:** <sup>1</sup>Discipline of General Practice, Adelaide Medical School, The University of Adelaide., Adelaide, Australia, <sup>2</sup>Adelaide Rural Clinical School, The University of Adelaide., Adelaide, Australia

#### Abstract:

**Background:** Influenza is an infectious disease responsible for 645,000 annual deaths worldwide. Surveillance systems are fundamental to detect outbreaks and enable earlier responses. This study compares the National Notifiable Diseases Surveillance System (NNDSS) with two Australian general practice databases (NPS MedicineInsight and the Australian Sentinel Practice Research Network (ASPREN)) for monitoring the epidemiology of influenza-like illness (ILI) in primary health settings.

**Methods:** All patients who had a consultation in 2015-2017 in general practices within MedicineInsight (n=32,254,306 encounters) or ASPREN (n=2,878,458 encounters), and all laboratory-confirmed influenza reported by the NNDSS (n=436,192) for the same period were included. Weekly ILI rates per 1,000 consultations were calculated for MedicineInsight and ASPREN and compared with confirmed influenza (NNDSS).

**Results:** Data was consistent among sources, with higher rates in 2017 than in previous years, and higher frequency among women and patients aged 20-49 years. In MedicineInsight, the ILI rate during the peak week was almost twice as high in 2017 compared to 2015 (18.0 vs. 9.4 per 1,000 consultations), but in ASPREN, the difference was less pronounced (25.8 vs. 22.1 per 1,000 consultations). MedicineInsight ILI curves more closely resembled NNDSS patterns (shape, start of season, peaks) than ASPREN. However, MedicineInsight and ASPREN results were highly correlated with NNDSS confirmed cases (r=0.90 to 0.97 and r=0.88 to 0.98, respectively).

**Conclusions:** MedicineInsight and ASPREN provided ILI results resembling laboratory-confirmed influenza epidemic curves. Therefore, MedicineInsight could complement ASPREN for monitoring ILI in Australian general practice at low cost, since it is already funded by the Australian Government.

## **A population level genomic snapshot study of Vancomycin-Resistant Enterococci, Victoria, November 2018**

**Authors:** Dr Sophia Bowman-Derrick<sup>1,2,3</sup>, Dr Claire Gorrie<sup>2</sup>, Dr Emma Field<sup>1</sup>, Ms Marion Easton<sup>3</sup>, Ms Courtney Lane<sup>2</sup>, Ms Kerrie Stevens<sup>2</sup>, Professor Benjamin Howden<sup>2</sup>

**Affiliations:** <sup>1</sup>*National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia*, <sup>2</sup>*Microbiological Diagnostic Unit Public Health Laboratory, Melbourne, Australia*, <sup>3</sup>*Victorian Department of Health and Human Services, Melbourne, Australia*

### **Abstract:**

**Background:** Vancomycin-resistant *Enterococcus faecium* (VREfm) colonises patients and causes serious infections, particularly within healthcare facilities. We conducted a cross-sectional study to investigate the genetic diversity and prevalence of VREfm within Victoria, in 2018 and compared findings to a similar 2015 study. Combining whole genome sequencing (WGS) and epidemiological data, evidence for transmission within and between healthcare facilities was assessed.

**Methods:** During November 2018, diagnostic microbiology laboratories submitted all VREfm cultures for WGS. In silico multi-locus sequence types (STs) and van genotypes were identified. Phylogenetic relatedness of isolates was analysed and compared with healthcare facility.

**Results:** In total, 311 isolates from 304 patients were identified. The incidence of VREfm infection in November 2018 was 1.7 per 100,000 population, similar to 2015 results (1.9 per 100,000) ( $p=0.92$ ). ST796 was the dominant clone in both years (182 [59%] of 311 VREfm isolates, 2018, predominantly vanB). Among patients with VREfm, vanA was detected in 64 (21%) of 311 isolates, compared to 55 (19%) of 293 isolates in 2015 ( $p=0.58$ ). ST1424 vanA isolates were identified in Victoria for the first time, present in 11 (27%) of 41 healthcare facilities. Of the 33 ST1424 vanA isolates, 31 (94%) fell within a closely-related genomic cluster, involving nine healthcare facilities.

**Conclusions:** The incidence of VREfm and the prevalence of vanA VREfm were similar in 2015 and 2018 studies. The limited genetic diversity of ST1424 suggests possible transmission occurring between healthcare facilities, indicating the need for additional patient screening and management to prevent further spread of VREfm.

## **The forgotten art of standardisation when generalising effect estimates from a sample**

**Authors:** A/Prof Sheena Sullivan<sup>1,2</sup>, Dr Shuo Feng<sup>3</sup>, Mr Arseniy Khvorov<sup>2</sup>, Prof Eric Tchetgen Tchetgen<sup>4</sup>, Prof Benjamin Cowling<sup>3</sup>

**Affiliations:** <sup>1</sup>*WHO Collaborating Centre for Reference and Research on Influenza, Melbourne, Australia*, <sup>2</sup>*University of Melbourne, Melbourne, Australia*, <sup>3</sup>*University of Hong Kong, Hong Kong, China*, <sup>4</sup>*University of Pennsylvania, Philadelphia, USA*

### **Abstract:**

Effect estimates derived from surveillance data are often needed for ongoing assessment of control measures to inform policy. However, even if surveillance is designed to capture a demographically-representative sample, the sample may not reflect the population in terms of key demographic characteristics such as age and sex, which may not only confound but also modify the effect. We use the example of influenza to illustrate the potential bias associated with estimating an overall vaccine effectiveness estimate for the population, when estimates are expected to vary with age and the sample does not represent the age-distribution of the population. First, we used simulations to confirm whether overall estimates would be biased towards the over-represented group(s). Second, we examined the potential impact of this bias on published data, where the sample was known to over-represent younger and older age groups. Published estimates were “standardised” according to the age-distribution of the population to re-estimate VE. Our standardised estimates differed from the published VE estimates to varying degrees depending on the level of over-representation. When children are over-represented, published VE estimates tended to be higher than the standardised estimate. Conversely, when the elderly are over-represented, published estimates tended to be lower than the standardised estimates. These differences may affect the interpretation of the risk reduction expected from vaccination and the total averted disease burden at the population level. Weighting overall estimates should be considered when reporting VE.

## Repellent effectiveness and malaria infection in Myanmar: a stepped-wedge cluster-randomised controlled trial

**Authors:** Mr Paul Agius<sup>1,2</sup>, Dr. Win Han Oo<sup>1</sup>, Ms. Katherine O'Flaherty<sup>1,3</sup>, Dr. Kyaw Zayar Aung<sup>1</sup>, Dr. Aung Thi<sup>4</sup>, Dr. Myat Mon Thein<sup>1</sup>, Dr. Htin Kyaw Thu<sup>1</sup>, Dr. Wai Yan Min Htay<sup>1</sup>, Dr. Aung Paing Soe<sup>1</sup>, Ms. Nicole Romero<sup>1,3</sup>, Ms. Zahra Razook<sup>5</sup>, A/Prof Alyssa Barry<sup>5</sup>, Dr. Angela Devine<sup>3,6</sup>, Prof. Julie Simpson<sup>3</sup>, Prof. Brendan Crabb<sup>1</sup>, Prof. James Beeson<sup>1</sup>, Ms. Naanki Pasricha<sup>1</sup>, Dr. Julia Cutts<sup>1</sup>, A/Prof. Freya Fowkes<sup>1,2,3</sup>

**Affiliations:** <sup>1</sup>Burnet Institute, Melbourne, Australia, <sup>2</sup>Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia, <sup>3</sup>Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Australia, <sup>4</sup>Department of Public Health, Myanmar Ministry of Health and Sports, Nay Pyi Taw, Myanmar, <sup>5</sup>Population Health and Immunity Division, Walter and Eliza Hall Institute of Medical Research, Melbourne, Australia, <sup>6</sup>Menzies School of Health Research, Darwin, Australia

### Abstract:

**Background:** The current World Health Organization guidelines for malaria vector control do not recommend distribution of personal repellent in large-scale public health campaigns given a lack of quality evidence of their public health value. We evaluated the effectiveness of personal repellent on malaria infection in a stepped-wedge cluster randomised trial in low-transmission regional areas in South-East Myanmar.

**Methods:** We performed a 15-month stepped-wedge trial where topical repellent was distributed to 114 villages through village health volunteers. Primary and secondary outcomes were Plasmodium spp. infection detected by rapid diagnostic (RDT) and Polymerase Chain Reaction (PCR), respectively. Generalised linear mixed modelling (logit (Plasmodium spp.) and multinomial (P. falciparum, P. vivax)) was performed to estimate the effectiveness of topical repellent distribution in reducing the odds of Plasmodium spp. infection.

**Results:** Plasmodium spp. infection was low over the study duration (RDT:0.16%, n=32,194 tests; PCR:3.2%, n=13,157 tests). Plasmodium spp. infection detected by both RDT (Adjusted Odds Ratio (AOR)=0.25, 95%CI=0.004-15.2) and PCR (AOR=0.82, 95%CI=0.62-1.09) reduced after villages transitioned to repellent distribution. Species specific modelling using PCR data showed that the protective effect was greatest for P. falciparum infection (Adjusted Relative Risk Ratio (ARRR)=0.67, 95%CI=0.47-0.95), with no protection observed against P. vivax infection (ARRR=1.40, 95%CI=0.80-2.46). The difference in effect was statistically significant (Wald  $\chi^2(1)=5.24$ , p=0.022).

**Conclusion:** The observed reduction in P. falciparum infection after repellent distribution suggests that incorporating repellent into existing malaria services may be an effective strategy in combating malaria and drug resistance in Myanmar and the Greater Mekong sub-region more broadly.

## Natural History of Oral HPV Infection— Findings from Queensland

**Authors:** Dr Annika Antonsson<sup>1</sup>, Dr Marjorie de Souza<sup>1</sup>, Ms Zoe C. Wood<sup>1</sup>, Dr Nirmala Pandeya<sup>1</sup>, Ms Angela Carroll<sup>1</sup>, Professor David Whiteman

**Affiliations:** <sup>1</sup>Qimr Berghofer Medical Research Institute, Brisbane, Australia

### Abstract:

**Background:** The increasing incidence of oropharyngeal squamous cell carcinoma (OPSCC) is linked to oral human papillomavirus (HPV) infections. Despite recent dramatic increase in OPSCC in younger patients, there is very little published data on natural history of oral HPV infection in any population.

**Aim:** To investigate the natural history of oral HPV infection in an Australian sample.

**Methods:** We recruited participants aged 20 to 70 years in Greater Brisbane from June 2014 to November 2016 (417 donated two or more samples for analysis below). Participants were asked to complete a questionnaire, and donate a saliva sample (at baseline, 6-, 12- and 24-months) for HPV testing and typing.

**Results:** Eighty-seven participants had incident infections over the 24 months, and incidence was associated with being born in Australia.

Sixty-eight people cleared their oral HPV infections. Factors associated with clearance was being a non-smoker, not using illicit drugs, no previous diagnosis of a sexually transmitted infection (STI), fewer kissing partners and fewer lifetime sexual partners.

Twenty-five participants had persistent oral HPV infections. Factors associated with persistence were smoking, more oral sex partners, particularly in the past 12 months, more sexual partners in a lifetime and a previous diagnosis of a STI.

**Conclusion:** Oral HPV incidence was associated with being born in Australia. We found that smoking and sexual behaviour was associated with oral HPV infection clearance and persistence.

## **Impact of pertussis vaccination strategies on pertussis epidemiology in infants, Australia, 2000–2017**

**Authors:** Ms Dharshi Thangarajah<sup>1,2</sup>, Dr Jonathan Malo<sup>2</sup>, Dr Emma Field<sup>1,3</sup>, Dr Stephen Lambert<sup>2,4</sup>

**Affiliations:** <sup>1</sup>*National Centre for Epidemiology and Population Health, Australian National University, Acton, Australia*, <sup>2</sup>*Communicable Diseases Branch, Queensland Health, Herston, Australia*, <sup>3</sup>*Menzies School of Health Research, Brisbane, Australia*, <sup>4</sup>*UQ Child Health Research Centre, Brisbane, Australia*

### **Abstract:**

**Background:** Despite the availability of pertussis-containing vaccines and high vaccination rates in children, pertussis remains one of the most commonly notified vaccine-preventable diseases in Australia. The purpose of this study was to provide an ecological assessment of the impact of funded 'cocooning' and funded maternal vaccination programs on pertussis epidemiology in young infants.

**Methods:** We reviewed national pertussis notification data from 2000–2017, a period where there was high and stable coverage of primary course vaccination. Notifications in children aged <6 months were analysed by relevant strategy time-periods for each Australian state and territory. The population-level impact of vaccination strategies on pertussis in young infants was assessed by comparing the proportion of notifications in children aged <8 weeks before and after periods of funded 'cocoon' and maternal vaccination strategies.

**Results:** In Australia from 2000–2017 there were 5,904 pertussis notifications in children aged <6 months, with 1,903 (32.2%) occurring in children aged <8 weeks. During periods where maternal vaccination strategies were funded, the proportion of notifications in children aged <8 weeks was 20.3%. This was significantly lower ( $p=0.002$ ) than the proportion during periods where no such strategies were funded (27.9%). We were unable to identify any difference in proportions ( $p=0.670$ ) when comparing periods before (34.8%) and after (34.2%) funded 'cocoon' strategies.

**Conclusions:** This study provides population-level support for the continuation of maternal vaccination during pregnancy as a strategy to protect infants aged <8 weeks against pertussis in Australia.

## Friday 25 October 2019

### Rapid Fire Presentations Round 2

Plaza Room P9 & P10, 10:00am - 10:20am

#### RF2.001- Hysterectomy with/without oophorectomy and all-cause and cause-specific mortality: A population-based record-linkage study

**Authors:** Karen Tunesley<sup>1,2</sup>, Melinda Protani<sup>1,2</sup>, Penelope Webb<sup>1,2</sup>, Suzanne Dixon-Suen<sup>1,2,3</sup>, Louise Wilson<sup>1</sup>, Louise Stewart<sup>4,5</sup>, Susan Jordan<sup>1,2</sup>

**Affiliations:** <sup>1</sup>School of Public Health, The University of Queensland, Brisbane, Australia, <sup>2</sup>Population Health Department, QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>3</sup>Cancer Epidemiology Division, Cancer Council Victoria, Melbourne, Australia, <sup>4</sup>Health Research and Data Analytics Hub, PHRN Centre for Data Linkage, School of Public Health, Curtin University, Perth, Australia, <sup>5</sup>Institute for Health Research, University of Notre Dame, Fremantle, Australia

#### Abstract:

**Background:** Some studies have suggested hysterectomy procedures increase the risk of premature mortality. The aim of our study was to examine the association between hysterectomy for benign indications, with or without oophorectomy, and all-cause and cause-specific mortality.

**Methods:** Our cohort (666,588 women) comprised the Western Australian female population with linked hospital and health records from 1970 to 2015. We used Cox regression models to assess the association between hysterectomy and all-cause, cardiovascular disease (CVD) and cancer mortality by whether oophorectomy was performed. We included women who had hysterectomy or oophorectomy for cancer as unexposed to the benign surgery of interest, but also performed sensitivity analysis censoring follow-up at the time of surgery for cancer.

**Results:** Compared to no surgery, having a hysterectomy without oophorectomy prior to age 35 years was associated with an increase in all-cause (HR=1.29, 95% CI:1.19-1.40), CVD, cancer and other mortality; however from 35 years, the association became inverse. Similarly, hysterectomy with bilateral salpingo-oophorectomy (BSO) was only associated with increased all-cause mortality when undertaken prior to 45 years of age (35-44 years: HR=1.15, 95% CI:1.04-1.27). Censoring at gynaecological surgery for cancer increased the HR for hysterectomy with BSO but excluded many cancer-related deaths for women in the reference group, therefore potentially biasing the results in favour of no surgery.

**Conclusions:** Our study found that among women having surgery for benign conditions, hysterectomy with ovarian conservation undertaken from age 35 and hysterectomy with BSO undertaken from age 45 were not associated with poorer long-term survival.

#### RF2.002- Burden of tobacco use: the Australian Burden of Disease Study 2015

**Authors:** Anna Reynolds<sup>1</sup>, Dr Vanessa Prescott<sup>1</sup>, Cathy Claydon<sup>1</sup>, Dr Paula Laws<sup>1</sup>

**Affiliations:** <sup>1</sup>Australian Institute of Health and Welfare, Canberra, Australia

#### Abstract:

**Background:** Tobacco use is responsible for substantial health burden in Australia as a risk factor for disease and premature death. Exposure to tobacco is widely recognised as a major cause of ill health, both in active and past smokers. The Australian Burden of Disease Study (ABDS) 2015 conducted extended analysis to provide further insight into the health burden of tobacco use.

**Methods:** Methods were adopted from the global burden of disease study 2016, including the definition of exposure, linked diseases and effect sizes (relative risks). Current tobacco use and second-hand smoke exposure were estimated from the National Drug Strategy Household Survey. Mortality data were used for past smoke exposure. A sensitivity analysis was also undertaken using the 45 and Up Study to investigate the impact of using Australian-specific effect size data on the estimates of burden attributable to direct tobacco use.

**Results:** Tobacco use caused more burden than any other risk factor in the ABDS 2015. The total burden attributable to tobacco was 9.2% for smoking and 0.1% for second-hand smoke. Overall, tobacco use was responsible for 13% of deaths in 2015. Tobacco use contributed to the burden for 9 disease groups including respiratory diseases and cancers. The burden was higher in some population groups. Results are presented on analyses of tobacco use by state/territory, remoteness area and socioeconomic group.

**Conclusion:** These results highlight the varying and complex association between tobacco use and health, and can be used to prioritise actions to minimise the harm of tobacco in Australia.

### **RF2.003- Oestrogen-exposure and cardiovascular disease events, all-cause and cardiovascular mortality: a systematic review**

**Authors:** **Mr Shiva Raj Mishra**<sup>1</sup>, Dr Hsin-Fang Chung<sup>1</sup>, Dr Michael Waller<sup>1</sup>, Prof Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, University of Queensland, Herston 4006, Australia*

**Abstract:**

**Background:** This study aims to synthesize the evidence for the effect of oestrogen exposure, age at menarche, and age at menopause on cardiovascular disease (CVD) events and mortality.

**Methods:** A comprehensive literature search was conducted in PubMed, EMBASE and Web of Science for published studies up to January 9, 2019, following the PRISMA guidelines. A total of 24 studies were included in this review. Due to the heterogeneity in the analytical methods, it was not possible to do a meta-analysis.

**Results:** Three indices for measurement of oestrogen exposures were identified: 1) reproductive duration (RD: age at menopause minus age at menarche), 2) endogenous oestrogen exposure (EOE) (additionally accounting for the time for pregnancy, breastfeeding and use of oral contraceptives), and 3) total oestrogen exposure (TOE) (additionally accounting for duration of hormone replacement therapy). RD ranged from 30 years to 40 years in most of the studies examined. A longer RD was associated with reduced risk of cardiovascular diseases (CVD: two studies, coronary artery disease: three studies, and stroke: four studies). The effect estimates were generally modest with parameter estimates ranging from 0.53 to 0.99 whereas the effect of EOE and TOE remained unclear.

**Conclusion:** A longer reproductive duration was associated with a reduced risk of CVD event particularly stroke. More research in need to quantify the association between reproductive duration and CVD.

### **RF2.004- Associations of retinal microvasculature with hearing status in childhood and mid-life**

**Authors:** Ms Jing Wang<sup>1,2</sup>, **Ms Mengjiao Liu**<sup>1,2</sup>, Dr Valerie Sung<sup>1,2</sup>, Dr Kate Lycett<sup>1,2,3</sup>, Dr Anneke Grobler<sup>1,2</sup>, Prof David Burgner<sup>1,2,4</sup>, Prof Melissa Wake<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*Murdoch Children's Research Institute, Melbourne, Australia*, <sup>2</sup>*The University of Melbourne, Melbourne, Australia*, <sup>3</sup>*Deakin University, Melbourne, Australia*, <sup>4</sup>*Monash University, Melbourne, Australia*

**Abstract:**

**Background:** Microvascular phenotypes, which can be assessed non-invasively by retinal imaging, may be informative about the pathogenesis of hearing loss. We investigated whether adverse retinal microvascular parameters (i.e. wider venules, narrower arterioles) were associated with (1) hearing thresholds and (2) hearing loss in mid-childhood and mid-life.

**Method:** Population-based cross-sectional study within the Longitudinal Study of Australian Children, with retinal microvasculature and audiometry data (1281 children, 1255 adults). We calculated high Fletcher index (hFI, mean threshold of 1, 2, 4 kHz) and defined bilateral hearing loss as hFI >15 dB HL. Linear/logistic regression quantified associations of retinal microvascular calibre with hearing threshold/loss.

**Results:** Mean (SD) hFI was 7.9 dB HL (5.8) for children and 13.0 (6.8) for adults; 8.5% and 26.1% respectively had hearing loss. In adults, each SD (18.6  $\mu$ m) wider (worse) in venular calibre was associated with higher (worse) hearing threshold at lower individual frequencies (2 kHz:  $\beta$  0.6, 95% CI 0.1–1.2) and hFI ( $\beta$  0.5, 0.1–1.0), and higher odds of hearing loss (OR 1.2, 1.0–1.4). Results were similar in children but attenuated towards the null. Wider (better) arteriolar calibre was only associated with lower odds of hearing loss in adults (OR per SD (14.0  $\mu$ m) 0.9, 0.7–1.0).

**Conclusions:** Adverse retinal microvascular parameters showed small associations with hearing loss by mid-life, some of which were evident in mid-childhood. Microvascular damage may contribute to the pathogenesis of hearing loss across the life course, warranting replication and mechanistic studies to inform causal inference and prevention efforts.

### **RF2.005- Age at natural menopause and risk of incident cardiovascular disease**

**Authors:** **Mr Dongshan Zhu**<sup>1</sup>, Dr Hsin-Fang Chung<sup>1</sup>, Professor Annette Dobson<sup>1</sup>, Dr Nirmala Pandeya<sup>2</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>*The University of Queensland, Brisbane, Australia*, <sup>2</sup>*QIMR Berghofer Medical Research Institute, Brisbane, Australia*

**Abstract:**

**Background:** To quantify the associations between age at natural menopause and the occurrence and timing of incident cardiovascular disease (CVD), including coronary heart disease (CHD) and stroke.

**Methods:** A total of 190 629 naturally postmenopausal women who had not experienced a CVD event and had not used menopause hormone therapy (MHT) before menopause were included. We used Cox proportional hazards models to estimate hazard ratios and 95% confidence intervals (HR, 95% CI) for the associations between age at menopause and incident CVD, as well as timing of first CVD event (grouped as <60, 60-69,  $\geq$ 70 years). The joint effects of age at menopause and postmenopausal hormone therapy (MHT) were also analysed.

**Results:** There were 10 604 first CVD events reported, including 7617 CHD and 3545 strokes. Women who experienced menopause at <40 (premature), 40-44 (early) and 45-49 years had higher risk of incident CVD compared with women who had menopause at 50-51 years, with adjusted HRs (95% CI) of 1.55 (1.38, 1.73), 1.30 (1.22, 1.39) and 1.12 (1.07, 1.18) respectively. Women with premature and early menopause had nearly double and 40% higher risk of incident CVD before the age of 60 years, with adjusted HRs (95% CI) of 1.88 (1.62, 2.20) and 1.40 (1.27, 1.54) respectively. The effect of earlier menopause on CHD was not varied by postmenopausal MHT status.

**Conclusions:** Premature and early menopause were associated with higher risk of incident CVD, and were strongly associated with having the first CVD event before the age of 60 years.

### **RF2.006- Diet and the risk of developing gastroesophageal reflux disease**

**Authors:** Miss Sabrina Wang<sup>1</sup>, A/Prof Allison Hodge<sup>1,2</sup>, Dr Ghazaleh Dashti<sup>1</sup>, Prof Dallas English<sup>1,2</sup>

**Affiliations:** <sup>1</sup>Melbourne School of Population and Global Health, University of Melbourne, Carlton, Australia, <sup>2</sup>Cancer Epidemiology Centre, Cancer Council Victoria, Melbourne, Australia

#### **Abstract:**

**Background:** Dietary triggers for established gastroesophageal reflux disease (GERD) have been extensively studied, but knowledge on diet as a risk factor in developing GERD is lacking.

**Methods:** We examined the association between diet and the risk of developing GERD in 21,034 participants aged 40-59 from the Melbourne Collaborative Cohort Study. Diet at baseline was measured using a 121-item food frequency questionnaire. GERD was defined as daily heartburn or acid regurgitation  $\geq 2$  years post-baseline. Exposures were intakes of nutrients, food groups, and food items or adherence to dietary scores. Substitution models were used to examine the effects of substituting each type of fat for other energy sources on risk of GERD. Analyses were repeated separately for men and women.

**Results:** For men, but not women, total fat intake was associated with increased risk of GERD (OR per 5g/d 1.05; 95%CI 1.01-1.09). Total carbohydrate (OR per 30g/d 0.89; CI 0.82-0.97) and starch (OR per 30g/d 0.85; CI 0.74-0.94) were associated with reduced risk. Substituting saturated for monounsaturated or polyunsaturated fat did not change the risk. In both men and women, for highest vs lowest intake frequency quintile, the ORs were 1.32 (1.06-1.63) for fish, 1.35 (1.11-1.63) chicken, 1.47 (1.20-1.81) cruciferous vegetable, 1.50 (1.26-1.79) carbonated beverage, 0.73 (0.58-0.93) total fruit, and 0.66 (0.54-0.82) for citrus. No association was observed for alcohol intake or dietary scores.

**Conclusion:** Diet could be a modifiable risk factor for GERD. For primary prevention, adhering to the recommended daily fat intake could be more important than substituting saturated with unsaturated fats.

### **RF2.007- Pre-diagnostic diet and survival following ovarian cancer; Ovarian Cancer Association Consortium.**

**Authors:** **Dr Christina Nagle**<sup>1</sup>, Dr Torukiri Ibiebele<sup>1</sup>, Professor Elisa Bandera<sup>2</sup>, Dr Jennifer Doherty<sup>3</sup>, Professor Graham Giles<sup>4</sup>, Professor Marc Goodman<sup>5,6</sup>, Dr Allan Jensen<sup>7</sup>, Professor Joellen Schildkraut<sup>8</sup>, Dr Weiva Sieh<sup>9</sup>, Dr Kathryn Terry<sup>10,11</sup>, Professor Nicolas Wentzensen<sup>12</sup>, Professor Anna Wu<sup>13</sup>, Professor Celeste Pearce<sup>13,14</sup>, Professor Penelope Webb<sup>1,15</sup>, for the OCAC/MOCOG study group

**Affiliations:** <sup>1</sup>Population Health Department, QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>2</sup>Division of Obstetrics and Gynecology, The Cancer Institute of New Jersey, Robert Wood Johnson Medical School, New Brunswick, USA, <sup>3</sup>Department of Population Health Sciences, Huntsman Cancer Institute, University of Utah, Salt Lake City, USA, <sup>4</sup>Cancer Epidemiology Division, Cancer Council of Victoria, Melbourne, Australia, <sup>5</sup>Cancer Prevention and Genetics Program, Samuel Oschin Comprehensive Cancer Institute, Cedars-Sinai Medical Center, Los Angeles, USA, <sup>6</sup>Department of Biomedical Sciences, Community and Population Health Research Institute, Cedars-Sinai Medical Center, Los Angeles, USA, <sup>7</sup>Department of Virus, Lifestyle and Genes, Danish Cancer Society Research Center, Copenhagen, Denmark, <sup>8</sup>Department of Public Health Sciences, The University of Virginia, Charlottesville, USA, <sup>9</sup>Departments of Population Health Science & Policy and Genetics & Genomic Sciences, Icahn School of Medicine at Mount Sinai, New York, USA, <sup>10</sup>Obstetrics and Gynecology Epidemiology Center, Brigham and Women's Hospital, Harvard Medical School, Boston, USA, <sup>11</sup>Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, USA, <sup>12</sup>Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, USA, <sup>13</sup>Department of Preventive Medicine, Keck School of Medicine, University of Southern California Norris Comprehensive Cancer Center, Los Angeles, USA, <sup>14</sup>Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, USA, <sup>15</sup>School of Public Health, University of Queensland, Herston, Australia

#### **Abstract:**

**Background:** The role of diet in survival of women with ovarian cancer is not well understood, largely due to a limited number of studies with small sample sizes. We have undertaken an international collaborative analysis to assess the association between 25 dietary exposures representing usual food/nutrient/beverage intake before diagnosis and overall survival among women with invasive ovarian cancer.

**Methods:** We used original data from 11 studies, which included 8,216 women with ovarian cancer. Self-reported dietary data from each study were harmonised and classified into study-specific quartiles of intake. We estimated hazard ratios (HRs) and 95% confidence limits (CI) adjusted for age, race, education, smoking, body-mass index, menopausal hormone use, energy intake and study site.

**Results:** Overall, 5,134 (61%) deaths occurred during an average follow-up of 6.7 years. We observed improved survival with highest compared with lowest quartile of total vegetable intake (excluding potatoes) (HR Q4 vs. Q1 0.90, 95%CI 0.81-1.00, p-trend 0.03). There was a suggestion of better survival among green tea drinkers (HR ever vs. never 0.87, 95%CI 0.80-0.98). There was no association with the other individual foods/nutrients/beverages studied including fibre, green leafy/cruciferous vegetables and fish, which have been associated with survival in previous studies.

**Conclusion:** Our study, the largest and most comprehensive to date, suggests that most pre-diagnostic dietary exposures are not strongly associated with survival among women with ovarian cancer. Further analyses will explore associations with overall diet quality and by histotype and duration of survival.

### **RF2.008- Perceived benefits of mammography still outweigh risks among women younger than 50**

**Authors:** Dr Kate McBride<sup>1</sup>, Mr Sam Hogan<sup>1</sup>

**Affiliations:** <sup>1</sup>Western Sydney University, Campbelltown, Australia

#### **Abstract:**

**Background:** BreastScreen offers free mammograms to women aged 40-49 who elect to have them. Sensitivity of mammograms in younger women with denser breasts is well recognised, with false positives and overdiagnosis more likely. Despite recent evidence of these risks, younger, lower risk women may still choose to have mammograms. It is important to assess why to inform strategies for education about harms and benefits in this age group.

**Methods:** An online cross-sectional survey investigating mammogram participation distributed to women >40 in Australia via targeted social media marketing. Analysis was done using descriptive statistics, chi-square tests of independence and generalised linear regression.

**Results:** N=892 women >40 attempted the survey, with n=151 aged 40-49. 73% of these younger women had at least one mammogram, with 35% having two or more. The most common reasons for screening were family history of breast cancer (n=34) and knowing someone with breast cancer (n=20). There were no significant associations between any socio-demographic features and having a mammogram. Health seeking behaviour was not correlated with attendance at breast screening.

**Conclusion:** Despite evidence suggesting lack of efficacy of mammograms among women <50, findings from our survey suggest women in this age group are motivated to screen. This indicates the need for education around who is at greater risk of breast cancer and appropriate for high risk services. Lower risk younger women could potentially be screened at primary care level with ultrasound or clinical breast exam to reduce incidence of false positives and overdiagnosis.

### **RF2.009- Body shape trajectory from age 5 to 50 and multiple myeloma risk**

**Authors:** Dr Julie Bassett<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer Council Victoria, Melbourne, Australia

#### **Abstract:**

**Background:** Several large studies have suggested a positive association with multiple myeloma risk and body size in both early and later adulthood. Other studies have reported the highest risk for people overweight or obese in both younger and later adulthood compared with those with normal BMI at both ages.

**Aim:** To investigate the association between body shape trajectory between ages 5 and 50 and multiple myeloma risk in the Epidemiology and Multiple Myeloma Australia (EMMA) study, a family-based case-control study.

**Methods:** Participants chose at recruitment one of 9 body shape diagrams that most closely resembled their average body shape at age, 5, 10, in their teens, 20s, 30s, 40s, 50s. A group-based trajectory modelling approach was used to identify distinct body shape trajectories. Logistic regression models were fitted, adjusting for clustering within families, to estimate odds ratios (OR) for the risk of multiple myeloma associated with different body shape trajectories.

**Results:** We included 780 multiple myeloma cases and 689 controls in our analyses. Six trajectory groups were identified and named: very lean-moderate increase; very lean-marked increase; lean-stable increase; lean-marked increase; heavy-stable; very heavy-stable. Compared with people in the lean-stable increase group, a higher risk of multiple myeloma was observed for those in the lean-marked increase (OR=1.38 [1.00, 1.90]) and those in the very heavy-stable group (OR=1.58 [0.98, 2.53]).

**Conclusion:** Being heavy throughout the lifecourse or having a lean body shape in early childhood followed by a marked increase from age 10 to 50 might increase the risk of multiple myeloma.

## RF2.010- Risk factors for keratoacanthoma in a large prospective cohort study

**Authors:** Dr Magdalena Claeson<sup>1,2,3</sup>, Dr Nirmala Pandeya<sup>1</sup>, Dr Jean-Claude Dusingize<sup>1</sup>, Professor Adele C Green<sup>1,4</sup>, Associate professor Rachel E Neale<sup>1</sup>, Associate Professor Catherine M Olsen<sup>1</sup>, Professor David C Whiteman<sup>1</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>2</sup>Dermatology Research Centre, The University of Queensland Diamantina Institute, Brisbane, Australia, <sup>3</sup>Department of Dermatology and Venereology, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden, <sup>4</sup>Cancer Research UK Manchester Institute and University of Manchester, Manchester Academic Health Science Centre, UK

### Abstract:

**Background:** Keratoacanthomas are common, rapidly growing skin tumours that often spontaneously resolve. Although the aetiology of keratoacanthomas is not well understood, associations with factors such as ultraviolet radiation exposure and immunosuppression have been reported. This study aimed to prospectively investigate risk factors associated with a diagnosis of keratoacanthoma in a population-based setting.

**Methods:** We used data from the large, prospective cohort study QSkin; 40438 people randomly sampled from residents of Queensland, Australia, aged 40-69 years, completed a baseline survey including questions on demographic items, previous medical history, medication, lifestyle, phenotype and ultraviolet exposure factors. Pathology reports for all diagnoses of keratoacanthoma between 2011 and June 2014 were obtained through data linkage. We performed logistic regression analyses to identify factors associated with keratoacanthoma, while taking account of the effects of potential confounding factors.

**Results:** In the cohort, 596 participants (247 women (41%) and 349 men (59%)) developed 776 keratoacanthomas. In preliminary analyses, current smoking was strongly associated with a diagnosis of keratoacanthoma (odds ratio for current vs. never smoking 2.58, 95% confidence interval 1.85-3.60). Other identified risk factors were increasing age, male sex, lower educational level, fair skin, greater sunburn tendency, tanning inability, previous history of actinic keratosis/keratinocyte skin cancer, and having had a skin check by a physician in the 3 years prior to baseline.

**Conclusion:** We infer smoking as a novel, independent risk factor for keratoacanthoma, along with phenotypic characteristics that confer increased sensitivity to ultraviolet radiation exposure.

## RF2.011- Omega-3 fatty acid intake and skin cancer incidence among organ transplant recipients

**Authors:** Dr Kyoko Miura<sup>1</sup>, Ms Mandy Way<sup>1</sup>, Professor Nikky Isbel<sup>2</sup>, Associate Professor Scott Campbell<sup>2</sup>, Professor Jonathan Fawcett<sup>3</sup>, Professor Adèle Green<sup>1,4</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>Department of Nephrology, The University of Queensland, Princess Alexandra Hospital, Brisbane, Australia, <sup>3</sup>Queensland Liver Transplant Service, University of Queensland, Princess Alexandra Hospital, Brisbane, Australia, <sup>4</sup>CRUK Manchester Institute and Faculty of Biology, Medicine and Health, University of Manchester, Manchester, UK

### Abstract:

**Background:** Organ transplant recipients have high risk of skin cancer. Because of Omega-3 fatty acids (FAs) are anti-inflammatory and may be protective, we examined omega-3 FA intake and incidence of cutaneous squamous cell carcinoma (SCC) among transplant recipients in Brisbane, Queensland.

**Methods:** Adult kidney or liver transplant recipients who were one year or more post-transplant were recruited from the tertiary transplant hospital in Brisbane, 2012–2014. Dietary omega-3 FAs comprising eicosapentaenoic acid, docosapentaenoic acid (DPA), docosahexaenoic acid, alpha-linolenic acid, and total long-chain omega-3 FAs were estimated using a baseline food frequency questionnaire and intakes of each FA were ranked in thirds. Patients were followed-up for confirmed SCCs until June 2016. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated using generalised linear models specified Poisson distribution with a robust error variance.

**Results:** Totals of 262 kidney and 190 liver transplant recipients (mean age 55 years and approximately two-thirds male for both) were studied. During follow-up, 102 (39%) kidney transplant recipients developed SCC and those with highest DPA intake showed reduced SCC risk compared with the lowest (RR 0.60, 95% CI 0.36–0.98; p-trend=0.038). Reduced risks with higher intake of other FAs were observed though not significant. For liver transplant recipients, 48 (25%) developed SCC and highest levels of intakes of all omega-3 FAs experienced significantly lower SCC risks, particularly high long-chain omega-3 FA intake: RR 0.30 (95% CI 0.14–0.63; p-trend=0.003).

**Conclusions:** High intake of omega-3 FAs may reduce SCC risk in kidney and especially liver transplant recipients.

### **RF2.012- Obesity is associated with BRAF-mutated thyroid cancer**

**Authors:** Mr. Sabbir Rahman<sup>1,2</sup>, Dr. Nirmala Pandeya<sup>1,2</sup>, Dr. Rachel Neale<sup>1,2</sup>, Dr. Donald McLeod<sup>1,3</sup>, Dr. Susan Jordan<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*QIMR Berghofer Medical Research Institute, Brisbane, Australia*, <sup>2</sup>*School of Public Health, The University of Queensland, Brisbane, Australia*, <sup>3</sup>*Department of Endocrinology and Diabetes, Royal Brisbane and Women's Hospital, Brisbane, Australia*

**Abstract:**

**Background:** Thyroid cancer incidence has increased in many parts of the world since 1980s, as has obesity prevalence. Evidence suggests that people with greater body size have greater thyroid cancer risk, but it is unclear whether this association is causal or is driven by over-diagnosis of indolent cancers because overweight/obese people use health services more frequently than those of normal weight and have greater opportunity for incidental diagnosis. Assessing whether obesity is associated with higher-risk thyroid cancers might help clarify this issue.

**Methods:** We recruited 1013 thyroid cancer cases diagnosed between 2013 and 2016 and 1057 population controls, frequency matched by sex and age group. We used logistic regression to assess the association between body mass index (BMI) and overall thyroid cancer risk as well as by tumour BRAF mutational status as a marker of potentially higher-risk cancer.

**Results:** In both women and men, higher BMI was associated with greater odds of thyroid cancer overall. Having a BMI  $\geq 30$  kg/m<sup>2</sup> was associated with increased odds of BRAF-mutated thyroid cancer (odds ratio =2.22; 95% confidence interval: 1.66-2.97 for obese vs. normal BMI); odds ratios were lower and inconsistent for BRAF-negative cancers. The odds of BRAF-mutated cancer increased by 18% and 24% for each 5 kg/m<sup>2</sup> increase in BMI in women and men respectively.

**Conclusions:** Greater risk of BRAF-mutated thyroid cancers among those with high BMI suggests that the association may not merely reflect greater healthcare service use and indicates an independent relationship between excess body fatness and clinically important thyroid cancer.

### **RF2.013- A healthy lifestyle and survival among women with ovarian cancer**

**Authors:** Jessy Hansen<sup>1,2</sup>, Dr Christina Nagle<sup>1</sup>, Dr Torukiri Ibiebele<sup>1</sup>, Prof Penelope Webb<sup>1,2</sup>, Ovarian Cancer Prognosis and Lifestyle Study Group<sup>1</sup>

**Affiliations:** <sup>1</sup>*Population Health Department, QIMR Berghofer, Herston, Australia*, <sup>2</sup>*School of Public Health, University of Queensland, Herston, Australia*

**Abstract:**

**Background:** Ovarian cancer has a poor survival rate of 46% in Australian women, and affected women often want to know how they can improve their prognosis. Little is known about how adherence to a combination of healthy lifestyle factors may impact survival of women with ovarian cancer. Our goal was to investigate the association between a healthy lifestyle pre- and post-diagnosis and survival in a cohort of Australian women with invasive epithelial ovarian cancer.

**Methods:** We calculated a healthy lifestyle index (HLI) based on women's self-reported smoking status, height, weight, physical activity, diet and alcohol consumption before diagnosis (n=678) and after completing treatment (n=461). Clinical data and vital status for each women were ascertained through medical records. Cox proportional hazards regression was conducted to calculate hazard ratios (HR) and 95% confidence intervals (CI) for all-cause mortality, adjusting for age, comorbidities and, for post-diagnosis measures, tumour stage, histology and residual disease.

**Results:** No association was found between HLI scores pre- and post-diagnosis and survival after ovarian cancer. Pre- and post-diagnosis smoking were associated with reduced survival (HR=1.47, 95%CI: 1.08, 1.99; HR=1.52, 95%CI: 0.73, 3.15, respectively), and higher physical activity post-diagnosis was associated with improved survival (HR=0.63, 95%CI: 0.43, 0.93).

**Conclusions:** Although no associations were found for adherence to an overall healthy lifestyle, increasing physical activity may help women with ovarian cancer improve their prognosis. However, further research is needed to confirm the findings.

### **RF2.014- How adherence to Australian screen time guidelines differs by age in Australian children aged 0 to 12 years**

**Authors:** Associate Professor Leigh Tooth<sup>1</sup>, Dr Katrina Moss<sup>1</sup>, Mr Richard Hockey<sup>1</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>*The University of Queensland, Brisbane, Australia*

**Abstract:**

**Background:** Australian government daily screen time (ST) guidelines recommend zero time for children aged <2, up to 1 hour for children aged 2-4 and up to 2 hours for children aged 5-12. No nationally representative studies report adherence across these ages.

**Methods:** Data were from the Mothers and their Children's Health Study (N=3,063 mothers, 5410 children aged 0-12). Mothers reported children's weekday and weekend day recreational ST. The associations of demographic, health and household characteristics of mothers and children with non-adherence were analysed using logistic regression, controlling for clustering of children within mothers.

**Results:** By 1 year children had 50 and 58 minutes ST on average on week and weekend days respectively, with this doubling by 2 years. Weekday ST plateaued around 3 years (mean 94 minutes) and from ages 5-12 was largely within guidelines (mean 74-115 minutes). Non-adherence to guidelines was higher on weekends and increased with age. Non-adherence on weekdays was 66%, 53%, 17%, 13%, 11% and 20% in 1, 3, 5, 7, 9 and 11 year-old children, respectively, and on weekend days in 65%, 72%, 40%, 46%, 50% and 60% (respectively). Factors associated with non-adherence varied by child age, but included financial stress, high maternal leisure time, less reading with the child and electronic devices in the child's bedroom.

**Conclusions:** The rapid uptake of ST in children before 3 years of age places them at risk of poorer developmental outcomes. Non-adherence on weekend days may be replacing active play with sedentary time, with potential health implications.

### **RF2.015- History of premenstrual syndrome and postpartum depression: a systematic review and meta-analysis**

**Authors:** Ms Sifan Cao<sup>1</sup>, Associate Professor Mark Jones<sup>2</sup>, Associate Professor Leigh Tooth<sup>1</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>Faculty of Medicine, School of Public Health, Centre for Longitudinal and Life Course Research, The University of Queensland, Brisbane, Australia, <sup>2</sup>Faculty of Health Sciences & Medicine, Bond University, Gold Coast, Robina, Australia

#### **Abstract:**

**Background:** Premenstrual syndrome (PMS) is thought to be a risk factor for postpartum depression (PPD), but results from studies examining the association have been mixed.

**Methods:** PubMed, EMBASE, CINAHL, PsycINFO, Cochrane Library, CNKI, Wanfang Data, and reference lists of relevant papers were searched for published observational studies that examined the association between pre-pregnancy history of PMS and depressive symptoms from one week to one year postpartum. This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Results of the original studies were meta-analysed using random-effect models and pooled odds ratio (OR) with 95% confidence interval (CI) were calculated. Risk of bias was evaluated using the Risk of Bias Instrument for Non-Randomized Studies of Exposures (ROBINS-E). Subgroup analyses were conducted by risk of bias, study design, PMS definition, and PPD assessment approach. Small study effect was assessed by funnel plot.

**Results:** Nineteen studies were included in the meta-analysis. Overall, women with a pre-pregnancy history of PMS had more than double the odds of PPD compared to those without PMS before pregnancy (OR: 2.20, 95% CI: 1.81-2.68). All subgroup estimates were consistent with the overall result. However, the quality of evidence is low: five studies had moderate risk, nine had serious risk, and four had critical risk of bias.

**Conclusions:** Current evidence supports a positive association between a history of PMS before pregnancy and development of PPD, but high-quality evidence is needed to confirm this finding.

### **RF2.016- Dietary patterns and risk of pregnancy outcomes: Systematic review and meta-analysis**

**Authors:** Mr Kelemu Tilahun Kibret<sup>1</sup>, Dr Catherine Chojenta<sup>1</sup>, Professor Deborah Loxton<sup>1</sup>, Dr Ellie D'Arcy<sup>2</sup>

**Affiliations:** <sup>1</sup>The University of Newcastle, Newcastle, Australia, <sup>2</sup>Western NSW Local Health District, Bathurst, Australia

#### **Abstract:**

**Background:** Epidemiological studies have indicated that dietary patterns during pregnancy have been associated with adverse pregnancy and birth outcomes such as hypertensive disorder of pregnancy (HDP), gestational diabetes mellitus (GDM), preterm birth (PTB) and low birth weight (LBW). However, the results of these studies are varied and inconsistent. The aim of this study was to systematically review the evidence to determine the association between dietary patterns and the risk of adverse pregnancy and birth outcomes.

**Methods:** Seven databases were searched for articles. Two reviewers performed the study selection and data extraction. A random-effects model was used to estimate the pooled effect sizes of eligible studies.

**Results:** A total of 21 observational studies were included. Adherence to a healthy dietary pattern (intake of vegetables, fruits, legumes, wholegrains) was significantly associated with lower odds of preeclampsia (odds ratio (OR) = 0.78, 95% confidence interval (CI) 0.70 to 0.86; I<sup>2</sup>=39.0%, p = 0.178), GDM (OR: 0.78; 95% CI: 0.56, 0.99; I<sup>2</sup>: 68.6%, p = 0.013) and PTB (OR: 0.75; 95% CI: 0.57, 0.93; I<sup>2</sup> = 89.6%, p = 0.0001).

**Conclusion:** This review supports the current dietary guidelines and suggests that dietary patterns with a higher intake of fruits, vegetables, legumes, wholegrain and fish are associated with a decreased likelihood of adverse pregnancy and birth outcomes. Since most of the articles included were conducted in a resource-rich setting, further research should be conducted in low-income countries to understand the impact of limited resources on dietary intake and adverse pregnancy and birth outcomes.

## RF2.017 - Stillbirth by Maternal Region of Birth and Gestational Age in NSW, Australia

**Authors:** Ye'Elah Berman<sup>1,2</sup>, **Dr Ibinabo Ibiebele**<sup>1,3</sup>, Dr Jillian Patterson<sup>1,3</sup>, Dr Deborah Randall<sup>1,3</sup>, Associate Professor Jane Ford<sup>1,3</sup>, Dr Tanya Nippita<sup>1,3,4</sup>, Professor Jonathan Morris<sup>1,3,4</sup>, Stephanie Todd<sup>1,2</sup>, Dr Miranda Davies-Tuck<sup>5,6</sup>, Associate Professor Siranda Torvaldsen<sup>1,3,7</sup>

**Affiliations:** <sup>1</sup>University Of Sydney Northern Clinical School, Clinical and Population Perinatal Health Research, St Leonards, Australia, <sup>2</sup>Biostatistics Training Program, New South Wales Ministry of Health, Sydney, Australia, <sup>3</sup>Northern Sydney Local Health District, Kolling Institute, St Leonards, Australia, <sup>4</sup>Department of Obstetrics and Gynaecology, Royal North Shore Hospital, St Leonards, Australia, <sup>5</sup>The Ritchie Centre, Department of Obstetrics and Gynaecology, Monash University, Melbourne, Australia, <sup>6</sup>Safer Care Victoria, Department of Health and Human Services, Melbourne, Australia, <sup>7</sup>School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia

### Abstract:

**Background:** Research suggests that maternal region of birth is a risk factor for stillbirth in Australia. We aimed to examine the relationship between stillbirth and maternal region of birth in NSW, Australia from 2004-2015.

**Methods:** Adjusted logistic regression was used to determine odds of stillbirth by maternal region of birth, compared with Australian or New Zealand born (AUS/NZ-born) women. Intervention rates (induction or pre-labour caesarean) by maternal region of birth, over time, were also examined. Interaction terms were used to assess change in relative odds of stillbirth over two time periods (2004-2011 and 2012-2015).

**Results:** There were 944,457 singleton births  $\geq 24$  weeks gestation that met the study inclusion criteria and 3,221 of these were stillbirths, giving a stillbirth rate of 3.4 per 1000 births. After adjustment for confounders, South Asian (adjusted odds ratio (aOR) 1.42, CI 1.24-1.62), Oceanian (aOR 1.45, CI 1.17-1.80) and African (aOR 1.46, CI 1.19 - 1.80) born women had significantly higher odds of stillbirth than AUS/NZ-born women. Intervention rates increased from the earlier to the later time period by 13.1% across the study population, but the increase was larger in African and South Asian-born women (18.1% and 19.6% respectively) than AUS/NZ-born women (11.2%). There was a significant interaction between ethnicity and time period for South Asian-born women in the all-births model, with their stillbirth rates becoming more similar to AUS/NZ-born women in the later period.

**Conclusion:** South Asian, African and Oceanian maternal region of birth are independent risk factors for stillbirth in NSW.

## RF2.018- The changing temporal association between caesarean birth and neonatal death in Ethiopia

**Authors:** **Mr Engida Yisma**<sup>1</sup>, Professor Ben Mol<sup>2</sup>, Professor John Lynch<sup>1</sup>, A/professor Lisa Smithers<sup>1</sup>

**Affiliations:** <sup>1</sup>School Of Public Health, The University of Adelaide, Adelaide, Australia, Adelaide, Australia, <sup>2</sup>Department of Obstetrics and Gynaecology, Monash University, Melbourne, Melbourne, Australia

### Abstract:

**Background:** We aimed to examine the changing temporal association between caesarean birth and neonatal death in Ethiopia from 2000 to 2016 using Demographic and Health Surveys (DHS).

**Methods:** We used data from Ethiopian DHS in 2000, 2005, 2011, and 2016. We analysed the association between caesarean birth and neonatal death using modified Poisson regression models for each survey adjusted for potential confounders. We then applied the 'Three Delays Model' to provide an interpretation of the changing association between caesarean birth and neonatal death in Ethiopia.

**Results:** The adjusted prevalence ratios (aPR) (95% CI) for neonatal death among neonates born via caesarean section versus vaginal birth increased over time, from 0.95 (0.29, 3.19) in 2000 to 2.81 (1.11, 7.13) in 2016. The association between caesarean birth and neonatal death was stronger among rural women (aPR (95% CI) 3.43 (1.22, 9.67)) and among women from the lowest quintile of household wealth (aPR (95% CI) 7.01 (0.92, 53.36) in 2016. Aggregate-level analysis revealed that an increased caesarean section rates were correlated with decreased proportion of neonatal deaths.

**Conclusions:** A naïve interpretation of the changing temporal association between caesarean birth and neonatal death from 2000 to 2016 is that caesarean section is increasingly associated with neonatal death. However, the changing temporal association reflects improvements in health service coverage and secular shifts in the characteristics of Ethiopian women undergoing caesarean section after complicated labour or severe foetal compromise.

### **3A – Cancer - descriptive epidemiology, screening and over-diagnosis**

Plaza Room P9, 10:30am - 12:00pm

#### **Has the transition to digital mammography in BreastScreen resulted in real benefits?**

**Authors:** Ms Rachel Farber<sup>1</sup>, Professor Alexandra Barratt<sup>1</sup>, Professor Nehmat Houssami<sup>1</sup>, Associate Professor Kevin McGeechan<sup>1</sup>, Dr Katy Bell<sup>1</sup>

**Affiliations:** <sup>1</sup>University of Sydney, University of Sydney, Australia

#### **Abstract:**

**Background:** Most breast screening programmes worldwide have replaced film mammography with digital mammography. This move will have only had beneficial effects on health outcomes if the additional cancers detected, from an increase in sensitivity and screen-detection rates, would have otherwise presented at a later stage and caused morbidity and premature mortality. An indirect measure of this is an observed decrease in interval cancer rates.

**Methods/Results:** This study compares health outcomes before, during and after the transition from film to digital in women in NSW, Australia. We linked data from 1988 to 2016, 1,290,695 women screened (6,122,102 screens) in Breastscreen NSW and 110,383 diagnosed breast cancers in NSW Cancer Registry, 420,590 NSW Admitted Patient Data records, and 214,879 NSW Mortality Data records. We will use interrupted time series regression to evaluate the effectiveness of the transition to digital mammography over time and a segmented regression to analyse the effect of change in technology in mammography screening on each outcome.

We will present the results of our evaluation of changes in screen-detected cancer, interval, recall and false-positive recall rates and changes in breast cancer tumour characteristics for screen-detected and interval cancers, and differences in breast cancer treatment and breast cancer mortality rates. We will conduct analyses stratified by age, breast density, and initial and subsequent screening examinations.

**Conclusion:** The innovative approach of estimating benefits and harms using rates of screen-detected cancers and interval cancers will allow for more timely and rigorous evaluation of changes in screening technologies and practice.

## The Burden of Cancer Overdiagnosis in Australia

**Authors:** Dr Katy Bell<sup>1</sup>, Associate Professor Mark Jones<sup>2</sup>, Dr Thanya Pathirana<sup>2,3</sup>, Professor Alexandra Barratt<sup>1</sup>, Professor Paul Glasziou<sup>2</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, The University of Sydney, Sydney, Australia*, <sup>2</sup>*Institute for Evidence-Based Healthcare Faculty of Health Sciences & Medicine, Bond University, Gold Coast, Australia*, <sup>3</sup>*School of Medicine, Griffith University, Sydney, Australia*

### Abstract:

**Objectives:** Cancer is increasing worldwide partly due to over-detection and overdiagnosis: cancers which would never cause symptoms or harm if left undetected. We sought to estimate Australia's cancer overdiagnosis burden.

**Methods:** Using routinely collected Australia-wide data and the Devcan software, we compared current (2012) and past (1982) lifetime risks for 5 cancers: prostate, breast, renal, thyroid cancers and melanoma (adjusted for the competing risk of dying from other causes, and changes in risk factor prevalence).

**Findings:** For Australian women, the lifetime probability of cancer diagnosis increased by 3.4%, 0.6%, 1% and 5.1% for breast, renal, thyroid cancer and melanoma, respectively. We estimated that 22% of breast cancers (13% of invasive), 58% of renal cancers, 73% of thyroid cancers and 54% of melanomas (15% of invasive) were overdiagnosed in 2012. Overdiagnosis of these cancers accounted for 18% of all cancers (8% of all invasive cancers) in women.

For Australian men, the lifetime probability of cancer diagnosis increased by 8.2%, 0.8%, 0.4% and 8% for prostate, renal, thyroid cancer and melanoma, respectively. We estimated that 42% of prostate cancers, 42% of renal cancers, 73% of thyroid cancers and 58% of melanomas (22% of invasive melanomas) were overdiagnosed in 2012. Overdiagnosis of these cancers accounted for 24% of all cancers (16% of all invasive cancers) in men.

**Conclusions:** These estimates mean that over 11,000 cancers in women (18%), and 18,000 cancers in men (24%) are currently overdiagnosed annually. Health policies are urgently needed to reduce the rates of overdiagnosis.

## Area-based analysis of predictors of bowel cancer screening participation in Australia

**Authors:** Dr James Chamberlain<sup>1</sup>, Dr Geoffrey Stuart<sup>1</sup>, Dr Julie Bassett<sup>1</sup>, Ms Kate Broun<sup>4</sup>, Professor Dallas English<sup>1,2</sup>, Associate Professor Roger Milne<sup>1,2,3</sup>

**Affiliations:** <sup>1</sup>*Cancer Epidemiology Division, Cancer Council Victoria, Melbourne, Australia*, <sup>2</sup>*Centre for Epidemiology and Biostatistics, School of Population and Global Health, The University of Melbourne, Melbourne, Australia*, <sup>3</sup>*Precision Medicine, School of Clinical Sciences at Monash Health, Monash University, Clayton, Australia*, <sup>4</sup>*Prevention Division, Cancer Council Victoria, Melbourne, Australia*

### Abstract:

**Background:** Participation in the National Bowel Cancer Screening Program (NBCSP) was 41% in 2015-2016.

**Aim:** We assessed area-based predictors of NBCSP participation in Victoria, aiming to identify targets for interventions to increase screening participation.

**Methods:** Screening participation data by Statistical Area 2 (SA2) were available from 2008-2016. Cultural variables as well as socio-economic position (SEIFA disadvantage quintile) and remoteness (city, inner regional or outer regional/remote) were available from the Australian Bureau of Statistics. Using principal components analysis and related methods, the cultural variables were weighted and selected to obtain a multi-dimensional culture index. We assessed how well the area-based measures predicted screening participation using regression, dominance and commonality analysis.

**Results:** The SA2-based variables together explained 60% of the variance in Victorian screening participation by SA2. The ranking of variable importance from dominance analysis was (1) "% speaking English well", with unique variance explained 6%, (2) cultural indexes, with unique variance 6%, (3) remoteness with unique variance 8% and (4) SEIFA, with unique variance 5%. The variance common to "% speaking English well", culture and SEIFA was 23% and the variance common to "% speaking English well" and SEIFA was 13%.

**Conclusions:** English proficiency is an important predictor of bowel screening participation by area, and is a key factor to consider when designing interventions. However, given that culturally diverse areas tend to coincide with urban areas of greater socioeconomic disadvantage, it is difficult to definitively separate out the effects of culture, English proficiency, SEIFA and remoteness.

### **Online trial of PSA screening decision-aids with information on overdiagnosis and overtreatment**

**Authors:** Dr Kristen Pickles<sup>1</sup>, Ms Luise Kazda<sup>1</sup>, Prof Alexandra Barratt<sup>1</sup>, Associate Prof Kevin McGeechan<sup>1</sup>, Dr olyn Hersch<sup>1</sup>, Prof Kirsten McCaffery<sup>1</sup>

**Affiliations:** <sup>1</sup>Wiser Healthcare, The University of Sydney, Australia

#### **Abstract:**

**Background:** Despite publication of two population-based trials of prostate cancer screening and advice to inform men about the finely balanced benefits and harms of the 'PSA test', most men remain poorly informed, with some men continuing to report PSA testing being done without their knowledge. To address this translation gap, we conducted an online randomised trial comparing two new decision aids (DAs) to inform men about PSA screening, regardless of their level of educational attainment.

**Methods:** ~3000 Australian men 45-60 years with varying educational attainment were randomised to view one of two DAs (one full length, one abbreviated) and complete a questionnaire. Our primary outcome was informed choice (comprising knowledge, attitude, intention).

**Results:** Significantly more men in the long DA group (38%) made an informed choice than men who received the shorter DA (33%) (4.7% more; 95% CI 1.1% to 8.2%; p=0.008). Men allocated the long DA were less likely to intend to have a PSA test in the future (53%) than men in the short DA group (59%). Both DAs rated highly on acceptability. The DAs were equally effective and similarly rated in higher and lower educated groups of men.

**Conclusions:** Both DAs were useful and acceptable to men regardless of education level, and both supported informed decision making. The long version resulted in higher knowledge, and a higher proportion of men able to make an informed choice, but the differences were small. These results demonstrate the feasibility and benefits of providing evidence-based information to men considering screening.

### **Social media for health promotion and skin cancer prevention**

**Authors:** Carina Silva<sup>1</sup>, Prof Monika Janda<sup>1</sup>

**Affiliations:** <sup>1</sup>Queensland University of Technology, Brisbane, Australia

#### **Abstract:**

**Background:** Skin cancer places a substantial burden on the health and economic systems in Australia. The modernisation of interventions by extending the use of social media may enhance the effectiveness of skin cancer prevention. The aim of this study was to analyse Twitter posts in Australia to establish skin cancer and sun-related communication trends and sentiments.

**Methods:** Tweets posted over the summers 2016/17 and 2018/19 related to relevant keywords and hashtags, such as 'SlipSlopSlap' and 'sunburn', were analysed using quantitative and qualitative methods. The number of tweets over time, patterns of peaks, and whether tweets accumulated in positive or negative sentiment category and correlated with weather or media data were studied. Qualitative analysis of peaks provided deeper insights into the data.

**Results:** Australians use Twitter most commonly to communicate about sunscreen, skin cancer, sunburn and tanning, however not so often about other sun-protective behaviours or skin cancer prevention campaigns. The number of tweets is significantly correlated to increases in temperature, as well as external events and traditional media reports about sun-related topics. Peak analyses found a predominance of controversial and potentially misleading information on Twitter, such as high volume of posts about sunscreen side effects and pro-tanning messages.

**Conclusions:** The study highlighted the need to share evidence-based and truthful information and expand the use of social media for public health research and skin cancer prevention. The results may deepen the understanding of important determinants of sun protection and how social media could be used more effectively in the future.

### **Small-area melanoma incidence patterns across Australia: the thick and thin of it**

**Authors:** Doctor Susanna Cramb<sup>1,2</sup>, Doctor Earl Duncan<sup>3</sup>, Professor Joanne Aitken<sup>1</sup>, Distinguished Professor Kerrie Mengersen<sup>3</sup>, Professor Peter Baade<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer Council Queensland, Brisbane, Australia, <sup>2</sup>Institute of Health and Biomedical Innovation, Queensland University Of Technology, Brisbane, Australia, <sup>3</sup>ARC Centre of Excellence for Mathematical & Statistical Frontiers (ACEMS), Science and Engineering Faculty, Queensland University of Technology, Brisbane, Australia

#### **Abstract:**

**Background:** Australia has among the highest rates of melanoma incidence worldwide, and there is substantial variation in melanoma incidence rates across the country. However, it is unclear what is driving these patterns. Investigating the small-area patterns of melanoma incidence across Australia by thickness categories, including correlation between these stratified thickness patterns, will help understand the contribution of early detection.

**Methods:** Data on invasive melanomas diagnosed during 2010-2014 for Australians aged 15+ years were obtained from the Australian Cancer Database following required ethics and data custodian approvals. Four thickness categories were considered: thin ( $\leq 1\text{mm}$ ), intermediate ( $>1\text{-}2\text{mm}$ ), thick ( $>2\text{mm}$ ) and unknown. A Bayesian hierarchical spatial multivariate model using the CARBayes package in R estimated patterns over 2,148 small geographical areas.

**Results:** Of 61,310 included melanomas diagnosed during 2010-2014, 63% were thin, 14% were intermediate and 16% were thick melanomas. For each thickness category, the highest incidence rates were in areas across south-east Queensland and north-east NSW. In contrast, the incidence rates in most areas across northern, middle and parts of western Australia tended to be lower than the Australian average. The consistency of these geographical patterns across thickness categories was reflected in the substantial correlation.

**Conclusions:** The study results support the hypothesis that the variation is driven more by population susceptibility in each area, rather than the variation only being among thin melanomas, the latter of which would support a hypothesis of 'overdiagnosis' in these regions. Further elucidating the population-level risk factors in these areas is a required next step.

### **Quantifying changes in population cure over time for Australian cancer patients**

**Authors:** Dr Kou Kou<sup>1,2</sup>, Dr Paramita Dasgupta<sup>1</sup>, Dr Susanna Cramb<sup>1,2</sup>, Dr Xue Qin Yu<sup>3,4</sup>, Dr Peter Baade<sup>1,2</sup>

**Affiliations:** <sup>1</sup>Cancer Council Queensland, Brisbane, Australia, <sup>2</sup>Queensland University of Technology, Brisbane, Australia, <sup>3</sup>Cancer Council New South Wales, Sydney, Australia, <sup>4</sup>University of Sydney, Sydney, Australia

#### **Abstract:**

**Objective:** Given that individual-level clinical information required to determine medical cure is rarely available at the population level, 'population cure' is the population-level equivalent and reflects the point when the excess mortality associated with a cancer diagnosis approaches zero. To date, Australian estimates of population-level cure have not been presented.

**Methods:** Australian population-based cohort of 2,286,538 cases aged 15-89 years, diagnosed with one of 19 leading cancers from 1984 to 2014 were included for analysis. Flexible parametric cure models were used to estimate the cure proportion and median survival time of uncured by age, sex and spread of disease, and assess temporal trends.

**Results:** Cure proportion ranged from 4.9% for pancreatic cancer to 89.2% for melanoma. Median survival time for these uncured ranged from 0.35 years for pancreatic cancer to 5.80 years for prostate cancer. Older age group and increasing spread of disease were associated with lower cure measures for most types. Between 1982 and 2009, the cure proportion increased significantly for all types, although the rate of growth varied considerably. The median survival time for uncured cases increased over time for most types except cervical cancer, for which there was a small decrease.

**Conclusions:** Cure estimates provide unique insights into whether survival improvements are due to prolonging life, or through curing the disease. For cancers with poor survival where little has changed either in prolonging life or statistical cure, efforts should be focused on reducing the prevalence of known risk factors and earlier detection, thereby enabling more effective treatment.

## 3B – Methods in epidemiological research and practice

Plaza Room P10, 10:30am - 12:00pm

### Using supermarket sales to inform trends and patterns in food consumption

**Authors:** Mr Paul Atyeo<sup>1</sup>, Ms Louise Gates

**Affiliations:** <sup>1</sup>*Australian Bureau of Statistics, Canberra, Australia*

**Abstract:**

**Background:** A long-standing public health information goal in Australia has been to establish a national food and nutrition monitoring system capable of providing ongoing information on food purchasing trends, in addition to the infrequent (yet more granular) data available from national nutrition surveys. While ABS has been using transactions data (TD) to measure price change for the Consumer Price Index since 2014, recent efforts to map purchased food products to a food classification have resulted in a new data source to measure apparent food consumption throughout Australia.

**Methods:** Using product descriptions associated with each sales item we coded each unique food and beverage to the AUSNUT 2011-13 database. As a majority of sales are available at small geographic areas, sales aggregates have also been geocoded to enable spatial analysis. Consumption amounts were estimated from the product size/volume by number of unit sales, with weighting applied to improve representation of all food retail (excluding restaurants, takeaway etc). Weights for overall food retail were derived from the ABS' 2015-16 Household Expenditure Survey which provides expenditure proportions to account for the varying propensity to purchase particular foodstuffs from supermarkets.

**Results:** Data show time trends such as declines in expenditure on sugar sweetened beverages (SSBs) and area-based socio-economic gradients in certain food groups of interest.

**Conclusions:** A timely and cost-effective data source based on TD has the potential to inform on trends and patterns across important food groups such as fruit, vegetables, milk, nuts, processed meat, SSBs, and confectionary.

### Data mining information in electronic health records: gold or garbage?

**Authors:** Katrien Groenhof<sup>1</sup>, Laurien Koers<sup>1</sup>, Enja Blasse<sup>2</sup>, Mark de Groot<sup>2</sup>, Diederick Grobbee<sup>1</sup>, Michiel Bots<sup>1</sup>, Folkert Asselbergs<sup>3,4,5</sup>, Titia Lely<sup>6</sup>, Saskia Haitjema<sup>2</sup>

**Affiliations:** <sup>1</sup>*Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, Utrecht, Netherlands*, <sup>2</sup>*Laboratory of Clinical Chemistry and Hematology, University Medical Center Utrecht, Utrecht University, Utrecht, The Netherlands*, <sup>3</sup>*Department of Cardiology, Division Heart & Lungs, University Medical Center Utrecht, Utrecht, The Netherlands*, <sup>4</sup>*Institute of Cardiovascular Science, Faculty of Population Health Sciences, University College London, London, United Kingdom*, <sup>5</sup>*Health Data Research UK, Institute of Health Informatics, University College London, London, United Kingdom*, <sup>6</sup>*Department of Obstetrics, Wilhelmina Children's Hospital, University Medical Center Utrecht, Utrecht, The Netherlands*

**Abstract:**

**Background:** Researchers are increasingly using routine clinical data for care evaluations and feedback to patients and clinicians. The quality of these evaluations depends on the quality and completeness of the input data.

**Methods:** We assessed the performance of an electronic health record (EHR)-based data mining algorithm, using the example of the smoking status in a cardiovascular population. As a reference standard we used the questionnaire from the Utrecht Cardiovascular Cohort (UCC). To assess diagnostic accuracy we calculated sensitivity, specificity, negative predictive value, and positive predictive value.

**Results:** We analyzed 1,661 patients included in UCC to January 18th 2019. Of those, 14% (n=238) had missing information on smoking status in the UCC questionnaire. Data mining provided information on smoking status in 99% of the 1,661 participants. Diagnostic accuracy for current smoking was: sensitivity 88%, specificity 92%, negative predictive value 98%, and positive predictive value 63%. From false positives, 85% reported they had quit smoking at the time of UCC.

**Conclusion:** Data mining showed great potential in retrieving information on smoking (a near complete yield). Its diagnostic performance is good for negative smoking statuses. When data mining is applied, the effect of time and clinical practice on the outcome, and the implications of misclassifications need to be considered.

### **Imputing pre-diagnosis health behaviour of cancer registry cases: An oesophageal cancer example.**

**Authors:** **Mr Paul Fahey**<sup>1,2</sup>, Professor Andrew Page<sup>1</sup>, Professor Glenn Stone<sup>3</sup>, Professor Thomas Astell-Burt<sup>4</sup>

**Affiliations:** <sup>1</sup>*Translational Health Research Institute, Western Sydney University, Campbelltown Campus, Australia*, <sup>2</sup>*School of Science and Health, Western Sydney University, Campbelltown Campus, Australia*, <sup>3</sup>*School of Computing, Engineering and Mathematics, Western Sydney University, Parramatta Campus, Australia*, <sup>4</sup>*Population Wellbeing and Environment Research Lab (PowerLab), University of Wollongong, Wollongong, Australia*

#### **Abstract:**

**Background:** Cancer registry data rarely contain information on pre-diagnosis health behaviour, limiting epidemiological investigations. This paper presents a novel approach to augmenting cancer registry data sets by imputing entire variables.

**Methods:** Health behaviour 5-years pre-diagnosis (tobacco smoking, 'at risk' alcohol consumption, obesity and physical activity) was imputed for 27700 US oesophageal cancer registry cases using an unrelated health behaviour survey and cold deck imputation. A key step was to calibrate the imputation by running it twice. Simulated data were used to check whether or not the true relative risks (for one-year survival) were recovered accurately. All analyses were repeated 100 times to allow calculation of empirical confidence intervals.

**Results:** The simulations showed that accurate estimates of relative risk could be retrieved for all behaviours with prevalence of 5% or higher (4 of the 6 we tested) although confidence intervals were wide. When applied to real data, the estimated relative risks appear consistent with current knowledge. For example, smoking 5-years pre-diagnosis displayed a statistically significantly increased age-adjusted risk of all cause death within one year of diagnosis in oesophageal squamous cell carcinoma (RR=1.99 95% CI 1.24,3.12) but not adenocarcinoma (RR=1.61, 95% CI 0.79,2.57).

**Conclusions:** Imputing completely missing variables is a novel approach to augmenting cancer registry data for epidemiological investigations. It requires large data sets and informative demographic variables, but can be applied in situations where data linkage is not feasible. There is much opportunity for further refinement and development.

### **Spatio-temporal analysis to identify health effects of landscape fires: establishing a methodology**

**Authors:** Dr Adeleh Shirangi<sup>1,2</sup>, **Dr Alex Xiao**<sup>1</sup>, Dr. Emmanuel Ongee<sup>2</sup>, Dr. Ivana Ivánová<sup>2</sup>, Dr. Ashraf Dewan<sup>2</sup>, Dr Grace Yun<sup>1</sup>, Dr. Peter Franklin<sup>3</sup>, Mr. Bradly Santos<sup>4</sup>, Mr. Natan Eaton<sup>5</sup>, Dr. Le Jian<sup>1</sup>, Dr Ting Lin<sup>1</sup>, Ms. Laura Clappinson<sup>1</sup>, Dr. Stephen Ball<sup>6</sup>, Ms. Rowena Burch<sup>1</sup>, MS. Paula Fieves<sup>8</sup>

**Affiliations:** <sup>1</sup>*Epidemiology Branch, Public and Aboriginal Health Division, Department of Health, East Perth, Australia*, <sup>2</sup>*School of Earth and Planetary Sciences, Curtin University, Bentley, Australia*, <sup>3</sup>*Environmental Health Directorate, Public and Aboriginal Health Division, Department of Health, East Perth, Australia*, <sup>4</sup>*Australian Government Bureau of Meteorology, Australia*, <sup>5</sup>*NGIS, Australia*, <sup>6</sup>*Faculty of Health Sciences, Curtin University, Bentley, Australia*, <sup>8</sup>*FrontierSI, Australia*

#### **Abstract:**

**Background:** Understanding the health effects of smoke from landscape fires (LF), including wildfires and prescribed burns, is limited by adequately assessing exposure. Therefore, it is important to develop good exposure models for LF studies.

**Objectives:** This study aims to establish a smoke exposure model using earth observation data that will be used to conduct a spatio-temporal analysis and adverse health effects on the population in the Perth metropolitan area.

We will present details in research design followed by patterns of LFs and preliminary results of the study.

**Research design:** This study is retrospective in nature covering the period of July 2015 to December 2017. Four-step statistical and spatial analysis will be conducted.

Firstly, the reported LFs will be used to assist in determining smoke plumes from satellite images. The 3,989 gridded cells with a resolution of 1.5 by 1.5 km over the Perth metropolitan area will be the study area.

Secondly, a well-established empirical model using linear regression will be used to estimate daily smoke exposure in the study area using air quality, meteorological, and satellite image data.

In the third step, a Geographically Weighted Regression modelling will be conducted to determine exposure to PM<sub>2.5</sub> over space and time in order to precisely identify and estimate exposed areas and associated populations.

Finally, a time stratified case-crossover study design will be used to investigate the association between fire smoke-related PM<sub>2.5</sub> and selected adverse health outcomes such as hospital admissions, emergency department visits and ambulance callouts due to respiratory and cardiovascular diseases.

## A Registry-based Algorithm to Predict Ejection Fraction in Electronic Health Records

**Authors:** Alicia Uijl<sup>1,2,3</sup>, Lars Lund<sup>2,4</sup>, Ilonca Vaartjes<sup>1</sup>, Jasper Brugts<sup>5</sup>, Gerard Linssen<sup>6</sup>, Folkert Asselbergs<sup>3,7,8</sup>, Arno Hoes<sup>1</sup>, Ulf Dahlstrom<sup>9</sup>, Stefan Koudstaal<sup>3,7</sup>, Gianluigi Savarese<sup>2</sup>

**Affiliations:** <sup>1</sup>Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, the Netherlands, <sup>2</sup>Division of Cardiology, Department of Medicine, Karolinska Institutet, Stockholm, Sweden, <sup>3</sup>Health Data Research UK London, Institute for Health Informatics, University College London, United Kingdom, <sup>4</sup>Heart and Vascular Theme, Karolinska University Hospital, Stockholm, Sweden, <sup>5</sup>Department of Cardiology, Erasmus University Medical Center, Thoraxcenter, Rotterdam, The Netherlands, <sup>6</sup>Department of Cardiology, Hospital Group Twente, Almelo and Hengelo, The Netherlands, <sup>7</sup>Department of Cardiology, Division Heart & Lungs, University Medical Center Utrecht, Utrecht University, the Netherlands, <sup>8</sup>Institute of Cardiovascular Science, Faculty of Population Health Sciences, University College London, London, United Kingdom, <sup>9</sup>Department of Cardiology and Department of Medical and Health Sciences, Linköping University, Linköping, Sweden

### Abstract:

**Background:** Left ventricular ejection fraction (EF) is required to categorize heart failure (HF) [i.e. HF with preserved (HFpEF), mid-range (HFmrEF) and reduced (HFrEF) EF], but is often not captured in electronic health records (EHRs). The aim was to create an algorithm that identifies EF phenotypes for research purposes.

**Methods:** We included 42,061 HF patients from the Swedish Heart Failure Registry. As primary analysis we performed two logistic regression models including 22 variables to predict 1) EF  $\geq$  vs.  $<$ 50%; and 2) EF  $\geq$  vs.  $<$ 40%. In the secondary analysis we performed a multivariable multinomial analysis with 22 variables to create a model for all 3 separate EF phenotypes: HFrEF vs. HFmrEF vs. HFpEF. The models were validated in the database from the CHECK-HF study, a cross-sectional survey of 10,627 patients from the Netherlands.

**Results:** The C-statistic (discrimination) was 0.775 (95% confidence interval 0.770 - 0.780) for EF  $\geq$ 50%, and 0.757 (95% CI 0.752 - 0.763) for EF  $\geq$ 40%. Similar results were achieved for HFrEF and HFpEF in the multinomial model, but the c-statistic for HFmrEF was lower: 0.633 (95% CI 0.627 - 0.640). The external validation showed similar discriminative ability to the development cohort.

**Conclusion:** Routine clinical characteristics can be used to identify different EF phenotypes in EHRs where EF is not documented. Accuracy was good for the prediction of HFpEF and HFrEF but lower for HFmrEF. The proposed algorithm enables more effective research on heart failure in the big data setting.

## Imputation Strategies To Handle Missing Data On An Individual Patient Level.

**Authors:** Steven Nijman<sup>1</sup>, Katrien Groenhof<sup>1</sup>, Michiel Bots<sup>1</sup>, Carl Moons<sup>1</sup>, Folkert Asselbergs<sup>2,3,4</sup>, Thomas Debray<sup>1</sup>

**Affiliations:** <sup>1</sup>Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, Utrecht, The Netherlands, <sup>2</sup>Department of Cardiology, Division Heart & Lungs, University Medical Center Utrecht, Utrecht University, Utrecht, The Netherlands, <sup>3</sup>Institute of Cardiovascular Science, Faculty of Population Health Sciences, University College London, London, United Kingdom, <sup>4</sup>Health Data Research UK, Institute of Health Informatics, University College London, London, United Kingdom

### Abstract:

**Background:** Cardiovascular risk management (CVRM) guidelines support and advocate the use of prediction models to estimate the risk of a cardiovascular event. Prediction models require complete data to calculate absolute risk in individual patients, which can be challenging in clinical practice. We developed and evaluated three strategies to handle missing predictors on an individual level in a live setting.

**Methods:** We used an existing prediction model (SMART) to predict the ten year risk of a cardiovascular event in the Utrecht Cardiovascular cohort (UCC). We used the UCC data (N=3880) to simulate different situations in which (1) a single predictor, (2) clustering of predictors based on characteristics and type (i.e. laboratory measurements such as glomerular filtration rate and lipids) or (3) a combination of multiple clusters (i.e. anthropometric and laboratory measurements) are missing at random in clinical practice. The imputation models were based on: (1) mean/median values, (2) normal approximation of the joint distribution, or (3) a series of conditional models. The primary outcome was the precision of the imputed values based on the mean squared error.

**Results:** Mean imputation led to a higher mean squared error when compared to joint distribution and conditional models.

**Conclusion:** Imputation based on normal approximations or conditional distributions are preferred when handling missing predictor values in a clinical setting. Next steps are incorporation of the models in a CVRM computerized decision support system to promote use in clinical practice and calibrate models on different patient populations to enhance scalability.

## Using politicians' relative survival to examine the history of income-related health inequalities

**Authors:** Prof Adrian Barnett<sup>1</sup>, Dr An Tran-Duy<sup>2</sup>, Mr Jay Stiles<sup>2</sup>, Prof Philip Clarke<sup>2,3</sup>

**Affiliations:** <sup>1</sup>Queensland University of Technology, Brisbane, Australia, <sup>2</sup>University of Melbourne, Melbourne, Australia, <sup>3</sup>University of Oxford, Oxford, England

### Abstract:

**Background:** Income-related health inequalities have long been studied with most research finding longer lives for wealthier people. There has been less research on the long-term history of health-inequalities, because prospectively collected data on both individual health status and income have only been available since the 1970s. We examined a long time period by comparing the survival of politicians with the populations they represented. Politicians generally have high incomes, and many countries have good historical records of their births, elections and deaths.

**Methods:** We matched each politician to annual population life tables using: country, year at risk, age at risk and sex. We then calculated: 1) annual standardised mortality ratios (SMRs), and 2) relative survival post-election. We plotted the SMRs over time and used splines to estimate smooth historical changes. We used animations for sensitivity analyses that varied the follow-up time and age at follow-up to investigate potential biases due to unrecorded deaths.

**Results:** We included over 30,000 politicians in seven countries. The earliest years of available data ranged from 1816 in France to 1947 in Austria. In most countries the SMR was close to 1 in the early half of the 20th century, followed by a growing inequality over time, with politicians living longer from the 1950s onwards. In every country politicians' relative survival increased after their election.

**Conclusions:** We hypothesise that the higher average income of politicians meant they benefited more from the post-war advances in health such as reductions in smoking.

## Methodological improvements in the Australian Burden of Disease Study 2015

**Authors:** Julianne Garcia<sup>1</sup>, Australian Burden of Disease Study team<sup>1</sup>

**Affiliations:** <sup>1</sup>Australian Institute of Health and Welfare, Canberra, Australia

### Abstract:

**Background:** The Australian Burden of Disease Study (ABDS) 2015 estimated the impact of 216 separate diseases and injuries and the contribution of 38 risk factor exposures on the health of the Australian population in 2003, 2011 and 2015. Total, non-fatal and fatal burden were estimated for each reference year using consistent methods.

**Methods:** A review of current ABDS data inputs and methods was conducted, alongside reviews of recent iterations of the Global Burden of Disease study and disease-specific epidemiologic literature. Where data, methodologies or epidemiological knowledge to inform methods had improved since the previous study, these were implemented in the ABDS 2015 and estimates for 2011 and 2003 were revised for comparability.

**Results:** Key changes for the ABDS 2015 included a more comprehensive list of diseases and risk factors, new data sources for many diseases and greater use of linked hospital and deaths data. Revisions were made to models for estimating non-fatal burden and to risk factor methodologies in line with changes to the disease or risk factor list or due to new evidence. New analyses on health-adjusted life expectancy were included in this study.

**Conclusions:** The AIHW continues to monitor the methods used in other burden of disease studies and revise methodologies to ensure that the most relevant data and disease models are incorporated.

### 3C – Risk factors, burden and chronic disease

Plaza Room P11, 10:30am - 12:00pm

#### The burden of disease and injury in Australia, 2015: overall results

**Authors:** Julianne Garcia<sup>1</sup>, Australian Burden of Disease Study team<sup>1</sup>

**Affiliations:** <sup>1</sup>*Australian Institute of Health and Welfare, Canberra, Australia*

##### Abstract:

**Background:** Understanding the impact of disease and injury in Australia is essential for informing health policy. The Australian Burden of Disease Study (ABDS) 2015 estimated the health impact of 216 diseases and injuries on the Australian population. Burden of disease describes the impact of living with and dying prematurely from different diseases or injuries.

**Methods:** Burden of disease measures years of healthy life lost from living with (non-fatal) and dying prematurely from (fatal) disease and injury. Fatal and non-fatal burden combined provides the total burden, measured in disability-adjusted life years (DALY). One DALY equals 1 year of healthy life lost. Disease burden was estimated for the years 2015, 2011 and 2003 for Australia and by state/territory, remoteness and socioeconomic areas for 2011 and 2015.

**Results:** In 2015, 4.8 million years of healthy life were lost from disease and injury. For the first time, Australians lost more healthy years from living with disease compared to dying prematurely. The five leading causes of burden were coronary heart disease, back pain, chronic obstructive pulmonary disease, dementia and lung cancer. A 20% reduction in burden could be achieved if all Australians experienced the same health burden as the most advantaged socioeconomic group. The burden in Remote and Very remote areas combined is 40% higher than in Major cities.

**Conclusions:** Overall, living with the impact of chronic diseases contributed substantial burden in Australia in 2015, however burden is not experienced equally across Australia.

#### WA Burden of Disease Study: better evidence for informing state policies

**Authors:** Wendy Sun<sup>1</sup>, Ann-Marie Chapman<sup>1</sup>, Jennifer Girschik<sup>2</sup>, Stella Serafino<sup>1</sup>, Karen Bishop<sup>3</sup>, Melanie Dunford<sup>3</sup>, Vanessa Prescott<sup>3</sup>, Julianne Garcia<sup>3</sup>, Parveen Fathima<sup>1</sup>, Laura Kirkland<sup>1</sup>

**Affiliations:** <sup>1</sup>*Department Of Health WA, East Perth, Australia*, <sup>2</sup>*International Agency for Research on Cancer, , France*, <sup>3</sup>*Australian Institute for Health and Welfare, Canberra, Australia*

##### Abstract:

**Background:** Estimates produced from burden of disease (BoD) studies are the gold standard for policy-relevant evidence. While providing vital national and state level BoD estimates, the Australian BoD study (ABDS) lacks granular information for decision-makers in state government who have the responsibility of providing many health services. ABDS may not use the best jurisdictional data, as the methods must be comparable across all jurisdictions.

**Methods:** The WA Department of Health conducted the WA BoD Study (WABoDS) using the best data in WA to generate fatal and non-fatal measures for over 200 diseases and injuries. The main inputs for the non-fatal measures were state- and sub-state-specific disease point-prevalence estimates. The estimated non-fatal burden from WABoDS and the ABDS 2015 for WA were compared, and the implications for government decision making, considered.

**Results:** State-based epidemiological studies and surveys provided better representations of WA populations and better estimations of age, sex and geographical distributions. The granular data was important when investigating burden of specific population groups, including the WA Indigenous and health region populations. The point-prevalence estimates used in two studies varied, with diseases in the cardiovascular, blood and metabolic disorders, skin and respiratory groups have the largest difference. As a result, there were differences in non-fatal burden outcomes and rankings for diseases.

**Conclusion:** Robust data for specific population groups and smaller geographical areas have the advantage of identifying tailored health interventions. The WABoDS provides the best basis for the understanding of WA's burden of disease, and that of sub-state comparison within WA.

#### Changes in disease burden over time in Australia, 2003–2015

**Authors:** Anna Reynolds<sup>1</sup>, Australian Burden of Disease Study team<sup>1</sup>

**Affiliations:** <sup>1</sup>*Australian Institute of Health and Welfare, Canberra, Australia*

##### Abstract:

**Background:** The Australian Burden of Disease Study (ABDS) 2015 estimated the impact of 216 separate diseases and injuries on the health of the Australian population in 2003, 2011 and 2015. Total, non-fatal and fatal burden were estimated for each year.

**Methods:** Burden of disease analysis measures the impact of disease and injury in a population by estimating the amount of 'disability-adjusted life years' (DALY). This measure counts the combined years of healthy life lost due to living with and dying prematurely from disease and injury. This study provides new estimates for each reference year using consistent methods. The change in burden over time was determined at the disease group and individual disease/injury levels.

**Results:** After accounting for the increase in size and ageing of the population, by using age standardised rates (ASR), there was an 11% decrease in the rate of burden (DALY) between 2003 and 2015 (from 208 to 184 DALY per 1,000 population). Most of the improvement in total burden over this period resulted from a large reduction (20%) in the ASR of fatal burden (from 111 to 89 YLL per 1,000 population). This was due to preventing or delaying deaths from many diseases and injuries. The overall ASR of non-fatal burden was similar between 2003 and 2015 (97 and 95 YLD per 1,000 population, a 2% reduction).

**Conclusions:** Overall burden of disease declined between 2003 and 2015, due to a large reduction in burden from dying prematurely. There were limited improvements in burden from living with disease.

### **Binge drinking and cause-specific mortality in an Australian cohort of 181,899 participants.**

**Authors:** Dr Peter Sarich<sup>1,2</sup>, Prof Karen Canfell<sup>1,2,3</sup>, Mr Sam Egger<sup>1,2</sup>, Prof Emily Banks<sup>4,5</sup>, Dr Grace Joshy<sup>4</sup>, Mr Paul Grogan<sup>1,2</sup>, Dr Marianne Weber<sup>1,2</sup>

**Affiliations:** <sup>1</sup>Cancer Research Division, Cancer Council NSW, KINGS CROSS, Australia, <sup>2</sup>Sydney School of Public Health, The University of Sydney, THE UNIVERSITY OF SYDNEY, Australia, <sup>3</sup>Prince of Wales Clinical School, University of New South Wales, UNIVERSITY OF NEW SOUTH WALES, Australia, <sup>4</sup>National Centre for Epidemiology and Population Health, Australian National University, THE AUSTRALIAN NATIONAL UNIVERSITY, Australia, <sup>5</sup>Sax Institute, HAYMARKET, Australia

#### **Abstract:**

**Background:** For many causes of death, the association of alcohol, and in particular pattern of drinking, with mortality remains unclear.

**Methods:** Cox proportional hazards models were used to calculate hazard ratios (HR) for cause-specific mortality risk in relation to overall alcohol consumption and patterns of drinking, accounting for overall alcohol consumption among 181,899 participants aged  $\geq 45$  years (2006-2009) in the 45 and Up Study.

**Results:** In a median follow-up of nine years, 12,690 deaths were captured to August 2017. Increasing levels of overall alcohol consumption were associated with increased risk of all-cause mortality (HR for  $>28$  drinks/week: 1.18; 95% confidence interval: 1.07-1.03), and death from alcohol-related cancers combined (1.61; 1.14-2.26), oesophageal cancer (3.27; 1.41-7.59), liver cancer (2.15; 1.03-4.48), cardiovascular disease (1.31; 1.05-1.63), digestive system disease (3.33; 2.00-5.54) and liver disease (10.2; 3.73-28.1). A significant trend of increased risk with increasing drinks per week was observed for mouth, pharyngeal and laryngeal cancer. After adjusting for overall alcohol intake, binge drinking (as measured by drinks per drinking-day) was independently associated with risk of all-cause mortality (1.14; 1.00-1.31 for  $>4$  drinks/drinking-day vs.  $\leq 1$ ), and death from any cancer (1.36; 1.08-1.72), alcohol-related cancers combined (1.89; 1.16-3.08), colorectal cancer (2.47; 1.34-4.56) and pancreatic cancer (2.31; 1.12-4.74). A significant trend of increased risk with increasing number of drinks consumed on drinking-days was observed for death from cerebrovascular disease.

**Conclusions:** Binge drinking and concentrating drinking on fewer days per week increased mortality risk independent of the risk associated with overall alcohol consumption. Further research is required to inform policy responses to reduce the chronic disease harms of binge-drinking.

### **Socioeconomic trajectories over the life course and adult dental health problem: A 30-year longitudinal study**

**Authors:** Dr Mohsina Khatun<sup>1</sup>, Associate Professor Abdullah Al Mamun<sup>2</sup>, Emeritus Professor Jake Najman<sup>2</sup>

**Affiliations:** <sup>1</sup>Queensland Health, Brisbane, Australia, <sup>2</sup>The University of Queensland, Brisbane, Australia

#### **Abstract:**

**Background:** In the life-course epidemiology, exposure to risk factors at various life stages are likely to accumulate over the lifespan of an individual. The aim of this study was to investigate the relative impacts of the socio-economic status operating throughout the life course on young adult dental health.

**Methods:** We analyzed 2000 adult, aged 30 years from the Mater-University of Queensland Study of Pregnancy, for whom relevant data were collected at birth, 6-months, 5, 14, 21 and 30 years prospectively. Parental income and maternal education were collected at each follow-up. Offspring reported their dental loss at 30 years and their other dental problems and health behavior were reported at 5, 14 and 21 years. Three income trajectories (consistently low, low to high and consistently high income) were identified using the group-based trajectory modelling to predict dental loss at 30 years. Offspring's own income, education and their dental health at childhood and adolescent were considered as mediating factors.

**Results:** One in four adults extracted at least one teeth by age 30 years. Consistently low income in early childhood, adolescent and young adulthood predicts 30 years loss of teeth (adjusted total effect, OR 1.66; 95% CI 1.15, 2.38). Offspring own income, education, and dental health problems in childhood and adolescent mediated 38% of the total effect.

**Conclusions:** Exposure to poverty, in the form of low income, in early life and other stages of the lifespan has a harmful effect on dental health. Reducing poverty may improve adult dental health.

## Exposure to grass pollens and respiratory outcomes: use of eDNA in UK

**Authors:** Associate Professor Nicholas Osborne<sup>1,2,3</sup>, Dr Francis Rowney<sup>3</sup>, Dr Caitlin Potter<sup>4</sup>, Dr Georgina Brennan<sup>5</sup>, Dr Theo Economou<sup>6</sup>, Dr Rachel McInnes<sup>7,3</sup>, Prof Simon Creer<sup>5</sup>, Dr Gareth Griffith<sup>4</sup>, Prof Carsten Skjøth<sup>8</sup>, Dr Natasha De Vere<sup>9,4</sup>, Yolanda Clewlow<sup>7</sup>, Adam Barber<sup>7</sup>, Helen Hanlon<sup>7</sup>, Dr Matt Hegarty<sup>4</sup>, Laura Jones<sup>9,5</sup>, Dr Alexander Kurganskiy<sup>8</sup>, Charlotte Armitage<sup>10</sup>, Dr Beverley Adams-Groom<sup>8</sup>, Col Ford<sup>9</sup>, Dr Geoff Petch<sup>8</sup>, Dr Ben Wheeler<sup>3</sup>, The PollerGEN Consortium<sup>1,2,3,4,5,6,7,8,9,10</sup>

**Affiliations:** <sup>1</sup>University of Queensland, Herston, Australia, <sup>2</sup>University of New South Wales, Kensington, Australia, <sup>3</sup>European Centre for Environment and Human Health, University of Exeter, Truro, UK, <sup>4</sup>Aberystwyth University, Aberystwyth, UK, <sup>5</sup>Molecular Ecology and Fisheries Genetics Laboratory, Bangor University, Bangor, UK, <sup>6</sup>Department of Mathematics, University of Exeter, Exeter, UK, <sup>7</sup>Met Office, Exeter, UK, <sup>8</sup>Institute of Science and the Environment, University of Worcester, Worcester, UK, <sup>9</sup>National Botanic Garden of Wales, Middleton Hall, UK, <sup>10</sup>The Woodland Trust, Grantham, UK

### Abstract:

**Background:** Respiratory outcomes such as asthma exacerbations and allergic rhinitis are often attributed to outdoor allergens such as grass pollen. Until recently, all grass pollen taxa were measured as one, as microscopy was unable to separate them at the species or genus level. New technologies with environmental DNA now allow characterisation of grass pollen concentrations at species level.

**Methods:** Health data were gathered from hospital episode statistics for attendance with asthma and prescribing rates at GPs for respiratory antihistamines, both with spatial and temporal markers. Grass pollen was collected at a range of sites May to September (6 in 2016, 13 in 2017) and the changing abundances of nine common grass species were measured using quantitative PCR methods. Generalised additive models were used to assess associations between different types of grass pollen and respiratory health outcomes. Models were adjusted for weather, air pollution, rural-urban, deprivation, health organisation and time period.

**Results:** Initial models indicate that relationships with respiratory public health outcomes (prescribing and admissions) vary between grass species/genera. Furthermore, response curves for overall grass pollen concentrations (i.e. standard pollen 'counts' via microscopy) are distinct from those of individual species/genera.

**Conclusions:** Grass species/taxa were found to contribute to total pollen load in different proportions at different times of year. Certain grass taxa may contribute more than others to respiratory health outcomes in the UK. A range of reasons could contribute to some species being more allergenic than others, including protein structure, ability to shatter when wet and concentration of allergenic proteins.

## Multimorbidity Index Trajectories and Health Service Use: a Data Linkage Study

**Authors:** MS Jeeva Kanesarajah<sup>1</sup>, Dr Michael Waller<sup>1</sup>, Professor Jennifer Whitty<sup>1,2</sup>, Professor Gita Mishra<sup>1</sup>

**Affiliations:** <sup>1</sup>The University of Queensland, Brisbane, Australia, <sup>2</sup>University of East Anglia, Norwich, United Kingdom

### Abstract:

**Introduction:** Multimorbidity is common, becoming the norm, and emerging earlier in adult life. Acceleration of multimorbidity occurs in mid-life which may impact women's health service use. Little is known of how multimorbidity progresses over time, and the implications of these trajectories for health service use at mid-life.

**Methods:** Multimorbidity trajectories were derived from 5 survey waves from the Australian Longitudinal Study on Women's Health (2004 to 2016) for 10128 mid-age women, using repeated measures latent class analysis. Survey data was linked to administrative data from the Medicare Benefits Schedule and hospital admissions data from three Australian states (n=5913, records from 2003 to 2017). Negative binomial mixed effects models were employed to examine the association between multimorbidity trajectories and annual number of General Practice (GP) services used, and hospital length of stay in days, separately.

**Results:** Five multimorbidity trajectory groups were identified and ordered based on increasing negative impact on health related quality of life (HrQoL): Constant, low (17%), Later transition between low to medium (9%), Constant, medium (23%), Transitions between medium and high (32%), Constant, high (19%). Health service use for all groups increased over the 12-year period, and in a dose-response manner. Those on higher impact groups used double the number of GP services and stayed twice as long in hospital, than the Constant, low group, over the 12-year period.

**Conclusion:** Those with severe multimorbidity used more services, earlier in the mid-life period. Health service planning should consider women's multimorbidity burden over time, to meet this differential need.

## Poster Presentations P2

Plaza Room P9 - P11 Foyer, 12:15pm - 1:15pm

### P2.001- Heart Failure Characteristics, Treatment and Survival: European Comparison in Electronic Health Records

**Authors:** [Alicia Uijl](#)<sup>1,2,3</sup>, Gianluigi Savarese<sup>2</sup>, Jose Holgado<sup>4</sup>, Ilonca Vaartjes<sup>1</sup>, Lars Lund<sup>2,5</sup>, Ulf Dahlstrom<sup>6</sup>, Josep Rendon<sup>4</sup>, Arno Hoes<sup>1</sup>, Folkert Asselbergs<sup>3,7,8</sup>, Stefan Koudstaal<sup>3,7</sup>

**Affiliations:** <sup>1</sup>Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, the Netherlands, <sup>2</sup>Division of Cardiology, Department of Medicine, Karolinska Institutet, Stockholm, Sweden, <sup>3</sup>Health Data Research UK London, Institute for Health Informatics, University College London, United Kingdom, <sup>4</sup>Big Data Group, INCLIVA Health Research Center, Hospital Clínico Universitario, University of Valencia, Valencia, Spain, <sup>5</sup>Heart and Vascular Theme, Karolinska University Hospital, Stockholm, Sweden, <sup>6</sup>Department of Cardiology and Department of Medical and Health Sciences, Linköping University, Linköping, Sweden, <sup>7</sup>Department of Cardiology, Division Heart & Lungs, University Medical Center Utrecht, Utrecht University, the Netherlands, <sup>8</sup>Institute of Cardiovascular Science, Faculty of Population Health Sciences, University College London, London, United Kingdom

#### Abstract:

**Background:** Recognition is growing for comparative effectiveness research to improve quality and outcomes of health care. International comparisons of whole health care systems might yield important knowledge of distinct differences in heart failure (HF) care.

**Methods:** We compared HF care of incident inpatients between 1 January 2008 and 31 December 2016 across 3 different countries: United Kingdom (UK) with linked electronic health records (EHR) called CALIBER, Spain with linked EHR (ABUCASIS) in the Valencia region and Sweden with the Swedish heart failure registry (SwedeHF). Patient characteristics are based on the International Statistical Classification of Diseases version 10 (ICD-10) and version 9 (ICD-9) and were mapped through the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) in order to enable the standardized comparison between the different datasets without the exchange of data.

**Results:** We included 44,535 patients from the UK with median age of 79.1 years [interquartile range (IQR) 69.4–86.0] and 47.8% women, 47,599 patients from Valencia, Spain, with median age of 77.9 years [IQR 72.0–86.0] and 51.6% women, lastly 15,159 patients were included from Sweden with a median age of 79.0 years [IQR 68.0–86.0] and 44.1% of women. The crude survival rate was highest in Sweden and lowest in Spain. Further analyses will commence in patients standardized for baseline characteristics.

**Conclusion:** We were able to map baseline characteristics of patients from different European countries. In unadjusted analyses we observed differences in HF care and survival between European countries.

### P2.002- Metabolic changes in cardiac patients after left ventricular assist-device implantation: Systematic review

**Authors:** [Mr Krishnaa Sivapalan](#)<sup>1,2</sup>, Miss Regina Yu<sup>1</sup>, Professor Adèle Green<sup>1</sup>, Dr Kyoko Miura<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer and Population Studies Group, QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>2</sup>Faculty of Medicine, University of Queensland, Brisbane, Australia

#### Abstract:

**Background:** Left ventricular assist devices (LVADs) are effective in the management of heart failure, and an interim alternative to heart transplantation. However, after LVAD implantation, changes in body weight and glucose metabolism can occur that affect health and potential candidature for transplantation. However, findings about the direction and magnitude of weight and metabolic changes are conflicting and we therefore comprehensively reviewed all relevant published evidence.

**Methods:** We searched PubMed and Embase to February 2019. Cohort studies that assessed change in body mass index (BMI), blood glucose and glycated haemoglobin (HbA1c) from pre- to at least 3 months post-LVAD implantation in adults were eligible.

**Results:** Of 846 studies identified, 90 full articles were reviewed, and 7 studies (5 retrospective, 2 prospective) were deemed eligible. Of 3 studies that reported BMI change in diabetic patients at 6 months post-LVAD implantation, one reported a reduction in mean BMI (–0.9 kg/m<sup>2</sup>) while two reported increases (+0.4, +1.5 kg/m<sup>2</sup>). One study of BMI in obese patients observed a reduction (–4.3 kg/m<sup>2</sup>), and all 4 studies of blood glucose in diabetic patients reported reductions in glucose levels (–14 to –54 mg/dL) and HbA1c (–1.4 to –1.7%) 6 months following LVAD implantation. Six of the 7 studies used incorrect statistical methodology to assess changes in outcomes, and thus actual magnitude of changes are unknown.

**Conclusion:** Currently available evidence is inadequate to assess the extent of changes in weight and glucose markers in patients who receive an LVAD.

### **P2.003- Impact of dementia on health service use**

**Authors:** Professor Annette Dobson<sup>1</sup>, Dr Michael Waller<sup>1</sup>, Richard Hockey<sup>1</sup>, Dr Xenia Dolja-Gore<sup>2</sup>, Peta Forder<sup>2</sup>, Professor Julie Byles<sup>2</sup>

**Affiliations:** <sup>1</sup>University Of Queensland, Brisbane, Australia, <sup>2</sup>University of Newcastle, Newcastle, Australia

#### **Abstract:**

**Background:** It is known that health service use among older people increases with comorbidity and proximity to death. We hypothesised that dementia would further increase service use, especially in the last two years of life, and we aimed to quantify the effect in the Australian context.

**Methods:** We used survey data and linked administrative health data for participants in the 1921-26 cohort of the Australian Longitudinal Study on Women's Health. Women with heart disease or chronic obstructive pulmonary disease, with or without dementia, were selected. We compared aged care services, GP and specialist visits and hospital admissions in the last two years of life between women throughout Australia who died and matched women with the same conditions who lived at least another two years.

**Results:** Women with dementia were more likely to live in residential aged care facilities than those without dementia. In the last 2 years of life use of residential aged care increased and community care declined. Women in residential aged care used fewer community services, were less likely to see medical specialists or be admitted to hospital, but had similar numbers of GP visits.

**Conclusion:** Service planning and comprehensive care of people living with dementia requires detailed understanding of the connections between the aged care and health sectors.

### **P2.004- Rheumatoid Arthritis and Biologic Treatment Pathways in the Australian Rheumatology Association Database**

**Authors:** Mr Ashley Fletcher<sup>1</sup>, Prof Lyn March<sup>2</sup>, Prof Marissa Lassere<sup>3</sup>, Prof Catherine Hill<sup>4</sup>, Prof Claire Barrett<sup>5</sup>, Prof Graeme Carroll<sup>6</sup>, Prof Rachele Buchbinder<sup>1</sup>

**Affiliations:** <sup>1</sup>Cabrini Health/Monash University, Malvern, Australia, <sup>2</sup>Florance and Cope Professorial Department of Rheumatology, Royal North Shore Hospital, Institute of Bone and Joint Research, University of Sydney, Sydney, Australia, <sup>3</sup>St George Hospital, University of New South Wales, Sydney, Australia, <sup>4</sup>Royal Adelaide Hospital, The University of Adelaide, The Queen Elizabeth Hospital, Adelaide, Australia, <sup>5</sup>Redcliffe Hospital, University of Queensland, Redcliffe, Australia, <sup>6</sup>Fiona Stanley Hospital, Perth, Australia

#### **Abstract:**

**Aim:** To describe current biologic disease-modifying antirheumatic drug (bDMARD) treatment patterns for Australian Rheumatology Association Database (ARAD).

**Methods:** ARAD, a voluntary longitudinal observational database established in 2001, collects long-term outcome data for people with rheumatoid arthritis (RA) in Australia. Logistic regression was used to evaluate the characteristics of participants who switched and Sankey diagrams were used to show the switching patterns. Time on first, second and third-line bDMARDs were analysed using Cox regression survival analysis methods.

**Results:** 3,470 RA participants were analysed. 47.7% starting first-line bDMARD therapy switched to another bDMARD, 50.5% switched from second-line therapies and 42.3% switched from third-line therapies. Inefficacy (55.4%) or side-effects (18.9%) were the most common reasons for stopping therapy, irrespective of line of therapy. Factors associated with switching were female gender, tertiary education, recent questionnaire year, worse quality of life (QoL) score and current opioid use. Switching due to side-effects were associated with a worse QoL and longer duration of disease than with inefficacy. Sankey diagrams show complex treatment patterns. The median time on first-line bDMARD varied from 258 days to 98 days depending on the bDMARD. Compared the largest group, etanercept, some were more likely to stop, some more likely to stay on a bDMARD for each line of therapy.

**Conclusions:** The treatment algorithm for bDMARD use in Australia is complex. Overall, around 50% of ARAD participants switch to another bDMARD therapy irrespective of the first, second or third-line bDMARD used. 55.4% stopped due to inefficacy and 18.9% due to side-effects.

### **P2.005- Developing a social accountability measure in dentistry: An exploratory factor analysis approach.**

**Authors:** Dr Jiaxu Zeng<sup>1</sup>, Vivian Chen, Calum Fisher, Barry Gibson, Karl Lyons, John McMillian, Dr Lyndie Foster

**Affiliations:** <sup>1</sup>University Of Otago, Dunedin, New Zealand

#### **Abstract:**

**Background:** Although social accountability of dental education is crucial to the development and sustainability of dentistry, there currently exists no measures of social accountability in dentistry. The Training for Health Equity network has developed the Medical Students Attitudes Towards the Underserved (MSATU) questionnaire for measuring the social accountability of health professionals, this questionnaire however, was developed for medical education. Therefore, the validity of the questionnaire in a dental context needs to be explored.

**Methods:** A modified MSATU questionnaire was proposed in a previous study to fit students in dentistry. The modified questionnaire consists of twenty-one questions, which assess people's attitudes towards social accountability from four domains: societal expectations (seven items), dentist/dental student responsibility (six items), personal efficacy (eight items) and access to care (two items). In this study, a total number of 155 second year or final year students in dental school, University of Otago, were invited to complete the modified questionnaire. An exploratory factor analysis was then performed to assess the validity of the questionnaire.

**Results:** Most items from the questionnaire were loaded on factor one and many items were loaded on more than one domain. This suggests that instead of three domains underpinning the concept of social accountability, only one domain may exist.

**Conclusion:** The finding suggests that the modified questionnaire may not be appropriate for measuring social accountability in a dental educational environment.

### **P2.006- An analysis of knee osteoarthritis information for Australian consumers and health professionals**

**Authors:** Miss Shih-yin Cheng<sup>1</sup>, Associate Professor Alison Marshall<sup>1</sup>, Dr Kaeleen Dingle<sup>1</sup>

**Affiliations:** <sup>1</sup>Queensland University Of Technology, Brisbane, Australia

#### **Abstract:**

**Background:** Although exercise therapy has been identified as the most effective first-line treatment for people with knee osteoarthritis (OA), compliance remains low among consumers. Due to the inadequacy of online health information, this study aimed to investigate and understand information given to consumers for conducting exercise therapy, and whether current clinical guidelines and position statements recommended to clinical practitioners meet consumers' needs in health information.

**Methods:** This study analysed website information for consumers and official clinical documents. To identify Australian-based websites and official documents for reviewing and analysing, the search was conducted using Google Search engine. Furthermore, a literature search regarding consumers' perceived needs in health information was conducted on electronic databases to enhance the understanding of their needs and develop the assessment questions on the website information and official documents.

**Results:** Eleven websites and ten official documents met the inclusion criteria and were analysed with the questions regarding consumers' needs. Five websites provided explicit health information about OA management consistent with the suggestion in current guidelines for consumers. While most of the included official documents recommended conservative treatments, the findings indicated insufficient information about viable prescription dosage.

**Conclusions:** Currently, despite the availability of websites and official documents strongly recommending conservative treatments as primary interventions for OA management, the information provided to consumers and clinicians were inadequate to be complied. Developing a guideline that provides specific instructions could assist clinicians to discuss exercise therapy more confidently with their clients. It may also benefit developing consumer-oriented websites to promote exercise therapy.

### **P2.007- Psychosocial work stressors and risk of mortality: A systematic review and meta-analysis**

**Authors:** Ms Yamna Taouk<sup>1</sup>, Associate Professor Allison Milner<sup>1</sup>, Associate Professor Matthew Spittal<sup>1</sup>, Professor Anthony LaMontagne<sup>2</sup>

**Affiliations:** <sup>1</sup>Melbourne School of Population and Global Health, The University of Melbourne, Parkville, Australia, <sup>2</sup>Centre for Population Health Research, Deakin University, Burwood, Australia

#### **Abstract:**

**Introduction:** Psychosocial work stressors are common exposures affecting the working population and there is good evidence that they have adverse health consequences. There is some evidence that they may impact on mortality, but this has not been systematically examined. We performed a systematic review, including risk of bias, and meta-analyses of observational studies to examine the association between psychosocial work stressors and all-cause mortality and death due to coronary heart disease (CHD).

**Methods:** Electronic databases were searched to identify studies and information on study characteristics and outcomes extracted in accordance with PRISMA guidelines. Risk estimates of outcomes associated with psychosocial work stressors: specifically, all-cause mortality, and death due to CHD were pooled using inverse variance weighted random effects meta-analysis.

**Results:** 45 eligible cohort studies were identified, of which 32 were included in the quantitative analyses of psychosocial work stressors and mortality. Low job control was associated with an increased risk of all-cause mortality (HR=1.21, 95% confidence interval 1.07 to 1.37), CHD mortality (1.50, 1.42 to 1.58). High job demands was associated with reduced mortality (all-cause mortality: 0.93, 0.81 to 1.08; CHD mortality: 0.89, 0.61 to 1.29) and an elevated risk of mortality was observed for job strain (all-cause mortality: 1.07, 0.82 to 1.39; CHD mortality: 1.31, 0.91 to 1.88).

**Conclusions:** Workers with low job control are at increased risk of all-cause and CHD mortality compared to workers with high job control. Policy and practice interventions to improve job control could contribute to reductions in all-cause and CHD mortality.

## **P2.008- Treatment Prescription Patterns in Real-World Heart Failure Patients using Electronic Health Records**

**Authors:** Alicia Uijl<sup>1,2,3</sup>, Stefan Koudstaal<sup>3,4</sup>, Ilonca Vaartjes<sup>1</sup>, Arno Hoes<sup>1</sup>, Folkert Asselbergs<sup>3,4,5</sup>

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### **Abstract:**

**Background:** The objective of this study was to examine temporal heart failure (HF) treatment prescription patterns in a large representative sample of real-world patients in the United Kingdom (UK), considering there is currently limited information on real-world HF management.

**Methods:** We selected 99,961 patients between 1 January 1998 and 31 December 2015 from the CALIBER resource (Cardiovascular research using Linked Bespoke studies and Electronic health Records). The median follow-up was 2.7 years [IQR 0.9; 5.6]. Treatment initiation of drug prescription after HF diagnosis was identified until the end of follow-up for: RAS-inhibitors, beta-blockers, MRA and loop diuretics. We will apply an algorithm on routine clinical characteristics to define HF ejection fraction subphenotypes.

**Results:** Overall, medication prescription increases for almost all types of medication, except loop diuretics which showed a decrease and RAS-inhibitors which show a stagnation after 2008. The prescription rate is lower for women compared to men for all types of medication, except loop diuretics. The largest differences between men and women were observed in the youngest patients. Elderly showed lower prescription rates compared to younger patients, differences between men and women were less pronounced.

**Conclusion:** the HF treatment prescription rate has increased over time, regardless of ejection fraction. From literature, it is known that different HF phenotypes are treated similarly, even in the absence of evidence-based recommendations. Further analyses will show results for different HF phenotypes.

## **P2.009- Risk Factors of Hypertension: A Cohort Study in Central Bogor, Indonesia**

**Authors:** Marice Sihombing<sup>1</sup>

**Affiliations:** <sup>1</sup>Center For Research And Development Of Resources And Health Services, Jakarta, Indonesia, Jakarta, Indonesia

### **Abstract:**

**Background:** Hypertension is a major contributor to cardiovascular disease. The prevalence of hypertension is rising in the world including Indonesia. This study aims to obtain the risk factors for newly diagnosed hypertension respondents in Cohort Study of Risk Factors for Non-Communicable Diseases in Central Bogor.

**Methods:** We conducted a prospective study, sample was respondents from baseline data Cohort Study 2011-2012 that they were not diagnosed hypertensive with JNC VII criteria, and not diabetes mellitus with ADA criteria (3984 persons), conducted follow-up for 6 years. Data collected by interviews, physical examinations (weight, height, abdominal circumference, blood pressure), and laboratories (fasting plasma glucose and 2 hours after loading 75 g of glucose, total cholesterol, HDL, LDL, triglycerides). We used multiple logistic regression for analysis and odd ratios with 95% confidence intervals were calculated to identify risk factors associated with hypertension.

**Results:** The incidence of hypertension increases every year and proportion of cumulative in 6 years was 770 persons (19.32%), 219 men (28.4%) and 551 women (71.6%). Hypertensive respondents had higher levels for fasting plasma glucose and 2 hours after loading, triglycerides and LDL than normotensive ( $p < 0.001$ ). Risk factors associated with hypertension are age  $\geq 45$  years (OR=1.31; 95% CI=1.114-1.549), obesity (OR=1.89; 95% CI=1.592-2.250), diabetes (OR=2.31; 95% CI=1.674-3.182), high LDL (OR=1.59; 95% CI=1.303-1.947), and stress (OR=2.5; 95% CI=1.985-3.166) with  $p \leq 0.05$ .

**Conclusion:** Age, obesity, diabetes, high LDL and stress are important risk factors associated with hypertension. The most of the risk factors can be modified and require prevention efforts with life style changes.

## **P2.010- Epidemiology of skin disease visits to Australian GPs: diagnosis and referral**

**Authors:** Dr Harrison Edwards<sup>1,2</sup>

**Affiliations:** <sup>1</sup>University Of Queensland, Brisbane, Australia, <sup>2</sup>Princess Alexandra Hospital, Brisbane, Australia

### **Abstract:**

**Background:** Skin conditions are one of the most common reasons for patient visits to general practitioners (GPs) in Australia, accounting for 14.8 percent of all patient visits, and six of the 26 most common new problems seen by GPs.

**Results:** GPs use six distinct diagnostic approaches to patients with skin complaints. The provisional diagnosis resulting from these six diagnostic approaches determines the course of the treatment, and possible multidisciplinary management of patients by referral to a dermatologist. Additionally, GPs may need to make decisions about the presence of psychosocial issues requiring referral to a psychologist. This includes disfiguring skin disease causing psychological symptoms of depression, low self-esteem, and suicidal ideation; psychological disorders causing dermatological symptoms such as compulsive skin picking and self-harm by cutting; and psychological disorders exacerbating dermatological symptoms such as acne worsening during stressful periods.

The six commonest skin problems referred by GPs to dermatologists from 2013-16 (the latest data) were “Malignant neoplasia”, “Other skin symptom/complaint”, “Contact dermatitis”, “Skin check-up”, “Acne”, and “Solar keratosis/sunburn”. These accounted for between 47.3% and 50.8% of all referrals to dermatologists annually during this period.

Referral rates differ for each skin disease; for example, in 2015-16, 13.8% of acne cases seen by GPs were referred to dermatologists compared to 10.4 % of malignant neoplasia and 3.8% of contact dermatitis.

From 2006-07 to 2015-16 dermatology, cardiology, and psychiatry were the only three specialties to have statistically significant referral rate increases.

**Conclusion:** Knowledge of this epidemiological data is important for trend monitoring and resource allocation.

## **P2.011- Assessing inequality of the health impacts of PM2.5 pollution and consumption-based responsibility**

**Authors:** Miss Yuhuan Zhu<sup>1</sup>, Dr. Guangwu Chen<sup>1</sup>, Dr. Ying Zhang<sup>2</sup>

**Affiliations:** <sup>1</sup>Beijing Normal University, Beijing, China, <sup>2</sup>The University of Sydney, Sydney, Australia

### **Abstract:**

Ambient fine particulate matter (PM2.5) as an environmental health risk factor is highly associated with increased mortality from non-accidental and cause-specific diseases. Much attention has been focused on the health burden of PM2.5 pollution at locations of residence where is exposed to PM2.5 (the risk for exposure), but relatively little attention has been paid to the health impact caused by PM2.5 emissions associated with the consumption of goods and services in each region, which is the cause of PM2.5 exposure (the responsibility for causation).

In this study, we explored the relations of health impacts between PM2.5 exposure and end-use activities responsible for the emission. First, we established a link between PM2.5 exposure and the individual activities ultimately responsible for the pollution, based on the provincial Multi-Regional Input-Output (MRIO) tables and household survey covering over 25,000 unique samples from China in 2012. Next, Integrated Exposure-Response (IER) models were employed to estimate the burden of disease attributable to PM2.5 from the perspectives of “exposed PM2.5” and “caused PM2.5”, respectively. Finally, we compared the results among provinces/individuals to assess inequality of the health impacts: the extent to which regions/individuals disproportionately contribute to or bear the loss of pollution.

Our findings identify the need for potential responsibility shifting in regional air pollution control strategies. Sharing the responsibility for pollution emissions among both risk-exposure groups and end-consuming groups could reduce health inequality, and assist in achieving multiple Sustainable Development Goals (SDGs).

## **P2.012- Partnerships in surgery – bringing researchers, clinicians and policy makers together.**

**Authors:** Ms Therese Rey-Conde<sup>1</sup>, Dr John North<sup>2</sup>, Ms Jenny Allen<sup>2</sup>, Ms Sonya Faint<sup>2</sup>

**Affiliations:** <sup>1</sup>Queensland Audit of Surgical Mortality, Brisbane, Australia, <sup>2</sup>Royal Australasian College of Surgeons, Brisbane, Australia

### **Abstract:**

**Background:** The health care sector is like a jigsaw – thousands of individuals striving to help people with their challenges in health. These participants in the health care sector are working separately, talking separately, thinking separately and all vying for their own share of precious healthcare dollars. BUT they all talk the same language: the language of improving the care of patients.

**Methods:** This paper will look at the competing interests of researchers: Queensland Audit of Surgical Mortality (QASM) (12,500 cases reviewed), its larger version the Australasian Audit of Surgical Mortality (ANZSM) and the researchers from the health literature.

The paper will also look at the clinicians: all Queensland surgeons (n=1,500), anaesthetists, Obstetrics and Gynaecological physicians, theatre nurses and Emergency Department staff.

The policy makers seen in this paper are: Safety and Quality experts, Chief Executive Officers (n=71), Public Hospitals (n=32), Private Hospitals (n=39) and once again - the literature.

The cement bringing these elements together in this paper are QASM's education tools: Lessons from the Audit booklets (n=36), annual reports (n=10), hospital reports (n=71), ad hoc reports to hospitals (n=1), special reports (n=2), papers (n=16), presentations, meetings and seminars (n=12).

**Results:** How effective are these measures? We think it is impossible to quantify. In twelve years, we have seen that deaths are decreasing, lengths of stay are decreasing and time to theatre is decreasing. Moving in the opposite direction, infections are increasing. Making measurement difficult, all these aspects of care have confounders – hospital care is improving, drugs are improving, nursing is improving.

**Conclusion:** This paper will show how QASM is working as a bridge between researchers, clinicians and policy makers to make the patient's surgical journey a safer one.

### **P2.013- The environmental cost of overtesting in Intensive Care Units**

**Authors:** Mr Scott McAlister<sup>1</sup>, **Professor Alexandra Barratt**<sup>2</sup>, Dr Katy Bell<sup>2</sup>, Dr Forbes McGain<sup>3,4</sup>

**Affiliations:** <sup>1</sup>The University of Melbourne, Melbourne, Australia, <sup>2</sup>Wiser Healthcare, The University of Sydney, Australia, <sup>3</sup>Western Health, Melbourne, Australia, <sup>4</sup>Planetary Health Platform, The University of Sydney, Australia

#### **Abstract:**

**Background and Aim:** Pathology and radiology testing are done routinely in Intensive Care Units (ICU). Yet early research suggests these test results infrequently change patient management. While some routine testing likely improves patient outcomes, overuse has the potential to distress and/or harm patients, waste financial resources and add unnecessarily to the carbon footprint of hospitals. Approximately 7% of Australia's total carbon footprint is attributed to healthcare, with hospitals being the major contributors. The primary aim of this project is to quantify the carbon footprint of six common ICU tests.

**Methods:** We will estimate the carbon footprint of five common pathology tests and one imaging test all of which are used daily in ICU. We use process based Life Cycle Analysis (LCA), calculating the environmental impact of each input (e.g. electricity) and each output (e.g. carbon dioxide emissions). As such, LCA captures the environmental impact of anything used in the manufacture, distribution, use and disposal of the tests. Some processes are being measured directly, whilst external inventory databases are used for background data. Data analysis (modelling) is in accordance with ISO standards (ISO 14040:2006).

**Results:** The project is in progress at Western Hospital, Melbourne, Australia. Measurements are complete and modelling is in progress. Results will be available for the conference.

**Conclusions:** The results will provide the first carbon footprint of six commonly used ICU tests. Such assessment is needed to provide the evidence base to ensure health care, especially hospitals, can shift towards more environmentally sustainable models of care.

### **P2.014- The Impact of a Hypothetical Commuter Railway Line on Diabetes Burden**

**Authors:** **Dr Soumya Mazumdar**<sup>1</sup>

**Affiliations:** <sup>1</sup>Population Health Intelligence, HPPU, SWSLHD, NSW Health, Liverpool, Australia

#### **Abstract:**

**Background:** A well-established mature literature has underscored a relationship between public transport use and greater physical activity. Policymakers in health and elsewhere are often interested in what the exact changes of disease burden (or health impact) are when a certain built environment intervention is implemented. Yet most Health Impact Assessments are not rigorous enough to provide such estimates or require the writing of complex ad-hoc software: A difficult task for many health agencies.

**Methods:** In this research we used a freely available, off the shelf dynamic simulation tool (DYNAMO-HIA) which combines aspects of macro and micro simulation to evaluate, how increased levels of walking from the introduction of a hypothetical commuter railway line to a growing peri-urban town affects the diabetes burden in the town over a period of ten years.

**Results:** The analysis established decreases in diabetes incidence and prevalence while gains in life expectancy and Disability Adjusted Life Years are found. Thus for instance the prevalence of diabetes decreased around 0.05% in the intervention scenario compared to the business as usual scenario.

**Conclusions:** This research demonstrates that quantitative health impact assessments of built environment interventions can be successfully achieved through the use of freely available software tools.

## **P2.015- Aspirin and nonsteroidal anti-inflammatory drug use and keratinocyte cancers**

**Authors:** Dr Nirmala Pandeya<sup>1</sup>, Associate Professor Catherine Olsen<sup>1</sup>, Dr Bridie Thompson<sup>1</sup>, Mr Jean Claude Dusingize<sup>1</sup>, Associate Professor Rachel Neale<sup>1</sup>, Prof Adele Green<sup>1</sup>, Prof David Whiteman<sup>1</sup>

**Affiliations:** <sup>1</sup>*QIMR Berghofer Medical Research Institute, Brisbane, Australia*

### **Abstract:**

**Background:** Nonsteroidal anti-inflammatory drugs (NSAIDs) have been postulated as chemopreventive agents for basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), but findings from observational studies have been inconsistent.

**Objectives:** To examine the association between aspirin and NSAID (nonaspirin) use and the risk of BCC and SCC in a large cohort specifically designed for skin cancer outcomes.

**Methods:** We used data from the QSkin Study, a prospective cohort of 43,764 residents of Queensland, Australia. We used Cox proportional hazards models to estimate the hazard ratios (HRs) between self-reported aspirin and NSAID use 1 year prior to study baseline and the first histologically confirmed BCC or SCC among high-risk (past skin of cancer excisions or >5 actinic lesions treated) and average-to-low-risk (no skin cancer excision and ≤5 actinic lesions treated) participants.

**Results:** After a median of 3 years follow-up, 3421 participants developed BCC and 1470 developed SCC. Among the high-risk, compared with never use, at least weekly NSAID use was associated with reduced risk of BCC (HR 0.84, 95% CI 0.71 – 0.99) but not SCC. Less than weekly use of aspirin was associated with reduced risk of SCC (HR 0.77, 95% CI 0.64 – 0.93) but not BCC. No associations were observed between NSAID or aspirin use and BCC or SCC among average-to-low-risk participants.

**Conclusions:** While some weakly inverse associations were observed between prior aspirin or NSAID use and skin cancer, the inconsistent patterns of associations do not provide convincing evidence that these medications reduce subsequent skin cancer risk.

## **P2.016 Statin use and endometrial cancer survival: a nationwide data-linkage study**

**Authors:** Dr Jia-Li Feng<sup>1</sup>, Associate Professor Susan Jordan<sup>1,2</sup>, Professor Penelope Webb<sup>1,2</sup>

**Affiliations:** <sup>1</sup>*Population Health Department, QIMR Berghofer Medical Research Institute, Brisbane, Australia*, <sup>2</sup>*School of Public Health, University of Queensland, Brisbane, Australia*

### **Abstract:**

**Background:** Evidence suggests that statins could potentially improve cancer survival but the effect on endometrial cancer (EC) is not conclusive. We therefore examined whether statins used after a diagnosis of EC are associated with the risk of EC-specific mortality.

**Methods:** From the Australian Cancer Database, we identified 16,051 women aged 18-89 years, newly diagnosed with EC in 2003-2013, with no prior and/or concurrent invasive cancers, and who survived for ≥12 months. This cohort was linked to the Pharmaceutical Benefits Scheme and National Death Index (to 2015). Cox proportional hazards models with statin use as a time-varying covariate (lagged by 1 year) were used to estimate cause-specific hazard ratios (HRs) and 95% confidence intervals (CIs) for EC-specific mortality.

**Results:** During follow-up, 3,066 women died, 1,267 from EC. We observed a weak inverse association between post-diagnosis statin use (≥2 prescriptions) and EC death (HR=0.91, 95%CI 0.80-1.03) compared to non-statin use after adjusting for age and year at diagnosis, EC type, chemotherapy, and socio-economic status. Compared to women who never used statins, the reduction in EC death was greater among new users (post-dx use only) (HR=0.68, 95%CI 0.52-0.90) with a more pronounced reduction for women with type 1 cancers (HR=0.55, 95%CI 0.39-0.78) and for use of hydrophilic statins (HR=0.58, 95%CI 0.36-0.95). Sensitivity analyses using fixed exposure periods post-dx and propensity scores yielded similar findings.

**Conclusions:** Statin use may reduce EC mortality among women who have not previously used statins but further studies that can rule out a potential healthy-user bias are required.

## **P2.017- Skin checks, sun protection and recurrent or new disease in melanoma patients**

**Authors:** Ms Maria Celia Hughes<sup>1</sup>, Dr Lena von Schuckmann<sup>1,5</sup>, Professor Kiarash Khosrotehrani<sup>2</sup>, Professor B.Mark Smithers<sup>3</sup>, Professor Adèle Green<sup>1,4</sup>

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### **Abstract:**

**Background:** Melanoma survivors are at risk of developing both a recurrence of their primary melanoma or another new melanoma. We assessed whether primary melanoma patients at high risk of metastasis who engaged in regular skin surveillance and/or sun protection could reduce their risks of recurrent or new melanoma.

**Methods:** In a cohort of patients newly diagnosed with localised melanoma showing high-risk histological features, we examined clustering of skin check and sun protection behaviours in the 5 years prior to diagnosis, by applying latent class analysis. Correlates of behaviour clusters and risks of i) melanoma recurrence and ii) subsequent new primaries within 3 years of diagnosis were then determined using Poisson and Cox proportional hazards regression.

**Results:** Among 789 high-risk primary melanoma patients, we identified 4 behaviour clusters: “no/ low skin checks/prevention” (34% of cohort), “skin checks only” (24%), “sun protection only” (26%), and “skin checks and sun protection” (16%). Prevalence of clusters, and their component behaviours, differed between males and females, and by past history of skin cancer. We found no association of behaviour clusters with recurrence at 3-year follow-up and no associations in males. In patients with a past history of cutaneous cancer, females in the “skin checks and sun protection” cluster had significantly lower risk (HR 0.15; 95% CI 0.03, 0.90) of developing a subsequent primary melanoma compared to those in the “no/ low prevention” cluster.

**Conclusion:** Our results may assist clinicians to tailor preventive advice to melanoma patients to reduce risk of new melanoma.

## **P2.018- Artificial intelligence and three-dimensional body imaging to identify naevi**

**Authors:** Dr Brigid Betz-Stablein<sup>1,2</sup>, Dr Brian D'Alessandro<sup>3</sup>, Dr Uyen Koh<sup>4</sup>, Prof Joanne Aitken<sup>5,6,7,8</sup>, Prof Rainer Hofmann-Wellenhofer<sup>9</sup>, Prof Monika Janda<sup>4,10</sup>, Prof Scott Menzies<sup>14</sup>, Prof Green AC<sup>1,11,12</sup>, Prof Soyer HP<sup>2,12,13</sup>

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### **Abstract:**

**Background:** Number of melanocytic naevi on the skin is the major risk factor for melanoma. However, manually counting all naevi on a person is resource-intensive. The VECTRA®WB360 imaging system (Canfield Scientific Inc., Parsippany, NJ, USA) allows for almost instant total body photography and the creation of a 3-D avatar. We aimed to use these images to develop an automated naevus identification algorithm, and explore its clinical impact.

**Methods:** Three expert dermoscopists independently identified all naevi > 2mm on a set of randomly-selected VECTRA 3-D avatars from members of the general population. A targeted minimum of 5000 labeled naevi (present on 82 avatars) was used to train a convolutional neural network-based artificial intelligence (AI) algorithm. This algorithm was then tested on the avatars of 10 additional randomly-selected individuals, independent of the training set. Specificity, sensitivity and overall accuracy were calculated for the algorithm compared to the consensus of the clinicians' naevus counts. Inter-rater agreement between clinicians was assessed using Cohen's Kappa.

**Results:** The AI algorithm performed well with a positive predictive value of 85% for identifying naevi >2mm. Cohen's Kappa was 0.75 between clinicians, indicating substantial agreement. Positive predictive value for both the AI algorithm, and for Cohen's Kappa between the clinicians increased with increasing naevus diameter.

**Conclusions:** Incorporating 3-D total body imaging and AI into naevus assessment can automate lesion identification and minimize clinical subjectivity.

## **P2.019- Melanoma incidence in Australian commercial pilots, 2011-2016**

**Authors:** Associate Professor Catherine Olsen<sup>1</sup>, Dr Kyoko Miura<sup>1</sup>, Dr Jean Claude Dusingize<sup>1</sup>, Dr Ian Hosegood<sup>2</sup>, Mr Russell Brown<sup>2</sup>, Dr Michael Drane<sup>3</sup>, Dr Peter Clem<sup>3</sup>, Dr Jerry Marsden<sup>4</sup>, Dr Rick Tinker<sup>5</sup>, Dr Ken Karipidis<sup>5</sup>, Professor Minas Coroneo<sup>6</sup>, Professor Adele Green<sup>1,7</sup>

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### **Abstract:**

**Objectives:** Occupational exposure to cosmic and ultraviolet radiation may increase airline pilots' risk of cutaneous melanoma. Meta-analyses of available data show a higher than average incidence of melanoma in airline pilots, but the most recent systematic review revealed that few contemporary data are available. Moreover all relevant studies have been conducted in Northern Hemisphere populations. We therefore aimed to examine if Australian commercial pilots have a raised incidence of melanoma compared with the general population.

**Methods:** We examined all melanoma histologically diagnosed among Australian-licensed commercial pilots in the period 2011-2016 by manually reviewing de-identified data in the medical records system of the Australian Civil Aviation Safety Authority. We estimated age-specific incidence rates and compared these with corresponding population rates using standardised incidence ratios (SIRs) as measures of relative risk. Expected numbers were calculated by multiplying age- and calendar period-specific person-years (PYs) with corresponding rates from the entire Australian population; 95% confidence intervals (CI) were calculated assuming a Poisson distribution of the observed cases.

**Results:** In this cohort of Australian-licensed commercial pilots observed for 91,370 PYs, 114 developed a melanoma (51 invasive, 63 in situ). More than 50% of melanomas occurred on the trunk, and the predominant subtype was superficial spreading melanoma. The SIR for invasive melanoma was 1.20 (95% CI 0.89-1.55) and for melanoma in situ, 1.39 (95% CI 1.08-1.78).

**Conclusion:** Australian-licensed commercial pilots may have a modestly raised risk of in situ melanoma but no elevation of invasive melanoma compared with the general population.

## **P2.020- Naevus density and associated factors in Queensland adults: population-based study**

**Authors:** Dr Brigid \*Betz-Stablein<sup>1</sup>, Dr Uyen \*Koh<sup>2</sup>, Dr Elsemieke Plasmeijer<sup>1,3</sup>, Prof Monika Janda<sup>2,4</sup>, Prof Joanne F. Aitken<sup>5,6,7,8</sup>, Prof H. Peter Soyer<sup>9,10,11</sup>, Prof Adele C. Green<sup>1,11,12</sup>

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### **Abstract:**

**Background:** Having high naevus counts on the skin is the strongest clinical risk factor for melanoma. However evidence about naevus counts in adults, particularly older adults, is lacking.

**Methods:** Adults aged 20-69 years residing in the greater Brisbane area were randomly recruited from the Australian Electoral roll to participate in a 3-year longitudinal study. All participants were asked to estimate their own total-body naevus density: 'few' (<20), 'some' (20-50) or 'many' (>50) in a standard phone interview. At the baseline study visit, participants completed a questionnaire on sun behaviour and related health. A single dermatologist conducted total-body naevus counts in a subgroup

**Results:** 196 people enrolled (mean age, 52 years; 57% male). The dermatologist counted all naevi on 50 participants. Self-reported naevus density correlated well with the dermatologist's gold-standard total-body counts. 104 participants (53%) reported having 'few', 64 (33%) 'some' and 28 (14%) 'many' naevi. Participants self-reporting 'many' naevi were approximately 4 years younger than those reporting 'few' naevi ( $p < 0.05$ ). Those reporting multiple sunburns before age 20 had a significant doubling of odds of reporting 'some' compared with 'few' naevi (OR= 2.27; 95% CI 1.14-4.50) after adjusting for age, sex and family history of melanoma. People with a family history had more than 2.5 times higher odds of reporting 'many' compared to 'few' naevi on their skin (OR= 2.56; 95% CI 1.03-6.37), after adjusting for age, sex and number of sunburns <20 years.

**Conclusions:** Adults of younger ages or with a family history of melanoma have higher naevus counts.

## **P2.021- Risk factor profiles for ovarian cancer by histologic subtype**

**Authors:** Dr Renhua Na<sup>1</sup>, Associate Professor Susan J Jordan<sup>2</sup>, Professor Penelope M Webb<sup>1,2</sup>, on behalf of the Ovarian Cancer Association Consortium.

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>School of Public Health, University of Queensland, Brisbane, Australia

### **Abstract:**

**Background:** Associations between hormonal and lifestyle factors and ovarian cancer (OvCa) risk vary by histotype but the evidence for less common histotypes is inconclusive.

**Aims:** to examine OvCa risk factor profiles by histotype in the Ovarian Cancer Association Consortium, with a particular focus on serous cancers.

**Methods:** We included individual-level data from 27 case-control studies including 2219 borderline and 12958 invasive serous (11823 high-grade, HGSC; 1135 low-grade, LGSC), 1926 endometrioid, 1618 borderline and 1493 invasive mucinous, 1630 clear-cell carcinomas and 33206 controls. Odds ratios (OR) and 95% confidence intervals (CI) were estimated from mixed-effects logistic regression considering study as a random effect, adjusted for potential confounders.

**Results:** We confirmed that full-term pregnancy and oral contraceptive (OC) use were associated with a decreased risk of all OvCa subtypes. The risk reduction per full-term pregnancy was greatest for clear-cell (OR, 0.57; 95% CI, 0.54-0.60) and endometrioid carcinomas (0.67; 0.64-0.70). Similar patterns were observed for OC use and tubal ligation. Endometriosis was strongly associated with clear-cell and endometrioid carcinomas and, to a lesser extent, with LGSC. Smoking was positively associated with borderline/invasive mucinous carcinomas and inversely associated with clear-cell and endometrioid carcinomas. Comparing borderline, LGSC and HGSC, the inverse association with OC use was strongest for HGSC but that for combined menopausal hormone therapy was weakest. A first-degree family history of OvCa/breast cancer was strongly associated with HGSC but not the other serous or non-serous histotypes.

**Conclusion:** Our results support the hypothesis that OvCa subtypes, including HGSC and LGSC, have distinct aetiologies.

## **P2.022- Clinical pathways and outcomes of patients with Barrett's Oesophagus**

**Authors:** Dr Renhua Na<sup>1</sup>, Dr Kyoko Miura<sup>1</sup>, A/Prof Bradley Kendall<sup>2,3</sup>, Prof David Whiteman<sup>1,3</sup>

**Affiliations:** <sup>1</sup>Qimr Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>Princess Alexandra Hospital, Brisbane, Australia, <sup>3</sup>University of Queensland, Brisbane, Australia

### **Abstract:**

**Background:** The incidence of oesophageal adenocarcinoma (OAC) has been rising worldwide, possibly due to the increased prevalence of Barrett's oesophagus (BO). The epidemiological and clinical profile of patients with BO, particularly with long-term follow-up, are unclear in Australia.

**Aims:** To investigate the epidemiological and clinical profile of BO patients in a prospective cohort in Australia between 2008 and 2016.

**Methods:** Individuals with histologically confirmed BO were identified in tertiary settings across Australia. Follow-up data were obtained by questionnaires and/or interviews. We compared baseline and follow-up epidemiological and clinical data between individuals with non-dysplastic BO (NDBO) and BO with dysplasia.

**Results:** Compared with NDBO (n = 382), individuals with low-grade dysplasia (LGD) (n = 54) and those with high-grade dysplasia (HGD) (n = 16) were significantly older and less educated. Aspirin use was higher in the LGD group compared with the NDBO group (33% vs 19%, p = 0.03). At baseline, the LGD and HGD groups were more likely to have long-segment BO (66% and 75%) than the NDBO group (40%). The progression rate to HGD/OAC was 32/1000 patient-years in LGD compared with 7/1000 person-years in individuals with NDBO. LGD at baseline or anytime during follow-up was associated with an increased risk of progression to HGD/OAC compared with NDBO.

**Conclusions:** Individuals of BO with dysplasia are older, less educated, more likely to use aspirin and have long-segment BO. LGD is associated with an increased risk of progression to HGD/OAC.

## **P2.023- Developing Policy1-Ovary: An Australian ovarian cancer microsimulation model**

**Authors:** Dr Amy Vassallo<sup>1</sup>, Dr Michael Caruana<sup>1</sup>, Prof Anna deFazio<sup>2</sup>, Mr Paul Grogan<sup>1</sup>, Dr Yoon Jung Kang<sup>1</sup>, Dr Carolyn Nickson<sup>1</sup>, Dr Julia Steinberg<sup>1</sup>, A/Prof Natalie Taylor<sup>1</sup>, Prof Karen Canfell<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer Research Division, Cancer Council NSW, Sydney, Australia, <sup>2</sup>The Westmead Institute for Medical Research, Sydney, Australia

### **Abstract:**

**Background:** Ovarian cancer is a rare but devastating disease. Each year approximately 1,600 Australian women are diagnosed, most with advanced stage disease. It's a malignancy with a high incidence-to-mortality ratio and the 5-year survival rate is only 45%.

**Pathways** To a cancer-free future is a strategic program at Cancer Council NSW aiming to identify evidence-based interventions for the greatest impact in reducing cancer burden. It draws on the predictive modelling tool Policy1 to guide investment in cancer prevention, detection and treatment. Several Policy1 models are currently in use or development, including for cervical, bowel, lung, hereditary cancers, and recently melanoma and ovarian. This protocol presents plans for the development of Policy1-Ovary.

**Methods:** The build, validation and use of microsimulation models are complex and collaborative processes, requiring large amounts of data. These data will be sourced from published scientific literature, routine population health datasets, further original research, and expert opinion from clinicians, collaborators and consumers.

**Results:** The initial research questions for Policy1-Ovary will include quantifying the impacts of increasing genetic testing uptake on cancer rates and survival, and ongoing evaluation of new opportunities for earlier detection. Identification of relevant data sources is currently underway, and a key element of this is facilitating communication and collaboration with existing and new stakeholders.

**Conclusion:** The Policy1 microsimulation models are comprehensive health economic assessment platforms that simulate cancer testing, diagnosis, treatment and/or surveillance. Based on the precedents set by other cancers, there is great potential for policy and practice impact through ovarian cancer modelling.

## **P2.024- Immunosuppressant medication and keratinocyte cancer risk in renal transplant recipients**

**Authors:** Dr Emily Shao<sup>1,2</sup>, Dr Brigid Brigid Betz-Stablein<sup>1</sup>, Associate Professor Nicole Isabel<sup>2,3</sup>, Dr Elsemieke Plasmeijer<sup>1</sup>, Professor Adele Green<sup>1,4</sup>

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### **Abstract:**

**Background:** Compared with the general population, renal transplant recipients (RTRs) have higher risk of keratinocyte cancer (KC) due to long-term immunosuppressive therapy, administered by combining a range of medications. We documented differences in KC risk according to type of immunosuppressive medication used by RTRs.

**Methods:** White-skinned RTRs at high risk of skin cancer (past history of skin cancer,  $\geq 40$  years of age, or  $\geq 10$  years post-transplant) were recruited from Princess Alexandra Hospital, Brisbane, 2012–2014, and were followed-up until August 2016. We reviewed medical records to ascertain immunosuppressive medication use. Participants underwent yearly skin examinations and were contacted 3-monthly to ascertain skin cancers treated by their GP or dermatologist. Diagnoses were confirmed histopathologically. Outcomes were incident BCCs and SCCs. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated using negative binomial regression.

**Results:** 183 RTRs with 8 years average duration of immunosuppression, and followed-up for a mean of 3 years experienced BCC and SCC tumour incidence rates of 543 and 539 per 1000 person-years respectively. Preliminary analyses showed that users of azathioprine (43/183, 23%) had increased SCC risk (RR<sub>adjusted</sub>=1.97, 95% CI 1.18–3.30) and increased BCC risk (RR<sub>adjusted</sub>=2.10, 95% CI 1.13–3.89) after adjustment for age, sex and years immunosuppressed, compared with non-use. Users of cyclosporine (95/183, 52%) had increased risk of BCC (RR<sub>adjusted</sub>=2.22, 95% CI 1.28–3.87) but not of SCC. There was no effect of tacrolimus or mycophenolate compared to non-use.

**Conclusion:** Risk of KC in RTRs appears to vary with type of immunosuppressive medication.

## **P2.025- Statin use and survival after a diagnosis of ovarian cancer**

**Authors:** Ms Azam Majidi<sup>1,2</sup>, Dr Renhua Na<sup>1</sup>, Professor Penelope M Webb<sup>1,2</sup>, OPAL study group<sup>1</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Brisbane, Australia, <sup>2</sup>School of public health, University of Queensland, Brisbane, Australia

### **Abstract:**

**Background:** In the absence of an effective screening test, ovarian cancer is usually diagnosed at an advanced stage when there is a low chance of long-term survival. In-vitro studies suggest statins may have some anti-cancer properties. Therefore, we investigated the association between use of statins and survival in women with ovarian cancer.

**Methods:** 958 Australian women aged 18–79, diagnosed with ovarian cancer between 2012–2015 were studied. Data were obtained from self-reported questionnaires and medical records. Women were classified as a user if they reported using statins during the year before diagnosis. Follow-up started from the date of primary treatment until death or the date a woman was last known to be alive.

Ovarian cancer-specific survival (OVS) and related 95% confidence intervals (CI) were estimated using Cox regression. We used propensity-scores to minimise bias.

**Results:** Our results suggest that offering statins to all women with ovarian cancer, including those without hyperlipidaemia, might improve the survival outcomes (OVS: 0.91, CI: 0.64–1.28). Also in statin users, being a user improved survival (OVS: 0.87, CI: 0.54–1.42). Though observed associations are not statistically significant. However, in a matched sample of women with hyperlipidaemia, statin use significantly improved survival (OVS: 0.61, CI: 0.38–0.99).

**Conclusions:** These findings suggest that standard doses of statins used for hyperlipidaemia treatment, do not improve OVS among all women with ovarian cancer, but suggest a potential benefit for those with hyperlipidaemia. Larger studies with minimum bias—ideally a randomised controlled trial—are required to clarify this.

## **P2.026- Geospatial patterns and determinants of obesity during pregnancy in the Gold Coast**

**Authors:** Ms Deena Malloy<sup>1</sup>, Ms Helen Clifford<sup>1</sup>

**Affiliations:** <sup>1</sup>Gold Coast Public Health Unit, Gold Coast, Australia

### **Abstract:**

**Background:** Pregnancy is recognised as a critical period in the life course, when targeted interventions can make the greatest gains in addressing childhood obesity and preventing obesity in later adult life. Understanding the local distribution of individual and environmental risk and protective factors is critical to inform the development of equitable and accessible community and health services.

**Methods:** A multi-level case-control study was carried out to examine the effect of socio-ecological factors and accounted for individual factors on the risk of women experiencing overweight or obesity pre-pregnancy. Data included three-years of de-identified admissions records from Gold Coast Health's (GCH) Maternity Service, publicly available City of Gold Coast (COGC) programs, parks and infrastructure data, and SEIFA scores from the ABS.

**Results:** Distinct geographic clusters of overweight and obesity were observed in the Gold Coast North region. Relative area disadvantage was not associated with overweight or obesity, while proximity to council and private physical activity opportunities was identified as a potential protective factor. Statistically significant individual risk factors included Maori or Pacific Islander ethnicity, diabetes, and history of C-section, endocrine disease and hypertension. Asian ethnicity was the only protective individual factor identified.

**Outcomes:** This study demonstrates the utility in using local multi-agency service data to inform community and health services. The evidence generated will inform the next iteration of the COGC Active and Healthy Program to improve accessibility in areas of need, the Gold Coast Active and Healthy City Strategy, GCH's master planning and maternity and child health service.

## **P2.027- Place of birth, risk-factors and outcomes associated with massive transfusion at birth**

**Authors:** Dr Jillian Patterson<sup>1</sup>, Dr Deborah Randall<sup>1</sup>, Dr Tanya Nippita<sup>1,2</sup>, Assoc Prof Siranda Torvaldsen<sup>1</sup>, Assoc Prof Jane Ford<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Sydney, Reserve Rd, Royal North Shore Hospital, Australia, <sup>2</sup>Royal North Shore Hospital, St Leonards, Australia

### **Abstract:**

**Background:** State and national policy recommends women with identifiable risk factors for post-partum haemorrhage (PPH) give birth in hospitals with facilities to manage a massive bleed, however haemorrhages are often unpredictable. This study aims to compare characteristics including place of birth and risk factors for massive haemorrhage (requiring  $\geq 4$  units of red cells) at birth.

**Methods:** Women receiving 0, 1–3 or 4+ units of blood were identified using linked New South Wales births, hospital and blood pack data for June 2006–December 2010 and compared according to tertiary or non-tertiary place of birth. Logistic models were fit to identify risk-factors associated with massive transfusions, and to compare outcomes between tertiary and non-tertiary place of birth.

**Results:** Data were available on 227,601 women, 3041 (1.3%) received 1–3 units and 952 (0.4%) received  $\geq 4$  units of red cells during their birth admission. Of women experiencing massive haemorrhage, 48% gave birth in non-tertiary centres and 6% of these were transferred. Predictors of massive transfusion identifiable at booking included previous PPH, multiple birth, IVF pregnancy, uterine fibroids, and uterine surgery. Additional factors identifiable at the birth admission included placenta praevia, and placental abruption. The strongest risk-factors were placenta praevia, previous PPH and placental abruption, however only 9% of women had at least one of these risk-factors, and accounted for only 56% of massive haemorrhages.

**Conclusions:** Placenta praevia, previous PPH and placental abruption were the strongest predictors of massive haemorrhage. Although other factors are identifiable, they are poorly predictive of massive PPH.

## **P2.028- The impact of caesarean section on breastfeeding indicators in sub-Saharan Africa**

**Authors:** Mr Engida Yisma<sup>1</sup>, Professor Ben Mol<sup>2</sup>, Professor John Lynch<sup>1</sup>, A/professor Lisa Smithers<sup>1</sup>

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### **Abstract:**

**Background:** We aimed to examine the impact of caesarean section on breastfeeding indicators—early initiation of breastfeeding, exclusive breastfeeding under 6 months, and children ever breastfed (at least once)—in sub-Saharan Africa.

**Methods:** We analysed the DHS data to examine the impact of caesarean section on breastfeeding indicators using modified Poisson regression models for each country adjusted for potential confounders. For each breastfeeding indicator, the within-country adjusted prevalence ratios (aPR) were pooled in random-effects meta-analysis.

**Results:** The within-country analyses showed, compared with vaginal birth, caesarean section was associated with aPR for early initiation of breastfeeding that ranged from 0.24 (95%CI, 0.17, 0.33) in Tanzania to 0.89 (95%CI, 0.78, 1.00) in South Africa. The aPR for exclusive breastfeeding under 6 months ranged from 0.58 (95%CI; 0.34, 0.98) in Angola to 1.93 (95%CI; 0.46, 8.10) in Cote d'Ivoire, while the aPR for children ever breastfed ranged from 0.91 (95%CI, 0.82, 1.02) in Gabon to 1.02 (95%CI, 0.99, 1.04) in Gambia. The meta-analysis showed caesarean section was associated with a 46% lower prevalence of early initiation of breastfeeding (pooled aPR, 0.54 (95%CI, 0.48, 0.60)). However, meta-analysis indicated little association with exclusive breastfeeding under 6 months (pooled aPR, 0.94 (95%CI; 0.88, 1.01) and children ever breastfed (pooled aPR: 0.98 (95% CI; 0.98, 0.99) among caesarean versus vaginally born children.

**Conclusions:** Caesarean section had a negative influence on early initiation of breastfeeding, but showed little difference in exclusive breastfeeding under 6 months, and children ever breastfed in sub-Saharan Africa.

## **P2.029- Systematic review: Does physical activity improve lung function and prevent childhood asthma?**

**Authors:** Miss Raisa Cassim<sup>1,2</sup>, Prof Shyamali Dharmage<sup>1,2</sup>, Dr Elasma Milanzi<sup>1</sup>, Dr Flávia Paro<sup>3</sup>, Dr Jennifer Koplin<sup>1,2</sup>, Dr Melissa Russell<sup>1,2</sup>

**Affiliations:** <sup>1</sup>The University Of Melbourne, Melbourne, Australia, <sup>2</sup>Murdoch Childrens Research Institute, Melbourne, Australia, <sup>3</sup>Universidade Federal do Espírito Santo, Vitória, Brazil

### **Abstract:**

**Background:** Physical activity may be a potentially modifiable risk factor for asthma and driver of lung function development. This systematic review aimed to summarise the available evidence concerning the longitudinal effect of physical activity on the development of asthma, the persistence of asthma symptoms, and lung function in children and adolescents.

**Methods:** PubMed and EMBASE electronic databases were searched for all English language original articles that longitudinally assessed the association between physical activity as the exposure and asthma outcomes or lung function outcomes in youths up to the age of 18 years.

**Results:** The literature search retrieved 2298 publications with 2289 subsequently excluded, resulting in nine longitudinal studies eligible for inclusion in this review. One study found low physical activity was associated with more asthma symptoms and one study observed this with ever asthma. Two studies found no association with incident wheeze, one study found no association with asthma control and one found no association with incident asthma. Three separate studies found increasing physical activity was associated with increased lung function in boys only, girls only and no evidence of association.

**Conclusion:** The evidence was highly inconsistent for both the relationship between physical activity and asthma and lung function outcomes. Hence, we conclude that there is insufficient evidence to suggest that physical activity has a long-term effect on the risk of asthma development or persistence of symptoms in youth. Furthermore, there is insufficient evidence to determine the longitudinal effects of physical activity on lung function in children.

## **P2.030- Sex, BMI and the association between asthma and physical activity in childhood**

**Authors:** Miss Raisa Cassim<sup>1,2</sup>, Dr Jennifer Koplin<sup>1,2</sup>, Prof Shyamali Dharmage<sup>1,2</sup>, Dr Elasma Milanzi<sup>1</sup>, Prof Timothy Olds<sup>3</sup>, Dr Francois Frayse<sup>3</sup>, Dr Melissa Russell<sup>1,2</sup>, on behalf of the HealthNuts Investigators

**Affiliations:** <sup>1</sup>The University Of Melbourne, Melbourne, Australia, <sup>2</sup>Murdoch Childrens Research Institute, Melbourne, Australia, <sup>3</sup>The University of South Australia, Adelaide, Australia

### **Abstract:**

**Background:** Evidence on whether asthma hinders participation in moderate to vigorous physical activity (MVPA) in children remains inconclusive. We investigated whether the presence of asthma at age 4 is associated with time spent in objectively measured MVPA at 6 years, and whether sex or body mass index (BMI) modifies the association.

**Methods:** This study analysed data from 391 participants of the HealthNuts Study. Asthma and BMI data were collected via questionnaire at 4 years. MVPA data were collected through accelerometry at 6 years. The longitudinal relationship was examined using linear regression adjusted for sex, BMI, SES, the presence of older siblings and familial history of allergy and asthma. Potential interactions by sex and BMI were examined.

**Results:** BMI modified the longitudinal association between asthma and time spent in MVPA (p value = 0.009), but not sex (p value= 0.414). In underweight children at age 4, those with asthma were more active at age 6 (30.7 minutes per day, 95%CI: 2.0, 59.5) than those without asthma. Whilst in children who were overweight at age 4, those with asthma were less active at age 6 (-43.9 minutes per day, 95%CI: -89.0, -1.2) compared to those without asthma.

**Conclusion:** The longitudinal effect of asthma on MVPA time is modified by BMI; with overweight children having asthma appearing to restrict the amount of time spent in MVPA in the future, however underweight children with asthma increased future time in MVPA. Overweight children with asthma may require additional encouragement to increase their MVPA.

## **P2.031- Using five indicators to assess potential overdiagnosis of ADHD: A scoping review**

**Authors:** Ms Luise Kazda<sup>1</sup>, Dr Katy Bell<sup>1</sup>, Dr Rae Thomas<sup>2</sup>, Dr Kevin McGeechan<sup>1</sup>, Prof Alexandra Barratt<sup>1</sup>

**Affiliations:** <sup>1</sup>The University Of Sydney, Sydney, Australia, <sup>2</sup>Bond University, Goldcoast, Australia

### **Abstract:**

**Background:** We use five, recently published indicators of potential overdiagnosis to systematically evaluate whether the existing literature indicates a potential for overdiagnosis and overtreatment of ADHD in children. This is a condition where overdiagnosis is widely hypothesised to occur, but the evidence to support or refute this hypothesis has not been comprehensively evaluated.

**Methods:** We are conducting a comprehensive scoping review of ADHD following the JBI methodology and using our five previously published indicators to guide the study. The five indicators are: 1. Is there potential for increased diagnosis?, 2. Is diagnosis actually increased?, 3. Are additional cases subclinical or low risk?, 4. Are additional cases treated?, and 5. Might harms outweigh benefits? Our search strategies - with keywords including trend, prevalence, benefits and harms, severity and others - have been piloted in MEDLINE (4,582 citations received of which: Q1 2,219, Q2 957, Q3 337, Q4 266, Q5 581, other 222). Embase, PsychINFO and the Cochrane Library will also be searched.

**Results:** Preliminary results will be presented at the AEA Annual Scientific Meeting. We will map the evidence retrieved in the scoping review to each of the five indicators in order to undertake an evidence-based evaluation of the potential for overdiagnosis of ADHD in current clinical practice.

**Conclusions:** By systematically considering the evidence of potential overdiagnosis of ADHD we have the potential to either support or refute the overdiagnosis hypothesis.

## **P2.032- Family socioeconomic status during childhood and academic achievement in secondary school**

**Authors:** Ms Anita Van Zwieten<sup>1,2</sup>, A/Prof Armando Teixeira-Pinto<sup>1,2</sup>, Prof Jonathan C Craig<sup>3</sup>, A/Prof Germaine Wong<sup>1,2,4</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, University Of Sydney, Sydney, Australia*, <sup>2</sup>*Centre for Kidney Research, The Children's Hospital at Westmead, Westmead, Australia*, <sup>3</sup>*College of Medicine and Health, Flinders University, Adelaide, Australia*, <sup>4</sup>*Department of Renal Medicine, Westmead, Australia*

### **Abstract:**

**Background:** Secondary education has lifelong implications for health. Low socioeconomic status (SES) in secondary school is associated with poorer academic achievement, but associations with the timing and duration of low SES across childhood are understudied.

**Methods:** Cohort design using Longitudinal Study of Australian Children dataset. Structured modelling approach used to evaluate life-course models for associations between the duration and timing of low SES (across 4-5, 6-7, 8-9, 10-11 years-old) and Grade 7 reading and numeracy achievement. Linear regressions fitted for four critical period (each including low SES in one period), one sensitive period (including low SES in all periods), and two strict accumulation (including low SES duration in linear/categorical form) models. Model with the highest likelihood-ratio p-value (compared to a fully saturated model) and lowest AIC selected as best-fitting. SES-by-sex interactions were examined.

**Results:** Of 3734 children, 1845 were female. For reading, the sensitive period model, without SES-by-sex interaction, fitted best. Reading z-score coefficients for low SES (reference: high SES) at 4-5, 6-7, 8-9, and 10-11 years were: -0.20, -0.18, -0.02, -0.22. For numeracy, the categorical strict accumulation model, with SES-by-sex interaction, fitted best. Numeracy z-score coefficients for 1, 2, 3, and 4 periods of low SES (reference: 0) were: -0.38, -0.42, -0.54, -0.77 for males, and -0.23, -0.34, -0.42, -0.54 for females.

**Conclusions:** Low SES at all ages except 8-9 years has cumulative associations with poorer secondary school reading achievement. Longer duration of low SES during childhood is associated with poorer numeracy achievement, although this is weaker in females.

## **P2.033- 'Every Week Counts': Harnessing and communicating research data to reduce early births.**

**Authors:** Dr Deborah Randall<sup>1,2</sup>, Ms Lyndsey Harvey<sup>1,2</sup>, Dr Felicity Gallimore<sup>1,2</sup>, Ms Angela Todd<sup>1,2</sup>, Dr Tanya Nippita<sup>1,2,3</sup>, Ms Shereen Zarganakis<sup>1,2</sup>, Associate Professor Siranda Torvaldsen<sup>1,2</sup>, Associate Professor Jane Ford<sup>1,2</sup>, Professor Jonathan Morris<sup>1,2,3</sup>

**Affiliations:** <sup>1</sup>*The University of Sydney Northern Clinical School, Women and Babies Research, St Leonards, Australia*, <sup>2</sup>*Northern Sydney Local Health District, Kolling Institute, St Leonards, Australia*, <sup>3</sup>*Department of Obstetrics and Gynaecology, Royal North Shore Hospital, Northern Sydney Local Health District, St Leonards, Australia*

### **Abstract:**

**Background:** Whilst the increased risks of adverse outcomes associated with preterm birth (<37 weeks gestation) are well established, adverse outcomes for babies born early term (37–38 weeks) compared with full term (38-39 weeks) have only recently become known.

**Objectives:** To develop and evaluate educational resources, using evidence from population data, to raise awareness among clinicians and women about the importance of timing planned births as close to 40 weeks as is safely possible.

**Method:** Resources communicating evidence about the benefits and risks of birth from 35–39 weeks were pilot-tested in two NSW tertiary hospitals starting in August 2018. Evaluation involved surveying healthcare professionals, and comparing midwife-recorded outcomes of singleton births  $\geq 34$  weeks' gestation, 6 months before and after the start of the intervention. The primary outcome was planned births <39 weeks.

**Results:** Of the 31 healthcare professionals who answered the online survey, 85% had seen the materials. Of the 22 who answered the evaluation questions, 95% agreed that the materials provided useful information and helped communication around timing of birth. Preliminary analysis in one hospital showed the percentage of planned births <39 weeks was 15.7% before and 18.1% in the first 6 months of the intervention. An interrupted time series analysis found no significant level change ( $\beta=0.024$ ,  $p=0.9$ ) or slope change ( $\beta= -0.089$ ,  $p=0.13$ ) in the first 6 months after introduction.

**Conclusions:** Preliminary evaluation results at the pilot hospitals show excellent recognition and acceptability of the education materials, but no impact yet on the proportion of early term planned births

### **P2.034- Where children play sport - participation in school and club settings**

**Authors:** Douglas Lincoln<sup>1</sup>, Susan Clemens<sup>1</sup>

**Affiliations:** <sup>1</sup>Queensland Health, Herston, Australia

**Abstract:**

**Introduction:** The health benefits of regular physical activity are well documented. Investment in organised sport and physical education for children and adolescents in school settings has been identified as two of the seven best buys for prevention investment. This study examined relationships between participation in these settings and child and household-level characteristics.

**Methods:** Using a general population survey of Queensland children's health and lifestyle characteristics, participation in organised sport was examined in (1) club settings, (2) club-based team or individual organised sport, and (3) school settings. The association between organised sport participation in either setting and meeting the Australia physical activity guidelines was also considered.

**Results:** The survey was conducted from 6–29 March 2017 and included 1,380 children in school years 4–12. Organised sport participation prevalence was 46% (both school and team settings), 16% (club sport only), 20% (school sport only) and 18% (neither setting). Multivariable logistic regression analysis indicated participation in one setting increased the odds of participation in other settings and exclusive participation in individual sport decreased the odds of school sport participation. Participation in organised sport in school or club settings did not increase the odds of meeting physical activity guidelines.

**Conclusions:** The study highlights areas where the contribution of organised sport to physical activity more broadly could be strengthened. Increasing individual sport and active recreation opportunities in school settings may increase participation in organised sport overall and contribute positively to increasing the physical activity of children.

### **P2.035- Neonatal Morbidity by Maternal Region of Birth in NSW, Australia 2003–2016**

**Authors:** Ms Ye'elah Berman<sup>2,1</sup>, Dr Jillian Patterson<sup>1</sup>, Dr Ibinabo Ibiebele<sup>1</sup>, Dr Deborah Randall<sup>1</sup>, Dr Tanya Nippita<sup>1,3</sup>, Dr Heather Baldwin<sup>1</sup>, Ms Stephanie Todd<sup>2</sup>, Dr Jennifer Bowen<sup>3</sup>, Prof Jonathan Morris<sup>1,3</sup>, A/Prof Jane Ford<sup>1</sup>, A/Prof Siranda Torvaldsen<sup>1,4</sup>

**Affiliations:** <sup>1</sup>University Of Sydney, Reserve Rd, Royal North Shore Hospital, Australia, <sup>2</sup>NSW Health, St Leonards, Australia, <sup>3</sup>Royal North Shore Hospital, St Leonards, Australia, <sup>4</sup>School of Public Health and Community Medicine, UNSW, Randwick, Australia

**Abstract:**

**Background:** Research suggests that neonatal morbidity differs by maternal region of birth at different gestational ages. This study aimed to determine the overall and gestation specific risk of neonatal morbidity by maternal region of birth, after adjustment for maternal, infant and birth characteristics, for women giving birth in NSW, Australia from 2003-2016.

**Methods:** Modified poisson regression was used to determine risk of neonatal morbidity by maternal region of birth, overall and at each gestational age, compared with Australian or New Zealand born (AUS/NZ-born) women giving birth at 39 weeks.

**Results:** There were 1,074,930 live singleton births  $\geq 32$  weeks gestation that met the study inclusion criteria, and 44,394 of these were morbid, giving a neonatal morbidity rate of 4.13 per 100 live births. The gestational age-specific neonatal morbidity rate declined from 32 weeks gestation, reaching a minimum at 39 weeks in all maternal regions of birth. The unadjusted neonatal morbidity rate was highest in South Asian-born women at most gestations. Adjusted rates of neonatal morbidity between 32 and 44 weeks were significantly lower for babies of women born to East, South-East and West Asian-born mothers, and higher for babies born to Oceanian-born mothers, compared to AUS/NZ-born mothers. Babies of African, Oceanian, South Asian and West Asian-born women had lower adjusted risk of neonatal morbidity than AUS/NZ-born women until 37 or 38 weeks gestation, and then equal or higher risk in the term and post-term periods.

**Conclusions:** Maternal region of birth is an independent risk factor for neonatal morbidity in NSW.

### **P2.036- The Impact of Pre-Pregnancy Body Mass Index on Placental Abruption Risk**

**Authors:** Dr Akilew A Adane<sup>1</sup>, Dr Carrington CJ Shepherd<sup>1,2</sup>, Dr Faye J Lim<sup>1</sup>, Dr Scott W White<sup>3,4</sup>, Dr Brad M Farrant<sup>1</sup>, Dr Helen D Bailey<sup>1</sup>

**Affiliations:** <sup>1</sup>Telethon Kids Institute, The University of Western Australia, Perth, Australia, <sup>2</sup>Ngangk Yira Research Centre for Aboriginal Health & Social Equity, Murdoch University, Perth, Australia, <sup>3</sup>Division of Obstetrics and Gynaecology (M550), The University of Western Australia, Perth, Australia, <sup>4</sup>Department of Maternal Fetal Medicine, King Edward Memorial Hospital, Perth, Australia

#### **Abstract:**

**Background:** The association between maternal weight and placental abruption has been under-investigated. The aim of this systematic review was to evaluate the association between maternal weight (pre-pregnancy body mass index and gestational weight gain) and placental abruption.

**Methods:** Relevant studies were identified from PubMed, EMBASE, Scopus and CINAHL. Studies evaluating pre-pregnancy body mass index and/or gestational weight gain and placental abruption were included, along with unpublished findings from analyses of linked population-based datasets from Western Australia (2012-2015, n=114,792). Two independent reviewers evaluated studies for inclusion and quality. Data including odds ratios (OR) and 95% confidence intervals (CI) were extracted and analysed by random effects meta-analysis. The review protocol was registered with the PROSPERO (CRD42018115427).

**Results:** 21 studies were included, of which 15 were eligible for meta-analyses with 7,145 pregnancies complicated by placental abruption and 594,773 controls. The summary ORs for the association of being underweight, overweight and obese, and placental abruption, compared to normal weight women, were 1.4 (95% CI: 1.1, 1.7), 0.8 (95% CI: 0.8, 0.9) and 0.8 (95% CI: 0.7, 0.9), respectively. These findings remained unchanged when each study was eliminated from the analysis and in subgroup analyses. Although data were scarce, women with gestational weight gain below the Institute of Medicine recommendations appeared to be at greater risk of abruption compared with women who had optimal weight gain.

**Conclusions:** Mothers that are underweight prior to or in early pregnancy are at a moderately increased risk of placental abruption.

### **P2.037- Factors associated with caesarean section in the ACT**

**Authors:** Mr Alexandra Rauli<sup>1</sup>, Dr Oscar Yang<sup>1</sup>

**Affiliations:** <sup>1</sup>Act Health, Canberra, Australia

#### **Abstract:**

**Background:** Caesarean section rates in the ACT and Australia have risen over the past two decades. This has coincided with factors such as increasing maternal age, increasing use of assisted reproductive technology and increasing prevalence of diabetes and obesity.

**Methods:** Data was derived from the Australian Capital Territory (ACT) Maternal and Perinatal Data Collection from 2015 to 2017. A total of 16,161 women were included. The association between risk factors and outcomes were investigated using logistic regression modelling.

**Results:** Maternal overweight and obesity were associated with increased odds of caesarean section as was a pre-existing medical condition or a medical condition that developed during pregnancy. In addition, the mother's country of birth was associated with caesarean section. Mothers born in sub-Saharan Africa had 1.7 times the odds and mothers born in Asia had 1.5 times the odds of having a caesarean section compared to Australian born mothers.

**Conclusions:** While factors such as high body mass index, increasing maternal age and medical conditions (such as diabetes and pre-eclampsia) are well documented risk factors for caesarean section, the effect of country of birth is less understood.

### **P2.038- Real-world RCT evaluation of a holistic hospital-based child health programme in Aotearoa/NZ**

**Authors:** Dr Polly Atatoa Carr<sup>1,2</sup>, Dr Nina Scott<sup>1</sup>, Dr Amy Jones<sup>1</sup>, Dr Peter Sandiford<sup>3</sup>, Dr Bridgette Masters-Awatere<sup>2</sup>, Dr Helen Clark<sup>1</sup>

**Affiliations:** <sup>1</sup>Waikato District Health Board, Hamilton, New Zealand, <sup>2</sup>Waikato University, Hamilton, New Zealand, <sup>3</sup>The University of Auckland, Auckland, New Zealand

#### **Abstract:**

**Background:** Large and persistent health inequities exist between tamariki Māori (indigenous children) and non-indigenous children in New Zealand. These result from a combination of socioeconomic deprivation and complex, poor quality, and siloed service delivery. Ongoing colonisation and racism both drive and sustain inequities and limit action required to eliminate them. The health system can dramatically improve outcomes through holistic whānau (family) focussed interventions, and high quality evidence is required for their justification. Randomised controlled trials (RCTs) are the gold standard for efficacy assessment but are challenging to implement in complex multifaceted interventions.

**Methods:** Kaupapa Māori, Integrated Knowledge Transfer, and Continuous Quality Improvement principles informed the design of a RCT to measure the impact of the Harti Hauora Tamariki (HHT) programme, a holistic whānau-based intervention co-created to identify and address health determinants in paediatrics. Included are: access to services, economic resources, housing quality, and screening for health conditions, risk and protective factors.

**Results:** We describe the HHT intervention, our evaluation using a RCT framework, and the challenges encountered with this approach. We show how emergent issues (e.g. provision of food, car seats, support for healthy skin) facilitated intervention evolution during the trial. The methodological implications for RCT design and implementation are discussed.

**Conclusions:** Despite challenges, complex interventions can and should be evaluated using RCTs more often. In being responsive to our design principles, flexibility has been essential in the application of RCT 'best practice' guidelines as well as in our approach to intervention implementation in the real world of inpatient paediatrics.

### **P2.039- Socioeconomic Differences in Opioid Use for Inflammatory Arthritis: Australian Rheumatology Association Database**

**Authors:** **Mr Ashley Fletcher**<sup>1</sup>, Prof Marissa Lassere<sup>2</sup>, Prof Lyn March<sup>3</sup>, Prof Rachelle Buchbinder<sup>1</sup>, Susan Lester<sup>4</sup>, Prof Claire Barrett<sup>5</sup>, Prof Graeme Carroll<sup>6</sup>, Dr Rachel Black<sup>7</sup>, Dr Bethan Richards<sup>2</sup>, Prof Catherine Hill<sup>4,7</sup>

**Affiliations:** <sup>1</sup>Cabrini Health/Monash University, Malvern, Australia, <sup>2</sup>University of New South Wales, Northern Clinical School, Sydney, Australia, <sup>3</sup>Institute of Bone and Joint Research, Kolling Institute, University of Sydney, Department of Rheumatology, Royal North Shore Hospital, Sydney, Australia, <sup>4</sup>The University of Adelaide and The Queen Elizabeth Hospital, Adelaide, Australia, <sup>5</sup>Redcliffe Hospital and University of Queensland, Redcliffe, Australia, <sup>6</sup>Fiona Stanley Hospital, Perth, Australia, <sup>7</sup>Royal Adelaide Hospital, Adelaide, Australia

#### **Abstract:**

**Aims:** To determine the longitudinal use of high potency opioid medication in people with inflammatory arthritis and to determine the effect of SES on longitudinal opioid use.

**Methods:** ARAD is an observational database that collects outcome data for people with inflammatory arthritis. Participants complete semi-annual then annual questionnaires. Longitudinal analysis was performed on all data (2001-2018). The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) was determined, using the participants address, from Socio-Economic Indexes for Areas (SEIFA) data from the 2011 Australian census, and grouped into Australian population-derived quintiles (Q1-5). Opioid use was analysed using mixed logistic regression modelling techniques.

**Results:** For 5,634 participants there are 47,134 questionnaires where 30.8% indicated use of opioids, of those 21.5% were taking high potency opioids. High potency opioid use was more prevalent in more disadvantaged participants (IRSAD Q1: 10.6%, Q5: 5.3%, OR 4.54; 95%CI 3.06-6.73). Other predictors of opioid use were a high Health Assessment Questionnaire (HAQ) Disability score, current smoking and permanently unable to work. In multi-variable analysis the IRSAD Q1:Q5 comparison was remained significant (OR 1.89; 95%CI 1.24-2.89). The prevalence of opioid use did not change significantly over time, and remained higher in IRSAD Q1, compared to Q5, participants ( $p < 0.05$ ). The most commonly used opioid was paracetamol/codeine, and use of more potent opioids (oxycodone and morphine) was higher in more disadvantaged participants.

**Conclusion:** Although high potency opioid use was more prevalent in the lower SES group, the strongest association with use was a high HAQ score, indicating more disability.

## 4A – Epidemiology in under-served populations

Plaza Room P9, 1:15pm- 2:45pm

### Revaccination with 23-valent-pneumococcal-polysaccharide vaccine in adult Aboriginal and Torres Strait Islander people

**Authors:** Ms Mari Takashima<sup>1</sup>, Associate Professor Stephen Lambert<sup>2</sup>, Dr Stuart Paynter<sup>3</sup>, Professor Robert Ware<sup>1</sup>

**Affiliations:** <sup>1</sup>Griffith University, Spring Hill, Australia, <sup>2</sup>Communicable Diseases Unit, Queensland Health, Brisbane, Australia, <sup>3</sup>School of Public Health, Curtin University, Perth, Australia

#### Abstract:

**Background:** Aboriginal and Torres Strait Islander Australians have high rates of invasive pneumococcal disease (IPD). A schedule of repeat doses of 23-valent polysaccharide pneumococcal vaccine (PPV23) is recommended due to these elevated disease rates. We evaluated the relative effectiveness of PPV23 revaccination, compared to no revaccination, in preventing IPD in Aboriginal and Torres Strait Islander adults in North Queensland, Australia.

**Methods:** A retrospective study using data linked from the Queensland vaccination register, notifiable diseases database, and death registry was conducted. All resident North Queensland Aboriginal and Torres Strait Islander adults who received any PPV23 vaccination between 2000 and 2012 were identified and linked with IPD cases. IPD rates were compared between three groups: adults who received only a first dose of PPV23, adults eligible for revaccination who were not revaccinated, adults who were revaccinated. The association between vaccination status and IPD notification was examined using Cox proportional hazards models.

**Results:** Analysed data included 12,809 individuals, 89,612 person-years, and 256 IPD notifications. Revaccinated adults had similar risk of IPD as non-revaccinated adults, after adjusting for potentially confounding variables (HR=0.92; 95%CI: 0.35-2.42). Findings were similar for vaccine-specific serotypes (HR=1.32; 95%CI: 0.32-5.43).

**Conclusions:** We were unable to demonstrate the benefits of PPV23 revaccination against IPD in this high-risk population. However, estimates were imprecise due to the low number of IPD cases, and due to the data source, we had difficulty controlling adequately for health-care engagement bias. Findings should be validated in other high-risk cohorts, and against all-cause pneumonia as a more frequent endpoint.

### Disability-inclusive research in social epidemiology: Sure, it can be done. But how?

**Authors:** Anne-Marie Bollier<sup>1</sup>, Ms Lauren Krnjacki<sup>1</sup>, Ms Georgia Katsikis<sup>1</sup>, Ms Vasiliky Kasidis<sup>1</sup>, Ms Jasmine Ozge<sup>1</sup>, Prof Anne Kavanagh<sup>1</sup>

**Affiliations:** <sup>1</sup>The University Of Melbourne, Carlton, Australia

#### Abstract:

**Context:** Inclusive research principles can be applied to all research methodologies. Yet, there is a misconception that participatory approaches are a bad match for quantitative research, and published examples of community-engaged quantitative research are scarce. This leaves epidemiologists with few resources on how to do inclusive research.

**Process:** Our academic unit received partial funding from the Victorian government to measure community attitudes toward people with disability in a population-based survey. We hired three co-researchers with disability to co-design the survey and co-author publications. In this presentation, we use our project to illustrate how disability-inclusive quantitative research can be done, and explore its challenges and benefits.

**Analysis:** We describe co-researcher involvement across all project phases, including validating survey content, planning analyses, and interpreting results. We challenge the notion that participatory approaches and quantitative methods are epistemologically opposed, noting that no research is purely objective, and that all researchers can benefit from practicing reflexivity and acknowledging lived experience. We advocate for pragmatism and transparency when deciding how deeply to involve co-researchers in tasks like survey design and statistical analyses. Finally, we discuss barriers such as entrenched power structures, inaccessible meeting rooms, and limited resources, as well as enabling factors such as trust, space to digress and debrief, and flexible deadlines.

**Outcomes:** Based on this review of our research process, we identify guiding principles and practical considerations for epidemiologists to conduct inclusive research without being tokenistic. We provide a realistic understanding of the challenges this approach brings and highlight the value it adds.

## Higher mortality for Aboriginal and Torres Strait Islander Australians hospitalised for cirrhosis

**Authors:** Associate Professor Patricia C Valery<sup>1</sup>, Mr Gregory Pratt<sup>1</sup>, Doctor Paul J Clark<sup>2</sup>, Doctor Christina M Bernardes<sup>1</sup>, Doctor Gunter Hartel<sup>1</sup>, Doctor Maree Toombs<sup>4</sup>, Professor Elizabeth Powell<sup>3</sup>

**Affiliations:** <sup>1</sup>QIMR Berghofer Medical Research Institute, Herston, Australia, <sup>2</sup>Mater Hospitals, Brisbane, Australia, <sup>3</sup>Princess Alexandra Hospital, Brisbane, Australia, <sup>4</sup>Rural Clinical School, Faculty of Medicine, University of Queensland, Toowoomba, Australia

### Abstract:

**Background:** Cirrhosis is the end stage of chronic liver diseases. In Queensland, the rate of cirrhosis hospitalization for Indigenous Australians during 2008-2016 was 3.5 times that for non-Indigenous Australians.[1] Using the Queensland study dataset,[1] we compare patient features and outcomes between Indigenous and non-Indigenous Australians with cirrhosis.

**Methods:** Hospital data on all patient admissions for cirrhosis during 2008-2016 were obtained. Adult patients were identified. Cumulative overall survival (Kaplan–Meier) and adjusted differences in survival (Cox regression) were calculated.

**Results:** Indigenous patients (n=678) compared with non-Indigenous patients (n=9,545) were significantly younger ( $p<0.001$ ), a higher proportion lived in remote/very remote ( $p<0.001$ ) and in most disadvantaged areas ( $p<0.001$ ). Alcohol was the most common aetiology for both groups, though a greater proportion of Indigenous patients had alcohol-related cirrhosis (72.0% vs. 47.9%;  $p<0.001$ ), and less had NAFLD/NASH (2.1% vs. 5.0%;  $p>0.001$ ) and cryptogenic (19.5% vs. 29.2%;  $p<0.001$ ) cirrhosis. A higher proportion of Indigenous patients died during the study period (55.8% vs. 50.1%;  $p=0.005$ ). The median survival was 1.42 years (IQR 0.25-3.58) for Indigenous and 1.67 years (IQR 0.33-4.25) for non-Indigenous patients. Overall survival was 26.3% and 35.5%, respectively ( $p=0.041$ ). In multivariable analysis, Indigenous status was not an independent predictor of survival (adjusted-HR=1.09 95%CI 0.96-1.23).

**Conclusion:** Indigenous Australians have higher mortality when hospitalised for cirrhosis. Specific plans for prevention and early diagnosis of cirrhosis should be designed by governments in consultation with Aboriginal and Torres Strait Islander communities to reduce the burden of liver diseases in this group.

1.Powell EE, et al. EClinicalMedicine 2019

## Have we underestimated the burden of cancer among Indigenous Queenslanders?

**Authors:** Dr Louise Mitchell<sup>1</sup>, Mr Nathan Dunn<sup>2</sup>, Ms Danica Cossio<sup>2</sup>, Ms Julie Moore<sup>2</sup>, Mr Gary Francois<sup>2</sup>, Professor Peter Baade<sup>3</sup>, Mr Daniel Williamson<sup>1</sup>

**Affiliations:** <sup>1</sup>Aboriginal and Torres Strait Islander Health Branch, Queensland Health, Brisbane, Australia, <sup>2</sup>Queensland Cancer Alliance, Queensland Health, Brisbane, Australia, <sup>3</sup>Cancer Council Queensland, Brisbane, Australia

### Abstract:

**Background:** Cancer was the leading cause of death among the Queensland Aboriginal and Torres Strait Islander population in 2017 but missing Indigenous identification may be underestimating the true burden.

**Methods:** The Queensland Cancer Register (QCR) was linked with other health administrative data collections to retrospectively determine the Indigenous status of Queenslanders diagnosed with cancer between 2002 – 2014. Incidence, mortality and survival outcomes were compared under three different methods: original identification, ever identified as Indigenous with in any data collection, and multi-stage median (MSM) algorithm determined Indigenous status implemented as described by Christensen et al (2016).

**Results:** Incidence counts from the original identification data were 3,998 cases among Aboriginal and Torres Strait Islander people, rising 48% to 5,907 when using MSM and an 86% increase (n=7,431) under the ever-identified approach.

Under MSM and ever approaches, age-standardised cancer incidence increased 1.4 and 1.8 times respectively, and age-standardised cancer mortality increased 1.5 and 1.8 times respectively compared to the original data. Relative survival (5-yrs) was higher under MSM (56%) and ever (59%) approaches compared with the original data (49%).

Cancers with similar (e.g. colorectal, breast or prostate cancer) or lower (e.g. melanoma) incidence and mortality rates compared to other Queenslanders in the original data, had significantly higher incidence and mortality rates using the MSM and ever identified methods.

**Conclusion:** Using linked data to improve Indigenous identification highlights previous under-reporting of the cancer burden among Aboriginal and Torres Strait Islander people in Queensland. This has implications for cancer prevention, detection and clinical care.

## **Imperfect, real-world linked data can quantify rheumatic heart disease: challenges, methods, results**

**Authors:** Dr Judith Katzenellenbogen<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Western Australia, Perth, Australia

### **Abstract:**

**Background:** Rheumatic Fever (RF) and Rheumatic Heart Disease (RHD) are endemic among Indigenous Australians. Quantitative evidence is key to ending RHD as a public health issue, but data are fragmented and incomplete. Aim: 1. Outline methods in creating the first quasi-national Australian linked dataset for RF/RHD; 2. Determine RF incidence (<45 years) and RHD prevalence (<60 years); 3. Quantify gaps in RF/RHD registration

**Methods:** We derived RF/RHD cohorts from linked RF/RHD register, inpatient hospital and death records data (2001-2017) covering five Australian jurisdictions (86% of Indigenous people). Additional datasets (e.g. surgery registry) were linked to expand data utility. Hospital diagnosis data were used to augment register information to ascertain RF and RHD cases (look-back to mid-2001). Given inaccuracies in hospital coding, a data-driven prediction algorithm identified hospital-only RHD cases.

**Results:** 1004 RF incident episodes (89% Indigenous, 53% female, 75% first-ever; 53% NT) pertaining to 946 people were identified (mid-2015 to mid-2017, 19% of which were not on registers, varying between 12% and 60% by jurisdiction). 9659 prevalent RHD cases at mid-2017 (51% indigenous, 66% female, 24% NT) were ascertained from hospital and register data, 65% of which were not registered (varying between 41% and 99% by jurisdiction). If raw hospital data were used instead of the prediction algorithm, 8191 (43%) additional, likely false-positive (misclassified) prevalent RHD cases would be identified.

**Conclusion:** Linked data from multiple sources and appropriate methods for case-ascertainment are critical to quantify the epidemiology of RF/RHD. This data will provide crucial information for health policy and monitoring.

## **'Kaat Koort' Aboriginal Brain Health Study: Implementing a multifactorial dementia prevention intervention trial in Western Australia (WA)**

**Authors:** Kyle Turner<sup>1</sup>, Lina Gubhaju<sup>1</sup>, Elsie Penny<sup>2</sup>, Sophie-Lee Carroll<sup>2</sup>, Susan Drmota<sup>2</sup>, Francine Eades<sup>3</sup>, Kerry Hunt<sup>3</sup>, Sandra Eades<sup>1</sup>

**Affiliations:** <sup>1</sup>University of Melbourne, Australia, <sup>2</sup>South West Aboriginal Medical Service (SWAMS), <sup>3</sup>Derbarl Yerrigan Health Service (DYHS)

### **Abstract:**

**Background:** The prevalence of dementia is three times higher among Indigenous Australians compared to the general Australian population. Effective, pragmatic and scalable interventions are required urgently to address the disproportionate burden of dementia in Indigenous Australians. This project aims to develop, implement and quantify the acceptability and effectiveness of a multifaceted, multidisciplinary Aboriginal Health Worker-led program to reduce the risk of dementia in Indigenous Australians, targeting individuals at high risk. Phase 1 explored knowledge and understanding of dementia in the community and potential barriers and facilitators to the successful implementation of the program.

**Method:** This research program is being conducted in partnership with the South West Aboriginal Medical Service (SWAMS) and Derbarl Yerrigan Health Service (DYHS). The interview guides for Phase 1 were devised in consultation with Aboriginal and non-Aboriginal research and clinic staff. Semi-structured interviews were conducted with Aboriginal men and women aged 35 years and above from and healthcare staff from SWAMS and DYHS. All interviews were digitally recorded and transcribed verbatim.

**Results:** Interviews were completed for 18 community members and 18 healthcare staff; analysis of the interview transcripts is ongoing. Preliminary analysis shows a poor understanding and awareness of dementia within the Indigenous community in south-west Western Australia. Participants were positive in response to a dementia prevention trial tailored for local Aboriginal peoples.

**Conclusions:** This research contributes to a baseline understanding of how older Aboriginal people and healthcare staff perceive dementia in the community. We received valuable insights from the community on the feasibility and cultural acceptability of the proposed program.

## **Next Generation: Youth Wellbeing Study': Chronic disease markers among young Aboriginal people**

**Authors:** Mr Chris McKay<sup>1</sup>, Dr Lina Gubhaju<sup>1</sup>, Dr Bridgette McNamara<sup>1</sup>, Professor Sandra Eades<sup>1</sup>, Dr Cheri Hotu<sup>2</sup>

**Affiliations:** <sup>1</sup>The University of Melbourne, Melbourne, Australia, <sup>2</sup>Baker Heart and Diabetes Institute, Alice Springs, Australia

### **Abstract:**

**Background:** Urgent action is required to understand factors influencing healthy trajectories for Aboriginal adolescents and young people in Australia to improve long-term health outcomes, particularly chronic diseases. The 'Next Generation' study, a longitudinal cohort of Aboriginal adolescents 10-24 years of age, quantified physical and mental health conditions, risk and protective behaviours, social and environmental factors and trajectories over time.

**Methods:** Young Aboriginal people aged 10-24 years in Central Australia, New South Wales and Western Australia were recruited by Aboriginal research officers through community organisations and researcher networks. The baseline survey captured: 1) social determinants; 2) Aboriginal cultural engagement/family and community connections; 3) physical health and injury; 4) social and emotional wellbeing; 5) tobacco, alcohol and drug use; and 6) sexual and reproductive health. Clinical assessments measured: anthropometry; cardio-metabolic risk markers; and kidney function. This presentation will focus on the cardio-metabolic outcomes and kidney function. Analyses will be stratified by age group (10-15 years; 16-24 years) and sex.

**Results:** To date, 631 participants have been recruited (58% are 10-15 years of age); recruitment will continue until 31 December 2019. Preliminary results including the prevalence of overweight and obesity, diabetes, high blood pressure, dyslipidaemia and albuminuria by age group and sex will be presented along with cross-sectional associations with individual-, family- and community-level factors.

**Conclusion:** This study will fill important evidence gaps about chronic disease risk and onset across the adolescent age spectrum. Findings will inform policy and practice for better management and prevention of chronic disease in Aboriginal people.

### **Preterm birth and intra-uterine growth restriction in WA children of immigrant backgrounds**

**Authors:** Ms Ifrah Abdullahi<sup>1,2</sup>, Dr Kingsley Wong<sup>2</sup>, Dr Emma Glasson<sup>2</sup>, Dr Raewyn Mutch<sup>1,2,3</sup>, Prof Nicholas de Klerk<sup>2</sup>, Dr Jenny Downs<sup>2,4</sup>, Dr Sarah Cherian<sup>1,3</sup>, Prof Helen Leonard<sup>2</sup>

**Affiliations:** <sup>1</sup>School of Paediatrics and Child Health, Faculty of Medical Sciences, The University Of Western Australia, Nedlands, Australia, <sup>2</sup>Telethon Kids Institute, Nedlands, Australia, <sup>3</sup>Department of General Paediatrics, Perth Children's Hospital, Perth, Australia, <sup>4</sup>School of Physiotherapy and Exercise Science, Curtin University, Bentley, Australia

#### **Abstract:**

To compare the prevalence of preterm birth, post term birth, intra-uterine growth retardation (IUGR) and distribution of Apgar scores in offspring of foreign-born women in WA with that of their Australian-born non-Indigenous and Indigenous counterparts. A population-based linked data study, involving 767,623 singleton births in WA between 1980 and 2010 was undertaken. These were compared amongst foreign-born women from low, lower-middle, upper middle and high income countries and Australian-born non-Indigenous and Indigenous women over two different time periods using multinomial logistic regression adjusted for covariates. Compared with Australian born non-Indigenous women, foreign-born women from low-income countries were at increased risk of extreme preterm and very early preterm births during the period from 1980-1996. During the period from 1997-2010, they were also at risk of extreme preterm, very early preterm and post-term birth. During this second time period other adverse outcomes included that for children of foreign-born women from low income and middle-income countries, there were increases in severe, moderate and mild IUGR compared to children of Australian-born non-Indigenous mothers. Uniformly higher risks of adverse outcomes were also demonstrated for infants of Indigenous mothers. Our findings illustrate the vulnerabilities of children born to foreign women from low and middle-income countries. The need for exploratory research examining mechanisms contributing to poorer birth outcomes following resettlement in a developed nation is highlighted. There is also a need to develop targeted interventions to improve outcomes for these women and their families.

## 4B – Epidemiological research and practice in cardio-metabolic diseases

Plaza Room P10, 1:15pm- 2:45pm

### Grip strength across the life course and prediabetes and type 2 diabetes

**Authors:** Miss Brooklyn Fraser<sup>1</sup>, Professor Leigh Blizzard<sup>1</sup>, Dr Marie-Jeanne Buscot<sup>1</sup>, Associate Professor Michael Schmidt<sup>2</sup>, Professor Terence Dwyer<sup>1,3</sup>, Professor Alison Venn<sup>1</sup>, Dr Costan Magnusson<sup>1,4</sup>

**Affiliations:** <sup>1</sup>*Menzies Institute For Medical Research, University Of Tasmania, Hobart, Australia*, <sup>2</sup>*Department of Kinesiology, University of Georgia, Athens, USA*, <sup>3</sup>*George Institute for Global Health, Oxford Martin School and Nuffield Department of Obstetrics & Gynaecology, Oxford University, Oxford, UK*, <sup>4</sup>*Research Centre of Applied and Preventive Cardiovascular Medicine, University of Turku, Turku, Finland*

#### Abstract:

**Background:** Although low child and adult grip strength is associated with adverse cardiometabolic health, it is unknown how grip strength across the life course associates with type 2 diabetes. This study identified the life course model that best describes the association between grip strength across the life course and prediabetes and type 2 diabetes in mid-adulthood.

**Methods:** Between 1985 and 2019, 265 participants had their grip strength measured using an isometric dynamometer in childhood (aged=9–15-years), early-adulthood (aged=26–36-years) and mid-adulthood (aged=36–49-years). In mid-adulthood, a fasting blood sample was collected and tested for glucose and glycated haemoglobin (HbA1c). Participants were categorised as having prediabetes or type 2 diabetes if fasting glucose levels were  $\geq 5.6$  mmol or if HbA1c levels were  $\geq 5.7\%$  (n=20). A Bayesian relevant life course exposure model examined the association between life course grip strength and future prediabetes and type 2 diabetes.

**Results:** Grip strength at each time point was equally associated with prediabetes and type 2 diabetes in mid-adulthood (childhood: 34%, early-adulthood: 39%, mid-adulthood: 27%), highlighting a relaxed accumulation life course model. A one standard deviation increase in life course cumulative exposure to grip strength decreased the odds of developing prediabetes and type 2 diabetes in mid-adulthood by 35% (OR=0.65, 95% Credible Interval=0.40, 0.97).

**Conclusions:** Higher grip strength levels across the life course could protect against the development of future prediabetes and type 2 diabetes. Strategies aimed at increasing muscular strength in childhood and maintaining these behaviours into adulthood could help improve future cardiometabolic health.

### Hypertension and Diabetes Attributable to Overweight and Obesity in PATH Cohorts

**Authors:** Dr Oscar Yang<sup>1</sup>, Prof Kaarin Anstey<sup>2</sup>, Mr Glenn Draper<sup>1</sup>, Mrs Alex Rauli<sup>1</sup>, Dr Hai Phung<sup>1</sup>

**Affiliations:** <sup>1</sup>*ACT Health, Canberra, Australia*, <sup>2</sup>*NeuRA, UNSW, Sydney, Australia*

#### Abstract:

**Background:** Hypertension and diabetes are the main illnesses associated with overweight and obesity. This study estimates the population-level contribution of overweight and obesity to hypertension and diabetes outcomes.

**Methods:** Data derived from The PATH Through Life Project were analysed. The association between risk factors and outcomes was investigated using multilevel regression modelling. Based on model predictions under various hypothetical weight scenarios, the number and proportion of hypertension and diabetes that could be potentially prevented were estimated.

**Results:** Overweight and obesity were associated with a large increase in risk of having hypertension and diabetes in the PATH cohorts. Comparing to those with normal weight, the odds ratio for having hypertension ranges from 1.9 (95% CI: 1.7-2.0) for overweight to 7.5 (95% CI: 5.7-10.0) for class 3 obesity. The proportion of hypertension prevalence attributable to overweight and obesity is estimated to be 25.4% (95% CI: 23.0-27.8%) for the three PATH cohorts overall. The odds ratio for developing diabetes ranges from 2.1 (95% CI: 1.6-2.6) for overweight to 14.4 (95% CI: 9.5-21.9) for class 3 obesity in the 40+ and 60+ cohorts. The estimated proportions of diabetes attributable to overweight and obesity is 55.7% (95% CI: 47.0-63.0%) in these two cohorts.

**Conclusions:** Overweight and obesity contribute to a large proportion of the prevalence of hypertension and diabetes in the PATH cohorts. Effective intervention strategies to reduce the prevalence of overweight and obese can have significant beneficial effects on healthcare burden caused by hypertension and diabetes.

## Prevalence of uncontrolled hypertension in Australia General Practice

**Authors:** Ms Jacqueline Roseleur<sup>1</sup>, Dr Carla Bernardo<sup>2</sup>, Dr David González-Chica<sup>2,5</sup>, Professor Gillian Harvey<sup>3</sup>, Professor Jonathan Karnon<sup>1,4</sup>, Professor Nigel Stocks<sup>2</sup>

**Affiliations:** <sup>1</sup> School of Public Health, Faculty of Health and Medical Sciences, The University of Adelaide, Adelaide, Australia, <sup>2</sup>Discipline of General Practice, Adelaide Medical School, The University of Adelaide, Adelaide, Australia, <sup>3</sup>Adelaide Nursing School, Faculty of Health and Medical Sciences, The University of Adelaide, Adelaide, Australia, <sup>4</sup>College of Medicine and Public Health, Flinders University, Adelaide, Australia, <sup>5</sup>Adelaide Rural Clinical School, University of Adelaide, Adelaide, Australia

### Abstract:

**Background:** Hypertension is a major risk factor for chronic diseases and the largest contributor to cardiovascular morbidity and mortality. The aim of this study was to assess the frequency and possible determinants of hypertension control within Australian general practices.

**Methods:** This was a cross-sectional study using data from the National Prescribing Service MedicineInsight database, which contains de-identified electronic medical records of 1.9 million adult patients attending 650 general practice across Australia. Diagnosis of hypertension and other chronic conditions were identified from different fields in the dataset (diagnosis, encounter reason, prescriptions) from 2015 to 2017. Uncontrolled hypertension was defined as a blood pressure reading of  $\geq 140/90$  mm Hg in 2017 among patients with a previous diagnosis of hypertension.

**Results:** Preliminary results identified 537,648 (29%) patients with hypertension; 78% had their blood pressure measured in 2017 and 51% had received a prescription for anti-hypertensive therapy in the last 6 months of 2017. Of those with a blood pressure measure in 2017, 49% had uncontrolled hypertension at their last observation. The proportion of uncontrolled hypertension by severity was 37%, 10% and 2% for grades 1, 2 and 3 hypertension respectively. Uncontrolled hypertension was 18% less frequent among patients with a history of diabetes, cardiac conditions or chronic kidney disease and more frequent in those prescribed four or more classes of antihypertensive therapy.

**Conclusions:** Consistent with findings from other countries, there is a large population with poorly controlled hypertension, suggesting a need for additional strategies to manage hypertension in general practice in Australia.

## All-cause mortality under hypothetical interventions on physical activity and TV viewing

**Authors:** Ms Yi Yang<sup>1</sup>

**Affiliations:** <sup>1</sup>Cancer Council Victoria, Melbourne, Australia, <sup>2</sup>The University of Melbourne, Melbourne, Australia

### Abstract:

**Background:** Long-term effects of insufficient physical activity and sedentary behaviors such as TV viewing on mortality have been inferred from observational studies. The associations observed do not allow inferences about the potential effects of population interventions, and could be subject to bias due to time-varying confounding.

**Methods:** Using data from the Australian Diabetes, Obesity and Lifestyle Study, collected at three time points, we applied the parametric g-formula to estimate cumulative risks of death under hypothetical interventions on physical activity and/or TV viewing, while adjusting for time-varying confounding. We compared these risks to the risk under no intervention, and to the risk under a hypothetical 'worst-case' scenario in which all participants had low physical activity (<30 minutes/week) and high TV viewing ( $\geq 4$  hours/day).

**Results:** In the 6,377 participants followed for 13 years from 2004-05 to death or censoring in 2017, the observed risk of death was 5.8%. The most effective intervention was to increase weekly physical activity to >300 minutes (RR=0.66, 0.46 to 0.86 compared with the 'worst-case' scenario; and RR=0.83, 0.73 to 0.94 compared with no intervention). Reducing daily TV viewing to <2 hours in addition to physical activity interventions did not show added survival benefits. Reducing TV viewing alone was least effective in reducing mortality (RR=0.85, 0.60 to 1.10 compared with the worst-case scenario; and RR=1.06, 0.93 to 1.20 compared with no intervention).

**Conclusion:** Our results suggest that, in this cohort of Australian adults, the risk of death could have been lowered by sustained interventions that increased physical activity.

## **Premenopausal cardiovascular disease and risk of early menopause: a pooled analysis**

**Authors:** Dr Hsin-Fang Chung<sup>1</sup>

**Affiliations:** <sup>1</sup>*School of Public Health, University of Queensland, Brisbane, Australia*

### **Abstract:**

**Background:** Early menopause is associated with an increased risk of subsequent cardiovascular disease (CVD), but little is known about the reverse association. This study aimed to examine whether premenopausal CVD events are associated with early age at natural menopause.

**Methods:** We pooled individual-level data of 177,131 women from nine cohort studies participating in the International Collaboration for a Life Course Approach to Reproductive Health and Chronic Disease Events (InterLACE) consortium. Multinomial logistic regression models were used to estimate multivariable relative risk ratios (RRR) and 95% confidence intervals (CI) for the association between age at onset of premenopausal CVD events and age at menopause.

**Results:** There were 1561 (0.9%) women experiencing premenopausal CVD events, including 1130 coronary heart disease (CHD) and 469 stroke. Compared with women without any premenopausal CVD events, women who had a first CVD event before age 35 years were at higher risk of experiencing menopause before age 45 years (early menopause), with adjusted RRR (95% CI) of 1.92 (1.17-3.14) for any CVD, 1.86 (1.01-3.43) for CHD, and 2.17 (1.43-3.30) for stroke. However, women who had a first CVD event after age 35 years were more likely to experience menopause at the expected age (around 50-51 years)

**Conclusions:** Premenopausal CVD before age 35 years was associated with a higher risk of early menopause, while premenopausal CVD after 35 years indicated a normal menopause at around 50-51 years. Shared genetic and environmental factors, such as smoking, as well as compromised vasculature following CVD events, may contribute to this outcome.

## **Out-of-hospital cardiac arrest in NSW, 2017**

**Authors:** Ms Sophie Dyson<sup>1</sup>, Dr Lee Taylor<sup>2</sup>, Dr Michael Nelson<sup>2</sup>, Dr Catherine Francis<sup>2</sup>, Maria Alfaro-Ramirez<sup>2</sup>, Dr Marianne Gale<sup>2</sup>

**Affiliations:** <sup>1</sup>*NSW Ambulance, Rozella, Australia*, <sup>2</sup>*NSW Ministry of Health, St Leonards, Australia*

### **Abstract:**

**Background:** Out-of-hospital cardiac arrest (OHCA) is the subject of international research and community interest. Survival rates from OHCA are generally low, however, there is limited information about OHCA outcomes in NSW. The aim of the project was to provide an analysis of OHCA in NSW in 2017, and to inform the discussion around the potential for publicly accessible defibrillators to improve survival from OHCA.

**Methods:** NSW Ambulance developed an Out-of-Hospital Cardiac Arrest Registry (OHCAR) containing details of OHCA from 1 January 2017 onwards. The OHCAR includes Utstein variables, which are endorsed by the international resuscitation community for consistency and comparability between jurisdictions. The OHCAR was linked to the NSW Health Emergency Department Data Collection (EDDC), Admitted Patient Data Collection (APDC) and NSW deaths registrations to determine survival to hospital discharge.

**Results:** In 2017, NSW Ambulance attended 8,222 OHCA and made 3,183 resuscitation attempts. Of these, 28% survived to the emergency department (ED) and 12% survived to hospital discharge. The Utstein patient subgroup includes patients with paramedic-attempted resuscitation, bystander-witnessed cardiac arrest and shockable cardiac rhythm. Out of 501 patients who met the Utstein subgroup criteria, 48% survived to ED and 30% survived to hospital discharge. Rates of bystander CPR were 33% overall and 64% for bystander-witnessed OHCA. Bystanders used defibrillators in 2% of all OHCA, and 7% of bystander-witnessed OHCA.

**Conclusions:** Survival rates from OHCA in NSW in 2017 were comparable to those in other jurisdictions. The results will help to inform the discussion around improving patient outcomes from OHCA.

## **Workforce participation of working age older people with cardiovascular disease in Australia**

**Authors:** Mr Muhammad Shahdaat Bin Sayeed<sup>1</sup>, Dr Grace Joshy<sup>1</sup>, Professor Emily Banks<sup>1</sup>, Dr Rosemary Korda<sup>1</sup>

**Affiliations:** <sup>1</sup>*National Centre for Epidemiology and Population Health, Research School of Population Health, Australian National University, Acton, Australia*

### **Abstract:**

**Background:** Workforce participation is reduced in people with Cardiovascular disease (CVD); large scale evidence from Australia on this relationship is limited. We quantified workforce participation and retirement patterns in people aged 45-65 years living with versus without CVD, overall and according to a range of CVD subtypes, and whether this was modified by other factors.

**Methods:** Baseline data (2006-2009) from the 45 and Up Study (n=267,153) were linked to hospitalisations data through 'Centre for Health Record Linkage' to ascertain CVD status of the participants at enrolment. Modified Poisson regression measured prevalence ratios (PRs) for non-participation in workforce and retirement due to ill health in those with versus without CVD; generalised linear models estimated differences in average hours of paid work per week.

**Results:** There were 8670 (5.3%) participants living with and 154,892 (94.7%) without CVD. Compared to those without CVD, those living with CVD were more likely to be out of the workforce (42.9% vs 24.5%; PR 1.42 (95%CI 1.39-1.46)); higher PRs were observed for those with cerebrovascular disease, heart failure and peripheral arterial disease. Among those in paid work, participants with CVD worked fewer hours/week (mean difference -0.83 (95%CI-1.04, -0.61) hours); retirees with CVD were more likely to be retired due to ill health (54.6% vs 24.4%; PR 2.05 (95%CI 1.99-2.12)). The PRs for workforce participation were also similar across population subgroups based on sociodemographic and other health factors.

**Conclusions:** Lower workforce participation was observed in those with versus without CVD for all CVD subtypes and across population subgroups.

### **Prevention of acute coronary events: are people with COPD missing out?**

**Authors:** Associate Professor Lianne Parkin<sup>1</sup>, Mr Joshua Quon<sup>2</sup>, Associate Professor Katrina Sharples<sup>3</sup>, Mr Dave Barson<sup>1</sup>, Dr Jack Dummer<sup>4</sup>

**Affiliations:** <sup>1</sup>Department of Preventive and Social Medicine, University Of Otago, Dunedin, New Zealand, <sup>2</sup>Dunedin School of Medicine, University of Otago, Dunedin, New Zealand, <sup>3</sup>Department of Mathematics and Statistics, University of Otago, Dunedin, New Zealand, <sup>4</sup>Department of Medicine, University of Otago, Dunedin, New Zealand

#### **Abstract:**

**Background:** Clinical guidelines recommend that beta-blockers and other cardiovascular prevention drugs are prescribed to people with acute coronary syndrome (ACS), including those with co-morbid chronic obstructive pulmonary disease (COPD), to reduce the risk of further coronary events and death. However, investigations in several countries have found that beta-blockers are under-prescribed to people with COPD – although most studies were based on unrepresentative sub-groups of patients.

**Methods:** We used routinely collected health and pharmaceutical dispensing data to establish a national cohort of people with COPD, to identify those who had an ACS event during follow-up, and to examine the use of beta-blockers and other cardiovascular prevention drugs before and after non-fatal ACS events.

**Results:** The study cohort included 83,435 patients aged ≥45 years, with 290,400 person-years of follow-up. Of 2,637 patients with ≥1 ACS admission during follow-up, only 56.6% received a beta-blocker in the 6 months following the first admission. By contrast, the proportions who received aspirin and a statin were much higher (87.7% and 81%, respectively). Patients with severe COPD were less likely to receive a beta-blocker than those with less severe disease (adjusted relative risk 0.80 [95% CI 0.72–0.88]).

**Conclusions:** Beta-blocker use following an ACS admission was much lower than would be expected based on the results of general audits of ACS management in New Zealand. Along with the higher proportions using aspirin and statins, and the decreasing use of beta-blockers with increasing COPD severity, this suggests a particular reluctance to prescribe beta-blockers to patients with COPD.

## 4C – Epidemiological research and practice in child and maternal health

Plaza Room P11, 1:15pm- 2:45pm

### Associations between masculinity and suicidal ideation among adolescent males

**Authors:** Doctor Tania King<sup>1</sup>, Ms Marissa Shields<sup>1</sup>, Doctor Victor Sojo<sup>1</sup>, Doctor Galina Daraganova<sup>2</sup>, Doctor Dianne Currier<sup>1</sup>, Associate Professor Adrienne O'Neil<sup>3</sup>, Doctor Kylie King<sup>1</sup>, Associate Professor Allison Milner<sup>1</sup>

**Affiliations:** <sup>1</sup>University Of Melbourne, Carlton, Australia, <sup>2</sup>Australian Institute of Family Studies, Melbourne, Australia, <sup>3</sup>Deakin University, Geelong, Australia

#### Abstract:

**Background:** On many health indicators such as suicide, adolescent boys and young men fare worse than girls. Traditional masculine-typed behaviors have been associated with deleterious effects on health, yet there has been little quantitative examination of associations between masculinity and mental health and suicide, particularly among boys/young men. This study aimed to examine associations between endorsement of masculine norms and suicidal ideation in a sample of adolescents.

**Methods:** A prospective cohort design, this study drew on a sample of 829 Australian boys/young men from the Australian Longitudinal Study on Male Health. Boys were 15-18 years at baseline. Masculine norms (measured Wave 1), were from the Conformity to Masculine Norms Inventory (CMNI-22). Suicidal ideation (measured Wave 2) was a single-item from the Youth Risk Behaviour Survey. Logistic regression analysis was conducted, adjusting for available confounders including parental education, Indigenous Australian identity and area disadvantage.

**Results:** In adjusted models, greater conformity to violent norms (OR 1.23, 95%CI: 1.03-1.47) and self-reliance norms (OR 1.49, 95% Confidence Interval (CI): 1.15-1.70) were associated with higher risk of suicidal ideation. Greater conformity to norms regarding heterosexuality was associated with reduced risk of suicidal ideation (OR 0.80, 95%CI: 0.68-0.91).

**Conclusions:** These results suggest that conforming to certain masculine norms may be deleterious for young male mental health and highlight the importance of presenting multiple ways of being a male. This is vital in shifting social norms toward a society that supports various, and varying forms of masculinity, particularly in terms of sexual orientation.

### Psychotropic Medicines are being Initiated at Younger Ages among Children with Autism

**Authors:** Dr Kylie-Ann Mallitt<sup>1,2</sup>, Dr Kathleen Falster<sup>1</sup>, Dr Helga Zoega<sup>1</sup>, Dr Alys Havard<sup>1</sup>, Professor Louisa Jorm<sup>1</sup>

**Affiliations:** <sup>1</sup>Centre for Big Data Research in Health, UNSW Sydney, Australia, <sup>2</sup>School of Women's and Children's Health, UNSW Sydney, Australia

#### Abstract:

**Background:** Autism Spectrum Disorder (ASD) is a developmental condition characterised by social communication deficits and restricted and repetitive behaviours. Behavioural therapy is the gold-standard treatment for ASD. However, psychotropic medicines are commonly and increasingly prescribed to treat associated symptoms, such as aggression and hyperactivity. In this study we investigated age at first psychotropic medicine use among a population-based cohort of Australian children with ASD.

**Methods:** We identified a cohort of Australian children with  $\geq 1$  ASD-specific Medicare Benefits Schedule (MBS) claims between 2003-2014 using linked MBS and Pharmaceutical Benefits Scheme (PBS) claims for a 10% sample of the Australian population. Cumulative incidence of  $\geq 1$  dispensing of psychotropic medicines was calculated by year of birth, and further stratified by sex, medicine type, state, and rurality.

**Results:** Among 3548 children aged 2-10 years with  $\geq 1$  ASD-specific MBS claims, 905 (25.5%) had  $\geq 1$  dispensing of psychotropic medicine. Children with ASD were initiated on psychotropic medicine at younger ages in more recent years. This was particularly evident among males, children who were also prescribed stimulants, and those from non-metropolitan areas. The proportion of children who had initiated psychotropic medicine use by 5-years of age increased from 5.9% of children born in 2004 (n=598) to 10.9% of children born in 2009 (n=357).

**Conclusions:** Psychotropic medicines are increasingly being prescribed to children at an earlier age, especially to males and non-metropolitan residents. However, studies of the benefits and effectiveness are few, particularly among very young children. Further research is urgently needed in this area.

### **The association between breastfeeding and allergic and non-allergic asthma phenotypes in childhood.**

**Authors:** Dr Rachel Peters<sup>1,2</sup>, Dr Tegan Kay<sup>1,2</sup>, Dr Adrian Lowe<sup>3</sup>, Prof Anne-Louise Ponsonby<sup>1,2</sup>, Dr Caroline Lodge<sup>3</sup>, Prof Shyamali Dharmage<sup>3</sup>, Dr Jennifer Koplin<sup>1,2,3</sup>

**Affiliations:** <sup>1</sup>*Murdoch Children's Research Institute, Parkville, Australia*, <sup>2</sup>*Department of Paediatrics, University of Melbourne, Parkville, Australia*, <sup>3</sup>*School of Population and Global Health, University of Melbourne, Parkville, Australia*

#### **Abstract:**

**Background:** Longer duration of breastfeeding may be protective against asthma, however data is limited regarding the differential effect of breastfeeding on allergic and non-allergic asthma phenotypes.

**Methods:** This analysis includes 3663 children who completed the 6-year-old follow-up of the population-based, longitudinal HealthNuts study. At age 1, information on breastfeeding and early-life allergy were collected. At age 6, questionnaires captured information on asthma and skin prick tests to food and aeroallergens distinguished asthma into allergic and non-allergic phenotypes. The association between breastfeeding and asthma phenotypes was examined using logistic regression, adjusting for confounders identified by a DAG.

**Results:** Breastfeeding was initiated in 96%; mean duration of exclusive breastfeeding and overall duration was 3.4 months ( $\pm 2.4m$ ) and 10.0 months ( $\pm 5.9m$ ), respectively. Breastfeeding initiation was not associated with allergic or non-allergic asthma (aOR 0.69, 95%CI 0.36-1.32 and aOR 0.80, 95%CI 0.29-2.21, respectively) when compared to never breastfeeding. Results were similar for length of exclusiveness and overall duration of breastfeeding. However, an inverse association was observed for increased duration of breastfeeding (per month increase) and allergic asthma, among children without eczema in their first year (aOR 0.95, 95%CI 0.92-0.98); this association was not evident among children who were diagnosed with eczema prior to cessation of breastfeeding (interaction  $p=0.02$ ).

**Conclusion:** Increased duration of breastfeeding may confer a modest inverse association with allergic asthma in children without eczema, but not non-allergic asthma. Further investigations are required among infants with eczema to account for potential reverse causation due to the influence of early life allergic disease.

### **Association between duration of breastfeeding and childhood obesity at 5 years**

**Authors:** Dr Seema Mhrshahi<sup>1</sup>, Mr Danai Modi<sup>1</sup>, Ms Lene Seidler<sup>2</sup>, Mr David Espinoza<sup>2</sup>, Professor Lisa Askie<sup>2</sup>

**Affiliations:** <sup>1</sup>*University Of Sydney, Sydney, Australia*, <sup>2</sup>*NHMRC Clinical Trials Centre, University of Sydney, Sydney, Australia*

#### **Abstract:**

**Background:** It is unclear whether breastfeeding is associated with childhood obesity, with some studies failing to establish a link between adiposity and breastfeeding in infants, and others finding that breastfeeding has a protective effect. Our purpose was to determine whether the duration of breastfeeding in early life influences the prevalence of overweight and obesity in children at the age of 5 years.

**Methods:** Data about breastfeeding duration, BMI and other covariates were collected from 1045 infants who participated in the control group of four randomised controlled trials (Healthy Beginnings, Nourish, The Melbourne INFANT Program, or POI New Zealand) conducted across Australia and New Zealand. A multiple linear regression model and a multivariable logistic regression model adjusting for covariates was created.

**Results:** We found that breastfeeding ( $\geq 6$  months or  $< 6$  months), parental BMI and birth weight were predictive of excess weight at the age of 5 years. Children that were breastfed for at least 6 months on average had a BMI z-score that was 0.279 lower than children that were breastfed for less than 6 months (95% CI = -0.443 to -0.116) when adjusting for parental BMI, parental education, birth weight, TV/game time and gender ( $p < 0.001$ ).

**Conclusion:** Our findings concur with other studies that show the duration of breastfeeding is associated overweight and obesity in infants. Our findings also support current WHO and NHMRC guidelines on prolonged breastfeeding to lower the risk of childhood obesity.

### **Spatial dependence of risk factors for stillbirth in Queensland**

**Authors:** Ms. Jessica Sexton<sup>1,3</sup>, Dr. Scott Lieske<sup>2</sup>, Dr. Michael Coory<sup>1,3</sup>, Professor Sailesh Kumar<sup>1,3</sup>, Professor Vicki Flenady<sup>1,3</sup>

**Affiliations:** <sup>1</sup>*University Of Queensland - Mater Research Institute, South Brisbane, Australia*, <sup>2</sup>*University of Queensland, St. Lucia, Australia*, <sup>3</sup>*NHMRC Centre of Research Excellence in Stillbirth, South Brisbane, Australia*

#### **Abstract:**

**Background:** Australia's Health 2018 (AIHW) identified a gap in our understanding of stillbirth due to an inability to identify and respond to vulnerable populations through existing health data. This study addresses this specific gap for stillbirth risk in Queensland.

**Methods:** Clinical data for all singleton births at the Mater Mothers' Hospital (MMH) in Brisbane, QLD (1997-2012) were collected retrospectively. Stillbirths with major abnormalities were excluded. We quantify key risk factors for stillbirth using logistic regression and describe non-constant intensity patterns while accounting for clustering (spatial dependence) using semivariograms and Ripley's K function. A geodatabase was developed using publicly available spatial data and MMH clinical data.

**Results:** There were 282 eligible singleton stillbirths (rate 2.3 per 1000) among 121,200 births. We found that overweight/obesity (OR 1.65, 95% CI 1.28-2.11), public insurance (OR 1.82, 95% CI 1.42-2.34), smoking (OR 1.61, 95% CI 1.17-2.21), pre-eclampsia (OR 2.5, 95% CI 1.20-5.41), diabetes (OR 3.01, 95% CI 1.08-8.42), previous stillbirth (OR 3.89, 95% CI 1.92-7.89), small for gestational age (OR 4.08, 95% CI 3.10-5.37), fetal growth restriction (OR 4.87, 95% CI 1.89-12.54), and pre-term birth (OR 18.6, 95% CI 14.5-23.8) were associated with increased risk of stillbirth. Our semivariograms indicate that these risk factors demonstrate distinct, spatially dependent geographic patterns.

**Conclusions:** For the first time, we identify unique, statistically significant spatial patterns for risk factors among stillbirths in Queensland. Improvement in access to clinical data with postcode-level locality at larger population levels is needed to fully assess spatial risk of adverse pregnancy outcomes in Australia.

### **Does bariatric surgery between a first and second pregnancy improve pregnancy outcomes?**

**Authors:** **Dr Ibinabo Ibiebele**<sup>1,2</sup>, Dr Felicity Gallimore<sup>1,2,3</sup>, Associate Professor Margaret Schnitzler<sup>1,4</sup>, Associate Professor Siranda Torvaldsen<sup>1,2,5</sup>, Associate Professor Jane Ford<sup>1,2</sup>

**Affiliations:** <sup>1</sup>The University of Sydney Northern Clinical School, Clinical and Population Perinatal Health Research, St Leonards, Australia, <sup>2</sup>Northern Sydney Local Health District, Kolling Institute, St Leonards, Australia, <sup>3</sup>North Shore Private Hospital, St Leonards, Australia, <sup>4</sup>Department of Colorectal Surgery, Royal North Shore Hospital, St Leonards, Australia, <sup>5</sup>School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia

#### **Abstract:**

**Background:** Bariatric surgery is becoming more common among women of reproductive age. The aim of this study was to compare pregnancy outcomes for women having bariatric surgery with a non-bariatric population having a first and second pregnancy.

**Methods:** This population-based study included all women aged 15–45 years with a New South Wales (NSW) hospital record (2002–2014) who also gave birth in NSW (1994–2015; n=1,606,737 women). Linked hospital, birth and death data were used. The exposure was primary bariatric surgery. Pregnancy outcomes were compared between bariatric and non-bariatric groups using logistic regression, and between first and second pregnancies using repeated measures logistic regression.

**Results:** During 2002–2014, there was a near 12-fold increase in hospitalisations for primary bariatric surgery. Compared to the general birthing population, women who had bariatric surgery experienced higher rates of hypertension, diabetes and preterm birth. Among women who had bariatric surgery between a first and second pregnancy, there were reduced rates of hypertension (OR 0.39, 95%CI 0.29-0.53), spontaneous preterm birth (OR 0.37, 95%CI 0.16-0.86), large-for-gestational age neonates (OR 0.63, 95%CI 0.44-0.88) and admission of neonates to special care nursery or neonatal intensive care (OR 0.64, 95%CI 0.46-0.90) in the second pregnancy. Although not statistically significant, there were reduced rates of gestational diabetes in the pregnancy following bariatric surgery.

**Conclusion:** Bariatric surgery between a first and second pregnancy was associated with reductions in obesity-related adverse pregnancy outcomes. Bariatric surgery for the management of obesity is associated with improved pregnancy outcomes in a subsequent pregnancy.

### **Cardiovascular outcomes of women in NSW with hypertensive complications of pregnancy**

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#### **Abstract:**

**Background:** Hypertension in pregnancy (HIP) affects 5-10% of pregnancies worldwide and is independently associated with the development of premature cardiovascular disease (CVD). The risk in different populations, contribution of other pregnancy complications, and interplay with traditional CVD risk factors is incompletely understood.

**Methods:** We carried out a population-based retrospective record linkage cohort study of 527 943 women who gave birth in New South Wales between January 2002 and December 2016, of whom 62 949 had ever had HIP. A multivariable time-dependent Cox regression model was used to estimate the association between HIP and major cardiovascular (CV) events, adjusting for age, smoking, gestational diabetes, preterm birth and socio-economic status for area of first birth (SEIFA). A major CV event was defined as hospitalisation or death with a diagnosis of ischaemic heart disease, stroke, hypertensive heart disease or hypertensive renal disease.

**Results:** After adjusting for smoking, age, gestational diabetes, preterm birth and SEIFA, compared to non-smokers with no HIP exposure, the rate of a CV event was 2.5 times higher for women with late onset HIP, 4 times higher for smokers with late onset HIP, 5 times higher for non-smokers with early onset HIP and 23 times higher for smokers with early onset HIP.

**Conclusion:** HIP increases the risk of a major CV event, with smokers who have had early onset HIP at highest risk.

### **Abnormally invasive placenta: outcomes for subsequent births**

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#### **Abstract:**

**Background:** Abnormally invasive placenta (AIP; placenta accreta, increta or percreta) involves abnormal adherence of the placenta to the myometrium, and is associated with maternal and perinatal morbidity and mortality. Despite increasing incidence, little is known about outcomes for subsequent pregnancies. This study aims to investigate maternal and neonatal outcomes for subsequent pregnancies.

**Methods:** A population-based record linkage study is being undertaken, including women who had at least a first, second or third birth in New South Wales between 2003 and 2016. Data were obtained from birth records, hospital admissions and death registrations. Modified Poisson regression models were performed, including women matched on exact criteria and propensity score.

**Results:** We identified recurrence in 27 (4.7%) of second and nine (7.5%) of third pregnancies after AIP in the preceding pregnancy (570 second and 120 third births). Subsequent deliveries had higher rates of intra- and post-partum haemorrhage (21.2% and 18.3% after AIP in the first and second pregnancy, respectively, compared to 8.0% of 365,535 without), transfusion (4.2% and 6.7% compared to 1.0%) and manual removal of placenta (12.3% and 10.5% vs 1.3%). Among infants, there were higher rates of preterm birth (11.2% and 13.7% vs 6.0%) and the neonatal adverse outcomes indicator (6.2% and 8.9% vs 4.3%).

**Conclusions:** Our findings suggest that there are some risks to maternal and neonatal morbidity for pregnancies subsequent to pregnancies with AIP. The results of this study may be used to inform counselling of women with AIP on the risks of future pregnancies.

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