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ABSTRACT BOOK

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Longitudinal epidemiology of multiple sclerosis in Townsville, Queensland, Australia, 2012-2022

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: Townsville (population=195,564, latitude=19.3°S) is the largest city in the Northern Queensland region of Australia, an area previously defined as a low/medium-prevalence zone for multiple sclerosis (MS). However, the epidemiology of MS in this region since 1981 is unknown.
Aims: To assess the 2012 to 2022 epidemiology of MS in Townsville.
Methods: Demographic/clinical data extracted from medical records of MS cases identified by public and private clinicians. Prevalence, and incidence and mortality rates estimated for 2012 and 2022 and age-standardised to the 2022 Australian population. Differences in estimates assessed by Poisson regression.
Results: Females and relapsing-remitting MS comprised most cases. The 2012 prevalence was 45.0/100,000 (50.4/100,000 age-standardised, F/M sex ratio=2.0). Prevalence increased by 188% in 2022, with a crude prevalence of 86.9/100,000 (91.7/100,000 age-standardised, F/M sex ratio=2.7). 2012-22 MS onset incidence rate was 3.8/100,000 person-years (age-standardised 3.5/100,000, F/M sex ratio=2.7). Mean age increased from 49.4 to 57.3 years. Age-standardised mortality rate was 0.9/100,000 person-years, with standardised mortality ratio=1.0.
Discussion: These results show that Townsville is a high-frequency region for MS, with prevalence and incidence on par with that seen at higher latitudes in Australia. These results have implications for clinical practice in the region and for organisational resource allocation.

Global antimicrobial-resistance drivers: an ecological country-level study at the human-animal interface

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background. Antimicrobial resistance (AMR) is a pressing, holistic, and multisectoral challenge facing contemporary global health. In this study we assessed the associations between socioeconomic, anthropogenic, and environmental indicators and country-level rates of AMR in humans and food-producing animals.
Methods. In this modelling study, we obtained data on Carbapenem-resistant Acinetobacter baumanii and Pseudomonas aeruginosa, third generation cephalosporins-resistant Escherichia coli and Klebsiella pneumoniae, oxacilin-resistant Staphylococcus aureus and vancomicyn-resistant Enterococcus faecium AMR in humans and food-producing animals from publicly available sources, including WHO, World Bank, and Center for Disease Dynamics Economics and Policy. AMR in food-producing animals presented a combined prevalence of AMR exposure in cattle, pigs, and chickens. We used multivariable β regression models to determine the adjusted association between human and food-producing animal AMR rates and an array of ecological country-level indicators. Human AMR rates were classified according to the WHO priority pathogens list and antibiotic–bacterium pairs.
Findings. Significant associations were identified between animal antimicrobial consumption and AMR in food- producing animals (OR 1·05 [95% CI 1·01–1·10]; p=0·013), and between human antimicrobial consumption and AMR specifically in WHO critical priority (1·06 [1·00–1·12]; p=0·035) and high priority (1·22 [1·09–1·37]; p<0·0001) pathogens. Bidirectional associations were also found: animal antibiotic consumption was positively linked with resistance in critical priority human pathogens (1·07 [1·01–1·13]; p=0·020) and human antibiotic consumption was positively linked with animal AMR (1·05 [1·01–1·09]; p=0·010). Carbapenem-resistant Acinetobacter baumanii, third generation cephalosporins-resistant Escherichia coli, and oxacillin-resistant Staphylococcus aureus all had significant associations with animal antibiotic consumption. Analyses also suggested significant roles of socioeconomics, including governance on AMR rates in humans and animals.
Interpretation. Reduced rates of antibiotic consumption alone will not be sufficient to combat the rising worldwide prevalence of AMR. Control methods should focus on poverty reduction and aim to prevent AMR transmission across different One Health domains while accounting for domain-specific risk factors. The levelling up of livestock surveillance systems to better match those reporting on human AMR, and, strengthening all surveillance efforts, particularly in low-income and middle-income countries, are pressing priorities.

New & Pre-existing Diabetes in COVID-19: Comparing Socio-demographics, Clinical Features, & Outcomes

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: The connection between COVID-19 and new-onset diabetes has been established, but the effects on patients in low-resource settings and their short-term outcomes post-hospital discharge is yet to be explored. This study aimed to examine sociodemographic factors, clinical features at admission, and short-term outcomes in COVID-19 patients with new-onset and pre-existing diabetes.

Methods: This prospective observational study involved 169 adult COVID-19 patients with either new-onset or pre-existing diabetes admitted to Dhaka Medical College Hospital's COVID-19 unit in April–October 2021. 29 patients died in the hospital, four left against medical advice, and 135 of the 136 survivors returned for follow-up two weeks after discharge. Bivariate analysis and Cox proportional hazard models were used to compare factors and assess death risk factors, respectively, using Stata Version 17.

Results: At baseline, 30.18% of patients had new-onset diabetes, while 69.80% had pre-existing diabetes. The average age was 56.38 ± 14.21 years, with 60.36% being male. A significantly higher percentage of COVID-19 patients with new-onset diabetes were smokers than those with pre-existing diabetes ($p = 0.003$). Pre-existing diabetes correlated with increased lung involvement ($p = 0.047$) and comorbidities ($p = 0.002$). Older age, family income exceeding 35000 BDT (335.5$), and BMI over 25 kg/m2 were significant predictors of in-hospital mortality among diabetic COVID-19 patients. Two weeks post-discharge, 8.89% had resolved diabetes, while 19.26% still had new-onset diabetes. Smoking significantly determined the persistence of new-onset diabetes among COVID-19 survivors ($p = 0.001$).

Conclusion: Policymakers should prioritize promoting smoking cessation and weight reduction to reduce new-onset diabetes in COVID-19 survivors.

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Impact of secondhand smoke on air quality in partially enclosed hospitality venues

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Smoking is a leading cause of premature mortality and morbidity globally. The pollutants generated from smoke are not only harmful to smokers, but also to those exposed to secondhand smoke. Although smoke-free policies have been widely implemented in indoor public spaces, outdoor smoking control policies have developed much more slowly. As a result of increasingly restrictive indoor smoke-free policies in many countries, there is a tendency for tobacco smoking to move outdoors into partially enclosed settings in hospitality venues. The aim of this systematic review was to evaluate the impact of secondhand smoke on air quality in partially enclosed public spaces such as pubs, bars and restaurants. A systematic search of the literature was conducted following PRISMA guidelines and using two electronic databases (PubMed and Scopus) in addition to manual searches. The literature search identified a total of 625 articles, of which 13 studies met the inclusion criteria and were included in this review. All reviewed studies indicated that air quality within partially enclosed public spaces where smoking is permitted is unlikely to meet current World Health Organization (WHO) ambient air quality guidelines for PM2.5. Secondhand smoke can also drift into adjacent smoke-free outdoor areas or infiltrate into indoor environments thus affecting air quality in spaces where smoking is not permitted. Customers and staff in partially enclosed public spaces with active smoking, and in adjacent outdoor and indoor non-smoking areas, are potentially exposed to secondhand smoke at levels exceeding WHO guidelines. Additional sources of secondhand smoke such as from e-cigarettes are becoming more prevalent, in part due to the concerning rise in the popularity of vaping among younger people. Although scarce in the literature, studies of e-cigarette emissions in outdoor locations indicate that PM2.5 levels can also exceed WHO ambient air quality guidelines. Stronger smoking control policies that include e-cigarettes are recommended for partially enclosed outdoor public spaces to protect the health of customers and staff from harmful secondhand smoke exposure.

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Gendered associations between unpaid labour domains and mental health in working-age adults

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background
Unpaid labour is a daily part of most people's lives, none more so than for women. Yet, in comparison to paid work, the effect of unpaid labour on mental health is under-researched. This study addresses key gaps in the extant literature, examining how unpaid labour is associated with mental health in working-age men and women, and whether gender differences exist.
Methods
Utilising nineteen waves of the Household Income and Labour Dynamics in Australia (HILDA) survey, this longitudinal cohort study employed fixed-effects analysis to examine the associations between unpaid labour and mental health in working-age (25-64 years) Australian adults. Mental health was assessed using the MHI-5 scale. Both the individual and combined effects of four different domains of unpaid labour (household work, childcare, care for adults, outdoor tasks) were interrogated, as were the gender differences.
Results
The analysis included 21,014 participants (150,163 observations). Increasing time in household work was negatively associated with mental health in both men and women, as was care for adults (disabled or older people) in women. Conversely, increasing time in childcare for women and outdoor tasks for men was positively associated with mental health. A null finding for both genders for overall cumulative total unpaid labour was likely attributable to the opposing direction of effects between the individual domains that constituted the total load.
Conclusion
This study reveals considerable variance and nuance in how different domains of unpaid labour impact on mental health, as well as continued inequity in the division of unpaid labour in households, with women doing considerably more. It also exposes important challenges associated with measuring and understanding total (combined) unpaid labour as a determinant of health.

Trajectories of unpaid labour and the probability of employment precarity among women

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
Worldwide, women are over-represented in precarious and insecure employment arrangements. Importantly, the high unpaid labour demands women experience over the life course compromise their paid labour force participation. Moreover, employment precarity and labour force detachment not only impart lasting economic consequences but are also linked to poorer health and wellbeing outcomes.
Methods
Group-based trajectory modelling (GBTM) was applied to 17 waves (2002-2018) of data from the Household Income and Labour Dynamics in Australia (HILDA) survey to identify different trajectories of time spent in unpaid labour throughout women's prime working and child-rearing years (from baseline age of 25-35yrs to 42-52yrs). Logistic regression models were then employed to examine associations between estimated trajectories and indicators of precarious employment (job security, job control, part-time employment, and casual employment) and labour force detachment later in wave 19 (2019).
Results
A 4-group trajectory model was identified as the optimal best-fitting model, with unpaid labour trajectory groups categorised as persistent low (33% of cohort), decreasing (37%), increasing umbrella (19%), and persistent high (11%). Our results showed that chronic exposure to high amounts of unpaid labour (compared to lower exposure levels) increased women's probability of precarious employment and labour force detachment later in prime working life.
Conclusions
This study provides evidence that ongoing inequity in the division of unpaid labour has considerable long-term implications for gender inequality in the paid labour force and underscores the importance of urgently addressing how men and women share and prioritise time across both paid and unpaid labour domains.

Spatial survival methods application in cancer research: trends, modelling and visualization techniques

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background: Geographic differences in cancer survival are known to exist for many cancer types and in many countries. Spatial modelling of cancer survival is an important tool for identifying disparities, providing an evidence base for resource allocation, and improving health equity. Many different approaches have attempted to understand how survival varies geographically. This is the first review to describe different methods and visualization techniques and to assess temporal trends in publications on this topic.

Methods: The review was carried out using the PRISMA guidelines and the PubMed and Web of Science databases. Articles were eligible for review if they measured cancer survival outcomes in small geographical areas by using spatial regression and/or mapping. Two authors independently screened articles.

Results: Thirty-two articles were included with the earliest publication identified in 2007. Despite the number of articles increasing over time, we found no peer-reviewed publications from low-middle-income or low-income countries. Most articles were conducted in high-income countries using cancer registry databases. Eight different methods of modelling spatial survival were identified, with Bayesian spatial survival models being the most frequently employed, followed by Cox proportional hazards additive models and accelerated failure time models. There were seven different ways of visualizing the survival results at small area-level.

Conclusions: This review highlighted the increasing utilization of spatial methods to describe disparities in cancer survival. A wide variety of spatial survival modelling methods and visualization techniques were employed, each providing a different method of interpreting the data. Although more than 25 years have passed since the WHO recommended using small-area disease mapping for health-related decision-making processes, the current application for cancer survival outcomes is mostly limited to high-income countries. Increasing the use of spatial modelling through enhanced data availability and knowledge sharing could help inform and motivate efforts to improve cancer outcomes and reduce excess deaths due to geographical inequalities.

Impact: Efforts to improve the coverage and completeness of population-based cancer registries should continue to be a priority, in addition to encouraging the open sharing of relevant statistical programming syntax and international collaborations.

Is childlessness associated with the risk of overweight and obesity in women?

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Approximately one in two adult women in Australia and worldwide are overweight or obese. Both childbearing and ageing affect the trajectories of women's weight gain. When putting these two effects together, it is unclear whether mothers or women who are childless have a higher risk of overweight and obesity in the long term.
Aim: We aimed to examine the association between motherhood status (mothers, voluntarily childless, involuntarily childless) and overweight and obesity over 22 years.
Methods: We used data from 4,092 women who were enrolled in the Australian Longitudinal Study on Women's Health (ALSWH) in 1996 when they were aged 18 to 23 years. These women were followed approximately every 3 years until 2018. Motherhood status was defined by women's reports on their fertility, attempts to conceive, use of in vitro fertilisation and fertility hormones, and number of biological children. Associations between motherhood status and overweight and obesity were examined using generalized estimating equations models with nominal responses, adjusting for socio-demographic characteristics, lifestyle factors, depressive symptoms, early life factors, and polycystic ovary syndrome (PCOS).
Results: At age 40-45 years in 2018, 12% of women were voluntarily childless and 5% were involuntarily childless. The prevalence of overweight and obesity increased with age and women who were voluntarily or involuntarily childless had higher prevalence of obesity than mothers in all surveys. After adjusting for covariates, compared with mothers, women who were voluntarily childless had higher odds of being overweight (odds ratio [OR], 95% confidence interval [CI]: 1.29, 1.09-1.52) and obese (OR, 95% CI: 1.65, 1.29-2.12). Involuntary childlessness was not associated with being overweight (OR, 95% CI: 1.05, 0.82-1.33), and its association with obesity was attenuated after adjusting for PCOS in the final model (OR, 95% CI: 1.40, 0.99-1.98).
Conclusions: Around one in nine Australian women remained voluntarily childless by their late reproductive years. On average, they had higher odds of being overweight and obese than mothers, suggesting that overweight and obesity prevention programs should consider tailoring their advice by motherhood status.

Health-Related Quality of Life: A Comparison of Mothers and Women without children

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Approximately one in four Australian women remain childless by the end of their reproductive years. Understanding the health-related quality of life (HRQoL) of women who are childless could help policymakers better meet their health and social needs. However, the current evidence on this topic is insufficient and inconsistent.
Aim: This study aimed to compare the HRQoL of mothers and women who were voluntarily or involuntarily childless over their reproductive years.
Methods: A total of 4,100 women born in 1973-78 from the Australian Longitudinal Study on Women's Health were followed for 22 years. Motherhood status was defined by women's reports in Survey 8 (2018, 40-45 years) on their fertility, attempts to conceive, use of in vitro fertilization and fertility hormones, and number of biological children. HRQoL was assessed in each survey using the 36-Item Short Form Survey (SF-36). Linear mixed models were used to assess the associations between motherhood status and HRQoL.
Results: Over 22 years, compared with women who were voluntarily childless, mothers on average had better HRQoL (shown by scores 1.5 to 3.4 points higher on five of the eight SF-36 subscales), while women who were involuntarily childless scored 2.2 to 3.0 points lower on three of eight SF-36 subscales. Compared with women who were voluntarily childless, teen mothers (age at first birth <20 years) scored lower on role limitations due to physical problems subscale (b=-5.5, 95% CI: -9.3, -1.6), while women with either two, or three or more children scored 1.6 to 4.8 points higher on seven of eight SF-36 subscales.
Conclusions: Women who were childless had poorer HRQoL than mothers. Further research is needed to understand the underlying mechanisms, which could inform policymakers on how to reduce the health disparities and improve long-term health outcomes for women.

Global daily ambient PM2.5 population exposure estimation: A machine learning modeling study

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Background: Short-term exposure to ambient particles with a diameter of 2·5 μm or less (PM2·5) is a leading contributor to the global burden of diseases and mortality. However, few studies provide the global spatiotemporal variations of daily PM2·5 concentrations over two decades.
Methods: We implemented a deep ensemble machine learning (DEML) model based on ground-based measurements from 5,446 monitoring stations in 65 countries worldwide, combined with GEOS-Chem chemical transport model (CTM) simulations, satellite-based data, and meteorological and land cover information to estimate global daily ambient PM2·5 concentration at 0·1°×0·1° spatial resolution in 2000-2019. We investigated the population-weighted (PWD) PM2·5 and annual population-weighted exposed days (PED) above daily WHO Air Quality Guidelines (AQGs) levels (15 μg/m3) to measure the spatiotemporal unequal exposure from 2000 to 2019.
Results: Our global DEML model achieved state-of-the-art performance with a cross-validation coefficient of determination (R2) of 0·91 and root mean square error (RMSE) of 7·86 μg/m3. Globally, there was a slight upward trend in the annual average PWD PM2·5 in 2000-2019, from 31·6 μg/m3 ± 10·5 μg/m3 in 2000 to 32·3 μg/m3 ± 10·1 μg/m3 in 2019. Despite a dramatic decline in Europe and North America, some regions in Asia, Oceania, and Northern Africa have witnessed substantial increases in PWD PM2·5 over two decades. Only 0·18% of the global land area and 0·001% of the global population were exposed to PM2·5 below the WHO AQG annual guideline value in 2019, with more than 70% of days experiencing the daily PM2·5 concentrations above AQGs. Distinct seasonal patterns were found in many regions of the world.
Conclusions: Our global high-resolution estimates of daily PM2·5 provide the first global view of the unequal spatiotemporal distribution in PM2·5 exposure over 20 years, which is of significance for assessing short- and long-term health impacts of PM2·5, especially for areas where monitoring station data are not available.

Changing epidemiology of multiple sclerosis in Newcastle, Australia: 1961 to 2021

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Introduction:
Newcastle, Australia has been serially studied for MS epidemiology since 1961, showing a consistently increasing prevalence and incidence rate to its most recent assessment in 2011.
Objectives:
To assess the 2011-2021 epidemiology of MS in Newcastle local government area (LGA) and to compare with previous measures.
Method:
Demographic/clinical data extracted from medical records of MS cases residing in Newcastle LGA identified by public and private clinicians. Prevalence and incidence rate estimated for 2021 and age-standardised to the 2021 Australian population. Historical estimates derived from previously published studies at this site, age standardised to the 2021 Australian population.
Results:
The 2021 prevalence was 168.3/100,000 (age-standardised=173.7/100,000, F/M sex ratio=3.3), a 38.2% increase from 2011 (F/M sex ratio=3.1) and 167.3% from 1996 (F/M sex ratio=2.6). The 2011-21 age-standardised onset incidence rate was 3.8/100,000 person-years (F/M sex ratio=3.3), 73.1% increase from 1971-81 (F/M sex ratio=2.3) and 48.2% from 1986-96 (F/M sex ratio=1.1). The age-standardised diagnosis incidence rate was 6.2/100,000 (F/M sex ratio=2.7), statistically unchanged from that in 2001-2011 (6.7/100,000, F/M sex ratio=3.1).
Conclusion
The Newcastle region continues to be a high frequency zone for MS. The incidence rate from onset is significantly increased from previous estimates, but incidence rate from diagnosis is stable. Prevalence and incidence sex ratios have stabilised at roughly 3.0, similar to other Australian sites.

Susceptible periods of PM2.5 and biothermal stress on term low birth weight

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: Identification of refined critical susceptible periods of fine particulate matter air pollution (PM2.5) and ambient temperature exposures and the risk of low birth weight is very important for timely interventions and understanding biological mechanisms. Furthermore, using a composite biothermal index such as Universal Thermal Climate Index (UTCI) is thermophysiologically more relevant than using only ambient temperature.
Objective: To identify critical susceptible periods of monthly PM2.5 and UTCI exposures and term low birth weight (TLBW) using a novel and robust statistical modelling approach.
Methods: A total of 385,337 singleton term births, of which 1.7% were TLBW between 1st January 2000 and 31st December in Western Australia were linked to spatiotemporal monthly PM2.5 and UTCI estimates for three months preconception to birth. Distributed lag linear and non-linear Cox regressions were performed to investigate monthly adjusted hazards of TLBW.
Results: The mean (standard deviation) of PM2.5 and UTCI exposures during the study period were 8.1 (1.0) μg/m³ and 14.5 (2.5) ˚°C, respectively. Using 5 μg/m³ (new international annual average limit) as a reference, there were higher hazards of TLBW at 1st to 99th centiles with critical susceptible PM2.5 exposure periods during the 2nd – 6th gestational months, and the strongest hazard was 1.03 (95% CI 1.01, 1.05) during the 3rd gestational month at 50th centile (8.1 μg/m³). Using median UTCI (14.2 °C) as a reference, the critical susceptible UTCI exposure periods were found during the 8th –10th gestational months at 1st to 10th UTCI centiles, and the strongest hazards was 1.24 (95% CI 1.08, 1.42) during the 10th gestational month at 1st centile (10.2 ˚°C). The joint exposure effects as the ratio of hazard ratios per 5 μg/m³ PM2.5 increment was stronger in moderate, 1.31 (95% CI 0.86, 1.98) than high UTCI exposure, 1.19 (95% CI 0.84, 1.67), using low UTCI as a reference. For each exposure, the hazard of TLBW was disproportionately elevated in births to mothers who were unmarried, non-Caucasian, multiparous, smoked during pregnancy, and rural residents.
Conclusion: The potential critical exposure periods of increased susceptibility and vulnerable subpopulations identified could inform public health interventions and further investigations.

A framework for Epidemiologist in the Application of Simulation to Quantify Bias

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Due to the observational nature of epidemiological studies, they are prone to various type of bias. In particular, reproductive and perinatal epidemiological studies are subject to unique methodological challenges due to unobservable events from pre-conception to birth and the clustering of outcomes across successive pregnancies or multiple births. To strengthen the validity of associations drawn from observational studies, it is important that researchers are able to identify and evaluate potential sources of bias.
Simulations studies involve computational methods to create data by pseudo-random sampling. They are ideal to quantify bias as the process of generating data allows greater control of the biased parameters of interest. Simulation studies have the potential to quantify the influence of a range of biases simultaneously on aetiological associations. Current simulation studies in reproductive and perinatal epidemiology present a heterogeneity in their design, analysis, and reporting. The absence of guidance in the application of simulation to quantify the influence of bias has hampered researchers and peer reviewers.
This framework includes five practical and important steps that guide epidemiologists in the application of simulation studies to quantify the magnitude and direction of biases in epidemiological studies. Using a perinatal example, we applied the framework to a simple simulation that quantified the influence of selection bias on the association between maternal BMI and preterm birth. This framework was aimed with highlighting the application of simulation methods to quantify the influence of various types of bias common in observational research, and to increase their application in the practice of quantitative bias analysis in epidemiological studies.

Blood levels of polyunsaturated fatty acids and disease progression of multiple sclerosis

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background
Multiple sclerosis (MS) is a chronic immune-mediated inflammatory disease of the central nervous system. Polyunsaturated fatty acids (PUFAs) may be beneficial in MS due to their potential anti-inflammatory effects. We aimed to test associations between omega-3 and omega-6 PUFAs and MS progression.

Methods
Data were from the AusLong Study, a multicentre prospective longitudinal cohort study of adults with MS. We analysed data at baseline and at 5- and 10-year follow-ups for males (n = 64) and females (n = 205), separately. Associations between whole blood levels of PUFAs and time between onset of relapses were analysed using survival analysis, and associations between PUFAs and Expanded Disability Status Scale (EDSS) scores were analysed using negative binomial regression, adjusting for covariates.

Results
Higher levels of γ-linolenic acid (GLA) were associated with increased time between onset of relapses in females (hazard ratio = 0.02, 95%CI [0.00, 0.21], p = 0.007), but not males. Higher linoleic acid (LA) was associated with lower EDSS scores in males (incidence rate ratio (IRR) = 0.92, 95%CI [0.87, 0.97], p = 0.010). Higher levels of eicosadienoic acid (EDA) were associated with lower EDSS scores in females (IRR = 0.15, 95%CI [0.06, 0.34], p < 0.001). There were no statistically significant associations between aggregated PUFAs, nor other individual PUFAs, and time between onset of relapses or EDSS.

Conclusions
Higher whole blood levels of certain omega-6 PUFAs (LA, mainly sourced from cereals/cereal-based products; GLA and EDA, both primarily endogenously converted from LA) were inversely associated with MS disease progression, with sex differences.

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"NEWS2: Early Warning System for COVID-19 Deterioration and ICU Admission in Bangladesh"

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: To rigorously evaluate the predictive accuracy of the National Early Warning Score 2 (NEWS2) in identifying clinical deterioration necessitating ICU admission among COVID-19 patients in Bangladesh.
Methods: A retrospective analysis was conducted on data from 244 laboratory-confirmed COVID-19 adult patients admitted between July 7th and September 23rd, 2021, at Aichi Hospital Ltd, Bangladesh. Categorical and quantitative variables were presented as numbers (percentages) and medians (interquartile range, IQR). The predictive performance of NEWS2 for ICU admission was assessed by comparing the area under the receiver operating characteristics curve (AUROC) at thresholds 5 and 7 and by conducting multivariate logistic regression analyses. Statistical analyses were performed using STATA (17.0).
Results: Out of 218 included patients, 68 were transferred to the ICU. The AUROC was 0.96 (SE 0.01, 95% CI: 0.93-0.98), indicating the strong predictive capability of NEWS2 in predicting transfer to ICU at hospital admission. NEWS2 thresholds of five and seven demonstrated high sensitivity (72.06% and 29.41%, respectively) and specificity (99.33% and 63.33%, respectively), with the threshold of seven having a higher positive predictive value (95.24% vs. 47.12%). Multivariate logistic regression analysis confirmed the association between NEWS2 scores of 5 and 7 with ICU admission.

Conclusion: NEWS2 at hospital admission is a reliable predictor for ICU admission among COVID-19 patients in Bangladesh. Screening patients with this tool at admission can identify those at risk for clinical deterioration, facilitating improved patient management.

Knowledge, Stigma and Prevalence of HBV among two populations from Nepal

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
Hepatitis B virus (HBV) remains a public health issue in many developing nations, including Nepal. In Nepal, the vaccination program, implemented in 2002-3, aimed to reduce national prevalence of HBV and ensure children would be protected against infection. This study investigated socio-demographic, behavioural, and health service factors associated with HBV infection in low (Pokhara) and high (Dolpa) prevalence populations.

Methods
A sero-survey of 400 participants from within each population was conducted (final N = 799). The study combined a blood draw and a questionnaire that included demographic questions and items on knowledge, stigma, behavioural and social risk factors of HBV.

Results
There were 8/399 (2.01%, 95% CI 0.87%, 3.91%) current HBV infections among participants from Dolpa, compared with 2/400 (0.5%, 95% CI 0.06%, 1.79%) among participants from Pokhara. An unclear association between vaccination programs and the low prevalence observed in this study was indicated. Evidence from both sites indicated there had been previous infections within the community as participants showed some level of protection from HBV either through vaccination or past infection (Dolpa 58/399, Pokhara 21/400), as well as recent cases among participants who had recovered (Dolpa 4/399, Pokhara 3/400). Due to the relatively low prevalence of active cases of HBV, no meaningful associations between demographic, behavioural, and health service factors could be calculated. However both samples showed low levels of knowledge of HBV, and stigma towards people with HBV was evident. Among both groups, only 28% in Dolpa and 43% in Pokhara had ever heard of HBV, and only 66% of respondents from either group indicated they would be comfortable living with a family member infected with HBV.

Conclusions
This study found a low prevalence of HBV infection in both low and putatively high prevalence populations. However, knowledge of how HBV can be spread was quite low in each of the groups, indicating participants are managing to avoid infections while not necessarily being cautious around behaviours representing the greatest infection risk. There was also evidence of stigma being associated with having an active HBV infection, which may reduce the willingness of individuals to seek diagnosis or treatment.

Developing Bayesian modelling methods for small area epidemiological measure estimates

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

BACKGROUND

Providing reliable population health outcome measures for small geographical areas like local government areas is important when assessing health needs and planning health services as different areas may have significantly different health needs. However, there are many missing values for epidemiological measures in even some larger areas due to small population sizes and small event counts. There is therefore a need to apply more complex analysis methods to estimate epidemiological measures for sparsely populated areas.

DATA SOURCES

Annual data were obtained from three sources:
1) Administrative data: Potentially preventable hospitalisations, hospitalisations due to injury and poisoning, and tobacco related hospitalisations were sourced from Western Australia (WA) Hospital Morbidity Data System and aetiological fractions derived by the Epidemiology Directorate, Department of Health WA. Cancer incidence data were sourced from the WA Cancer Registry.

2) Survey data: Adult prevalence of health risk were sourced from the WA Health and Wellbeing Surveillance System.

3) Burden of disease data: Years of life lost (YLL) and years lost to disability (YLD) were sourced from the WA Mortality Dataset and the WA Burden of Disease study, respectively.

MODELLING METHODS DEVELOPED

Different Bayesian spatio-temporal models were developed for the aforementioned three types of data for all local government areas in WA. The models were fitted using Markov chain Monte Carlo methods in R.

Based on the data types and models selected, counts, age standardised rate (ASR), standardised incidence ratio (SIR), prevalence, YLL and YLD were estimated for small areas over time. The uncertainty around estimates was captured through credible intervals and exceedance probabilities.

Visualisation of modelled estimates and uncertainty measures were explored. Modelling processes, and lessons learnt were also discussed. The WA Public Health Atlas containing these results will be launched in early 2024.

CONCLUSION

The Bayesian modelling methods explored have provided estimates for sparsely populated areas of WA that would not be achievable via conventional epidemiological methods. The modelling methods explored can be applied to other similar data based on data types.

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Effect of vitamin D supplementation on risk of fracture

Dr Mary Waterhouse[1], Professor Peter Ebeling[2], Dr Donald McLeod[1,3], Professor Dallas English[4,5], Ms Briony Duarte Romero[1], Ms Catherine Baxter[1], Professor Bruce Armstrong[6,7], Dr Gunter Hartel[1], Professor Michael Kimlin[8], Dr Rachel O'Connell[9], Associate Professor Jolieke van der Pols[10], Professor Alison Venn[11], Professor Penelope Webb[1,12], Professor David Whiteman[1], Professor Rachel Neale[1,12]
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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Background
Fractures cause considerable morbidity and mortality in older people. It is uncertain whether vitamin D supplementation reduces fractures, or whether intermittent doses are harmful. Monthly dosing is used in practice, so understanding its effects on fracture incidence, including whether it is harmful, is important.
Methods
The D-Health Trial was a population-based, double-blind, randomised, placebo-controlled trial of oral vitamin D supplementation (60,000 IU per month) for up to 5 years, conducted in 21,315 Australians aged 60-84 years. We ascertained fractures through linkage with administrative datasets. The main outcome was total fractures. Additional outcomes were nonvertebral, major osteoporotic (hip, wrist, proximal humerus, spine), and hip fractures. We excluded participants (4.6%) without linked data, and estimated hazard ratios (HRs) and 95% confidence intervals (CIs) using flexible parametric survival models. Australian New Zealand Clinical Trials Registry: ACTRN12613000743763
Results
We included 20,326 participants [vitamin D, n=10,154 (50.0%); placebo, n=10,172 (50.0%); 46% women; mean age 69.3 (SD 5.5) years]. Over a median follow-up of 5.1 (IQR 5.1 to 5.1) years, 568 (5.6%) and 603 (5.9%) participants in the vitamin D and placebo groups, respectively, experienced ≥1 fracture (overall HR 0.94; 95% CI 0.84 to 1.06). Although the interaction between randomisation group and time was not significant (p=0.14), the HR for total fractures appeared to decrease with increasing follow-up time. The overall HRs for nonvertebral, major osteoporotic, and hip fractures were 0.96 (95% CI 0.85 to 1.08), 1.00 (95% CI 0.85 to 1.18), and 1.11 (95% CI 0.86 to 1.45), respectively.
Conclusion
These findings do not support concerns that bolus doses of vitamin D administered monthly increase fracture risk. Long-term supplementation may reduce the incidence of total fractures.

Association between unstable diabetes mellitus and risk of pancreatic cancer

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Deterioration of glycaemic control in people with long-standing diabetes mellitus (DM) may be a possible indicator of pancreatic cancer. However, the magnitude of the association between DM deterioration and pancreatic cancer has received little attention.
We conducted a matched cohort study, nested within a population-based cohort of Australian diabetic women. Women with unstable DM, defined as a change in medication after a 2-year period of stable medication use, were matched by birth year to those with stable DM, in a 1:4 ratio. We used flexible parametric survival models to estimate hazard ratios (HRs) and 95% confidence intervals (CI).
We included 134,954 and 539,789 women in the unstable and stable DM cohorts, respectively (mean age 68 years). In total, 1,315 pancreatic cancers were diagnosed. Deterioration of stable DM was associated with a 2.5-fold increased risk of pancreatic cancer (HR 2.55; 95% CI 2.29 – 2.85). The risk was particularly high within the first year after DM deteriorated. HRs at 3 months, 6 months and 1 year were: 5.76 (95% CI 4.72 – 7.04); 4.56 (95% CI 3.81 – 5.46); and 3.33 (95% CI 2.86 – 3.89), respectively. The risk was no longer significantly different after 7 years.
Deterioration in glycaemic control in people with previously stable DM may be an indicator of pancreatic cancer, suggesting investigations of the pancreas may be appropriate. The weaker longer-term (3-7 years) association between DM deterioration and pancreatic cancer may indicate that poor glycaemic control is a risk factor for pancreatic cancer.

Impact of mental disorders on unplanned readmissions of congestive heart failure patients

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Introduction: Reducing preventable hospitalisation for congestive heart failure (CHF) patients is a challenge for health systems worldwide. CHF patients who also experience mental disorders may have worse health outcomes compared to CHF patients with no disorder. This study examines the impact of mental disorders on 28 day unplanned readmission of CHF patients.

Method: Retrospective cohort study using population-level linked hospitalisation and death data of adults aged ≥18 years who had a CHF admission in New South Wales, Australia, between 1 January 2014 and 31 December 2020. Patient's mental disorder and/or Charlson comorbidity was identified from admission records. The Hospital Frailty Risk Score was used to identify frailty. Competing risk and cause-specific risk analyses were conducted to examine the impact of having a mental disorder diagnosis on all-cause hospital readmission.

Results: CHF patients with a mental disorder diagnosis within 12 months prior to or on the index admission had higher risk of 28 day unplanned readmission (Hazard Ratio(HR): 1.21, 95%CI: 1.15-1.27), particularly those with anxiety disorder (HR: 1.49, 95%CI: 1.35-1.65). In addition to having a mental disorder, CHF patients aged ≥85 (HR: 1.19, 95%CI: 1.11-1.28), having ≥3 other comorbidities (HR: 1.35, 95%CI: 1.25-1.46) and intermediate (HR: 1.34, 95%CI: 1.28-1.40) or high (HR: 1.37, 95%CI: 1.27-1.47) frailty score on admission had a higher risk of unplanned readmission. A dementia (HR: 1.07, 95%CI: 0.98-1.17) or depression (HR: 0.99, 95%CI: 0.81-1.21) diagnosis within 12 months prior to or on the index admission was not associated with significant differences in unplanned readmissions. CHF patients with a mental disorder who have ≥3 other comorbidities and intermediate frailty score had the highest probability of unplanned readmission (29.84% 95%CI: 24.68-35.73%) after considering other patient-level factors and competing events.

Conclusion: CHF patients who have a mental disorder diagnosis within 1 year of admission are more likely to be readmitted compared to those without a mental disorder. CHF patients with frailty and mental health disorders have the highest probability of readmission. Addressing mental health care services in CHF patient's discharge plan could potentially assist reduce unplanned readmissions.

Impact of childhood PCV13 introduction on adult pneumonia hospitalizations in Mongolia

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Community-acquired pneumonia is a leading cause of morbidity and mortality worldwide. However, few studies have assessed the potential indirect effects of childhood pneumococcal conjugate vaccine (PCV) programs on the adult pneumonia burden in resource-limited settings. We evaluated the impact of childhood PCV13 immunization on adult all-cause pneumonia following a phased program introduction from 2016. We conducted a time-series analysis to assess changes in pneumonia hospitalization incidence at four district hospitals in Mongolia. Adults (≥18 years) that met the clinical case definition for all-cause pneumonia were enrolled. A negative binomial mixed-effects model was used to assess the impact of PCV13 introduction on monthly counts of pneumonia admissions from January 2015—February 2022. We also performed a restricted analysis excluding the COVID-19 pandemic period. All models were stratified by age and assessed separately. Additional analyses assessed the robustness of our findings. We found that the average annual incidence of all-cause pneumonia hospitalization was highest in adults 65+ years (62.81 per 10,000 population) and declined with decreasing age. After adjusting for the COVID-19 pandemic period, we found that rates of pneumonia hospitalization remained largely unchanged over time. We did not observe a reduction in pneumonia hospitalizations in any age group. Results from restricted and sensitivity analyses were comparable to the primary results, finding limited evidence of a reduced pneumonia burden. Overall, we did not find evidence of indirect protection against all-cause pneumonia in adults following childhood PCV13 introduction. Direct pneumococcal vaccination and other interventions should be considered to reduce burden of pneumonia among older adults.

Suicidal and self-harming behaviours among young carers

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background
Young carers provide unpaid, informal care to someone else, usually a family member. Young carers commonly carry out this work with little support or recognition. Evidence indicates that they are at increased risk of poor mental health, however little is known about self-harming and suicidal behaviours. This study used population representative data to examine self-harming and suicidal behaviours among young carers.

Methods
We used data from Waves 6-8 (2014-2018) of the Longitudinal Study of Australian Children to assess the effect of "core" caring activities on suicidal and self-harming behaviours. Core care activities (personal care, assistance moving around, assistance communicating) were assessed as a binary variable at 16-17years (core care vs no core care). Five self-harming and suicidal behaviours variables were assessed: thoughts of self-harm, self-harm, thoughts of suicide, plan to suicide, suicide attempt (binary variables). Analyses were carried out using augmented inverse probability treatment weighting, adjusting for potential confounders on complete case data, and sensitivity analysis was carried out on an imputed dataset.

Results
There were no associations between core care provision and self-harming or suicidal thoughts and plans. Providing core care at 16-17 years was associated with reporting self-harm or suicide attempt in the previous 12 months at 18-19 years. Those providing core care at age 16-17 years had greater odds of self-harm (OR 2.06 95%CI 1.17, 2.96) and suicide attempt (OR 2.10 95%CI 0.80, 3.42) at aged 18-19 years.

Conclusion
This study provides the first quantitative evidence of a relationship between caring and suicidal and self-harming behaviours among young carers. It highlights the need to better identify and support young carers.

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Impacts of caring on mental health in a national cohort of men

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background
To advance gender equality, there needs to be a redistribution of care, with calls for men to take on more caring roles. There is evidence that caring can negatively affect mental health, however most studies examining this have been carried out on women, and where men have been included, inadequate sample sizes limit evidence. This study aimed to address this gap and use population representative data to examine associations between caregiving and depressive symptoms among men.

Methods
We used data from Waves 1-3 (2013, 2016, 2021) of the Longitudinal Study of Australian Male Health (Ten-to-Men). Effects of caring on depressive symptoms were assessed using augmented inverse probability treatment weighting, with adjustment for potential confounders. Caring was assessed as a binary variable (caring vs none), and depressive symptoms were measured using the Patient Health Questionnaire (continuous score, 0-27). Main analysis was prospective, drawing on Waves 1 (caring) & 2 (mental health), and sensitivity analyses modelled cross-sectional associations.
Results
Caring in Wave 1 was associated with depressive symptoms in Wave 2, with an average treatment effect (ATE) of 1.31(95%CI 0.57, 2.05). Associations were robust to several sensitivity analyses, with cross-sectional associations supporting the main prospective analyses.

Conclusion
These results indicate that there is a mental health impact of caring on male caregivers. This has important social implications. As we seek to shift caregiving responsibilities toward a more gender equal distribution of care, policy must recognise that, like female caregivers, male caregivers also experience mental health impacts related to caring.

Socioeconomic position, inflammation, metabolomic profile and cardiometabolic risk in early to mid-childhood

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background
Lower socioeconomic position (SEP) is associated with inflammation and an unfavourable metabolomic profile, which both predict cardiovascular disease (CVD) risk in adults. It is unclear when these relationships become evident earlier in the life course. We investigated the associations between SEP, inflammation, metabolomic profile, and cardiovascular phenotypes in early and mid-childhood.

Methods
Data were available from Australian children recruited to the Barwon Infant Study (BIS, n= 511) and Child Health CheckPoint study (CHCP, n=1874). In both cohorts, neighbourhood and household SEP were measured at birth. Metabolomic profile, inflammatory biomarkers (high sensitivity C-reactive protein, hsCRP, and glycoprotein acetyls, GlycA) and preclinical cardiovascular phenotypes (mean arterial pressure, MAP, carotid intima-media thickness, CIMT, and pulse wave velocity, PWV) were measured at age 4 years in BIS and 11–12 years in CHCP. Simple linear regression was used to describe the association between SEP and metabolomic measures. The effects of metabolomic measures on each preclinical cardiovascular phenotype were estimated using regression models to adjust for age, sex, and body mass index (BMI).

Results
At 4 years there was limited evidence of an association between lower SEP and an adverse metabolomic profile (e.g. lower amino acids, lower DHA and Omega-3 fatty acids), and a higher level of inflammation. Lower SEP and higher inflammation were associated more evidently at 11-12 years. A higher level of inflammation was associated with higher MAP at both ages, and there were additional associations between specific metabolites (e.g. higher citrate and creatinine) and increased CIMT at 11-12 years. Neither inflammation nor metabolomic profile appeared to be associated with PWV at these ages.

Discussion
Socioeconomic disadvantage was associated with inflammation and metabolomic profiles, and inflammation was associated with adverse cardiovascular phenotypes in childhood. Understanding the causal drivers of these relationships may inform intervention opportunities in childhood to reduce CVD risk.

Associations between pathological features and risk of metachronous colorectal cancer

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Abstract
Background and aims: Survivors of colorectal cancer (CRC) are at risk of developing a metachronous CRC. Understanding how pathological features of the first tumour relate to risk of metachronous CRC might help tailor existing surveillance guidelines.
Methods: Individuals were recruited through Colon Cancer Family Registry from United States of America, Canada, Australia and New Zealand. Metachronous CRC was defined as a new primary CRC diagnosed at least one year after the initial CRC. Those with genetic syndromes were excluded. Cox proportional hazards regression models were fitted to estimate hazard ratios (HRs) and corresponding 95% confidence intervals (CIs).
Results: Of 6,085 CRC cases, 138 (2.3%) were diagnosed with a metachronous CRC over a median follow-up time of 12 years. The incidence rate of metachronous CRC was 2.0 per 1,000 person-years. Having a synchronous CRC at the diagnosis of the first CRC was positively associated with increased risk of developing a metachronous CRC (adjusted HR: 3.36, 95% CI: 1.89-5.98). Compared with CRC cases with MMR-proficient tumours, the risk of developing a metachronous CRC was 72% higher for cases with MMR-deficient tumours (adjusted HR: 1.72, 95% CI: 1.11-2.64). Compared to cases whose first CRC had an adenocarcinoma histology, those with an undifferentiated histologic type were less likely to develop a metachronous CRC (adjusted HR: 0.23, 95% CI: 0.06-0.94). There was no evidence for the associations between other pathological features and metachronous CRC.
Conclusion: Existing surveillance guidelines for individuals diagnosed with an initial CRC could be updated to include increased surveillance for those whose first CRC was diagnosed in the presence of synchronous CRC, or was MMR-deficient.

Persistent low job control and subsequent major depression over time

Dr Yamna Taouk[1], Dr Zoe Aitken[1], Professor Anthony LaMontagne[2], Associate Professor Tania King[1]
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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background: Workers' perception of control over work is a key construct in the relationship between the psychosocial work environment and health. While exposure to low job control has been prospectively linked to poor mental health including depression and anxiety, there is scant extant research examining whether persistent exposure to low job control over time has an even greater negative impact on mental health.
Methods: Data from 4,762 men aged 18-55 years in the Australian Longitudinal Study on Male Health was used to explore the association between persistent low job control over time and subsequent major mental health problems. Persistent low job control measure was based on consecutive low job control exposure indication over two waves of data (waves 1 & 2). A dichotomous measure of major depression was derived from the Patient Health Questionnaire-9 in wave 3. The association between persistent low job control and subsequent major depression was assessed using logistic regression models.
Results: Controlling for sociodemographic, health and major depression at baseline, persistent exposure to low job control was significantly associated with subsequent major depression (OR 1.78, 95% CI 1.27, 2.48). The inclusion of a term representing the interaction between persistent low job control and baseline major depression did not improve overall model fit (p= 0.65), suggesting the effect of persistent low job control on major depression was not differential for people with and without baseline depression. Additional analysis examining men exposed to persistent low job control versus those persistent high job control and subsequent major depression did not change results (OR 1.70, 95% CI 1.17, 2.49).
Conclusion: This study addresses reverse causation and confounding strengthening the evidence regarding the causal relationship between psychosocial working conditions and mental health, underlining the important role that repeated exposure to low job control contributes to the development of major depression.

Nutritional risks associated with restrictive diets in people living with multiple sclerosis.

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Introduction

People living with multiple sclerosis (MS) are at increased risk of malnutrition associated with symptoms including dysphagia and fatigue. The risk may be further increased by restrictive eating patterns often adopted by people living with MS, as well as by indiscriminate supplementation, which may cause toxicities and/or interactions with medications. Healthcare professionals should be better aware of these eating patterns so that they may attenuate risk using a person-centred approach.

Objectives/Aim

To identify eating patterns promoted to people living with MS and evaluate the associated nutritional risks.

Methods

The search ‘ms AND (diet OR food OR eat)’ was conducted in Google and Bing, based on high-frequency Google Trends search terms, to identify popular eating patterns promoted for MS using web scraping techniques (R Software). Eating patterns were summarised using online sources, to capture information as presented to consumers. They were then mapped to Australian Dietary Guideline food groups, and food composition tables used to define their nutritional characteristics, including nutrients with excessively high/low intake. Australian Nutrient Reference Values were used to determine risk of supplement toxicity and the Monthly Index of Medical Specialties used to check for interactions with medications.

Results

The five most mentioned eating patterns were: healthy, balanced diet; Wahls Protocol/Palaeolithic diet; Swank low-fat diet; fasting/ketogenic diet; and Overcoming MS low-saturated fat diet. Nutrients with potentially low intake included total energy, protein, fibre, vitamin B12, calcium, iron, thiamin, and folate, with saturated fat having potentially high intake. Other risks included supplementation with vitamin D and omega-3 above the Australian Upper Level; these were also identified as having interactions with medications.

Conclusion

Some eating patterns promoted to people with MS are nutritionally complete, however, many are restrictive. Healthcare professionals should support people with MS to achieve nutritional completeness with alternative foods and safe supplementation where necessary, including through multidisciplinary care.

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Reduced infant pertussis severity following vaccination of pregnant mothers in Spain, 2005-2019

Dr Andrea Parisi[1,2], Dr Olivier Nunez[1], Dr Noemi Lopez Perea[1], Dr Josefa Masa Calles[1]
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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background :
Pertussis vaccination of mothers during the third trimester of pregnancy was implemented nationwide in 2015 in Spain,
reaching a national coverage of 84% in 2019. In this ecological study, we sought to investigate whether there was a
change in the pertussis severity in infants upon introduction of prenatal pertussis vaccination.

Methods :
We performed a time-trend analysis of infant hospitalizations for pertussis reported by the National Hospitalization
Registry during 2005-2019 in Spain. Annual hospitalization rates and the mean length of hospital stay were calculated
for infants under 3 months of age (target group for the vaccination effect) and a for a comparison group of infants aged
3-11 months. We compared the average annual percent changes in both age groups before (2005-2014) and after
vaccination introduction (2015-2019), using segmented Poisson regression.

Results :
Throughout the pre-vaccination period, the hospitalization rate and mean length of stay for pertussis in infants under 3
months were about 5 and 1.5 times higher, respectively, than in infants aged 3-11 months. After the introduction of
maternal vaccination, the hospitalization rate decreased more rapidly in infants aged 0-2 months than in infants aged
3-11 months: annual reduction of 33% (95% CI: 29%-36%) versus 24% (95% CI: 19%-29%) in the hospitalization rate
and 13% (95% CI: 11%–15%) versus 6% (95% CI: 3%–9%) in the mean hospital stay, respectively. In 2019, the mean
hospital stay for pertussis was 4 days in both age groups.

Conclusions :
These results suggest that maternal pertussis vaccination led to a stronger reduction in disease severity in the target
group as compared to older infants. Efforts should continue on educating prenatal care professionals and pregnant
women on the importance of prenatal pertussis vaccination.

Burden of disease and injury in Australia in 2022

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background
Burden of disease describes the impact of living with and dying prematurely from different diseases or injuries. The Australian Burden of Disease Study (ABDS) 2022 estimated the health impact of 220 diseases and injuries on the Australian population.
Methods
The ABDS quantifies 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). For the first time, the Study includes estimates of burden due to COVID-19.
Results
In 2022, 5.5 million years of healthy life were lost. Living with illness or injury caused more total disease burden than dying prematurely (52% vs. 48%). Over the 19-year period from 2003 to 2022, the rate of total disease burden remained fairly constant (212 DALY per 1,000 population in 2003 compared with 213 DALY per 1,000 population in 2022). Underlying this was an 8.5% decrease in the rate of fatal burden while the rate of non-fatal burden increased by 11% over that period. In 2022, the 5 disease groups causing the most burden were cancer, musculoskeletal conditions, cardiovascular diseases, mental health & substance use disorders and neurological conditions. Together these accounted for around two-thirds (62%) of the total burden. When considering individual diseases, coronary heart disease was the leading cause of burden for every reference year in the Study. However, the burden from coronary heart disease showed the largest absolute reduction over time which was mainly driven by large declines in fatal burden. COVID-19 ranked 8th among specific diseases in 2022, contributing 2.7% of the total burden. The burden from COVID-19 was predominantly fatal (73%) and was higher in males.
Conclusions
The 2022 study was the first to show an increase in the average amount of time spent in ill health (DALY) by Australians increasing by 2% compared with the 2018 study. This is likely to be largely driven by the impact of COVID-19 as when this disease is excluded, fatal and total burden rates were lower for 2022 than 2018.

Understanding the changing burden of maternal and neonatal disorders in Nepal

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Given the high maternal and neonatal mortality rates, improving maternal and neonatal health in Nepal is a priority. To ensure that the healthcare system can direct limited resources to areas with the most urgent areas, it is crucial to identify maternal and neonatal disorders with the most significant population burden.
Methods: We examined annual Global Burden of Disease (GBD) Study data on prevalence, deaths, years lived with disability (YLDs) and disability-adjusted life years (DALYs) for maternal and neonatal disorders in Nepal for 1990-2019. We also calculated the annual percentage change (EAPC) to examine trends in age-standardized rates (ASR) for each disease burden metric.
Results: There were 80,724 cases of maternal disorders in Nepal in 2019, representing a 37% reduction from 1990. The ASR for prevalence, DALYs, YLDs and deaths for maternal disorders overall showed a significant decreasing trend. Maternal haemorrhage had the highest prevalence (49,695 cases, 43% reduction from 1990) and remained the second leading cause of death (394 cases, 57% reduction from 1990), after indirect causes. There was an increasing trend in prevalence (EAPC = 1.28) and YLDs (EAPC = 1.32) for maternal abortion. The prevalence and YLDs for neonatal disorders increased by 57% and 110%, respectively from 1990-2019. The prevalence and YLDs of all neonatal subcategories other than haemolytic diseases increased over time. Preterm births had the highest prevalence (393,437, 29% higher compared to 1990). The ASR of deaths and DALYs for neonatal disorders overall had a decreasing trend.
Conclusion: These data highlight the priority maternal and neonatal health issues that must be considered in the upcoming national program planning. Maternal haemorrhage, abortion and neonatal disorders are priority areas in Nepal that require urgent attention given the prevalence and sustained impacts over three decades. Similarly, indirect maternal deaths should also be highlighted, as they have emerged as the leading cause of maternal mortality, surpassing other direct causes.

Disability, employment, and mental health among young adults: a causal mediation analysis

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background: Young adults with disabilities are less likely to be employed and more likely to have poor mental health compared to their peers without disabilities. Growing evidence suggests that the social determinants of health, including employment, are causally related to the mental health outcomes of people with disabilities. However, no studies to date have examined the association between employment and mental health for young adults with disabilities. To address this gap, our study aimed to estimate the causal effect of disability on mental health among young adults aged 20-35 years and quantify the effect mediated by employment status.

Methods: Four consecutive years (2016-19) of data from the Household, Income, and Labour Dynamics in Australia survey were used to conduct a causal mediation analysis. We decomposed the total causal effect of disability status on mental health (SF-36 MHI-5) into the natural direct effect from disability to mental health and the natural indirect effect representing the pathway through the employment mediator. We used multiple imputation to address missing data.

Results: 3 435 participants (3 058 with no disabilities, 377 with disabilities) were included in the analysis. The total causal effect of disability status on mental health was an estimated mean decrease in mental health of 4.84 points (95% CI -7.44, -2.23). The indirect effect, through employment status, was estimated to be a 0.91-point decline in mental health (95% CI -1.50, -0.31), explaining 18.8% of the effect of disability on mental health.

Conclusion: Our results suggest disability has a large effect on the mental health of young adults, and a proportion of this effect appears to operate through employment. This suggests that some of the poorer mental health experienced by young adults with disabilities may be due to not being employed when employment is desired. Well-designed interventions to improve employment rates may improve mental health outcomes among this group and reduce mental health inequalities. Further studies should be undertaken to test hypothetical interventions and the role of other key social determinants of health in the relationship between disability and mental health among young adults.

Handling missing data in randomised controlled trials: a methodological scoping review

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Missing data can compromise the validity of inferences when conducting randomised controlled trials (RCTs), especially when complete case analysis (CCA) is used to handle the missing data. This approach can result in biased estimates and may exclude many in the target population for whom the intervention is intended, limiting use of the results in real-world settings. Motivated by missing data issues encountered in a melanoma surveillance trial (MEL-SELF), we conducted a methodological scoping review to identify and summarise missing data methods in RCTs.

Methods: We searched MEDLINE, EMBASE, CENTRAL, and CINAHL for articles in which authors discussed missing data methods in RCTs. One reviewer undertook full-text screening and data extraction, while a second reviewer checked 20 data extractions. Data extractions were also discussed with 3 other reviewers.

Results: From 1872 records screened, 101 eligible papers were included in the review. 11 (11%) papers were frameworks that provided comprehensive guidance for handling missing data, including a machine learning (ML) framework and a control-based multiple imputation (MI) framework, which extends the use of MI to handle missing not at random (MNAR) data. 90 (89%) papers explored the use of one or more method(s), with 27 methods in total. 6 (22%) of these methods could be used under the missing at random (MAR) assumption, 15 (56%) under the MNAR assumption and 6 (22%) under a hybrid of MAR and MNAR data. MI was the most common MAR method, while control-based MI methods were the most performed MNAR method. Novel methods under MNAR also featured including ML methods. While these MAR and MNAR methods typically performed favourably compared to methods such as CCA, their performance was only directly compared in 39 (43%) papers.

Conclusion: This scoping review synthesises evidence on different statistical approaches for handling missing data in RCTs, and circumstances where one method may be preferred over another. Use of more robust methods, such as ones used under MNAR, may ensure better use of all trial data. However, further assessment of their performance, particularly that of novel methods, is needed to better understand their applicability to RCT settings.

Causal inference and mediation methods in randomised controlled trials: a scoping review

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: Traditionally, when treatment estimates are reported in randomised controlled trials (RCT), they are intention-to-treat (ITT) estimates. However, these estimates do not always provide the information that patients and clinicians want. For example, when non-adherence occurs in a trial, ITT estimates reflect the effect of being offered the intervention, rather than the benefits of adhering to the intervention. Moreover, it can often be of interest to understand what role mediators may play in facilitating the effects of an intervention. Estimating the effects of actually adhering to an intervention and of potential mediators requires alternatives to ITT estimates that can estimated using innovative causal inference and mediation methods. We aim to conduct a methodological scoping review to identify and summarise causal inference and mediation methods that can be used in RCTs.

Methods: We searched MEDLINE and EMBASE, for articles in which authors discussed causal inference and mediation methods in RCTs. One reviewer will undertake full-text screening and data extraction and a second reviewer will check extractions.

Results: 745 unique articles were retrieved from the database searches. After title and abstract screening, 117 studies were included for full-text screening. Preliminary findings show that using causal inference methods to account for nonadherence or to provide mediator effects often compares favourably to more traditional approaches. These methods are applied in both simple scenarios (e.g., where participants either adhere or don't adhere, or where there is a single mediator) and more complex scenarios (e.g., where participants partially adhere or where there are multiple mediators). There has also been increased application of novel approaches such as combining causal inference methods with machine learning techniques such as random forest and stacking. Selection of included studies is currently underway, and final results will be presented at the conference.

Conclusion: This scoping review will summarise evidence on causal inference and mediation methods and their use in RCTs. Use of these methods will allow estimation of potentially more informative estimates than ITT in RCTs, as they will assist in generating evidence that end-users are most interested in: what is the effect of an intervention if they actually adhere to it.

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Endocrine treatment for cancer among Indigenous peoples: a systematic review and meta-analysis

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Abstract
Background: Enhancing the utilisation of endocrine treatment (EDT) holds great significance in addressing cancer outcomes disparities in Indigenous populations. Previous studies examining EDT usage in Indigenous populations have predominately focused on the sub-national level, often resulting in small sample sizes with limited statistical power. We aimed to bring together and synthesis all relevant peer-reviewed evidence to quantify the cancer-related EDT utilisation rate and describe relevant factors that may influence EDT use.
Methods: We conducted a systematic review and meta-analysis of studies reporting EDT use for cancer among Indigenous populations worldwide, following the PRISMA checklist (Prospero protocol: CRD42023403562). PubMed, Scopus, CINAHL, Web of Science, and Embase were searched for relevant articles published between 1973 and 2023. A random-effect meta-analysis was used to pool proportions of EDT use. We also performed a subgroup analysis (such as with sample sizes and by countries) and a meta-regression to explore the potential sources of heterogeneity. A socio-ecological theoretical framework was used to present relevant factors that could impact EDT use.
Results: Thirteen articles reported EDT utilisation among Indigenous populations, yielding a pooled estimate of 67% (95% CI:54−80), which is comparable to that of White/European populations 67% (95% CI: 53−81). However, among studies with sufficiently sized study sample/cohorts (≥500), Indigenous populations had a 14% (62%; 95% CI:43−82) lower EDT utilisation than White/European populations (76%; 95% CI: 60−92). The EDT rate in Indigenous peoples of the USA (e.g., American Indian) and New Zealand (e.g., Māori) was 72% (95% CI:56–88) and 60% (95% CI:49–71), respectively. Compared to White/European populations, a higher proportion of Indigenous populations were diagnosed with advanced cancer, at younger age, had limited access to health services, lower socio-economic status, and a higher prevalence of comorbidities.
Conclusion: Indigenous cancer patients have lower EDT utilisation than White/European cancer patients, despite the higher rate of advanced cancer at diagnosis. While reasons for these disparities are unclear, they are likely reflecting, at least to some degree, inequitable access to cancer treatment services. Strengthening the provision of and access to culturally appropriate cancer care and treatment services may enhance EDT utilisation in Indigenous population.

Trends in mental health inequalities for people with disability, 2003 to 2020

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Objective: Cross-sectional studies have demonstrated that people with disability have substantial inequalities in mental health compared to people without disability. However, it is not known if these inequalities have changed over time, which is important because not only are mental health inequalities are unjust, but they are also largely avoidable. This study therefore compared the mental health of people with and without disability annually from 2003 to 2020 to investigate time-trends in disability-related mental health inequalities.
Methods: We used annual data (2003-2020) from the Household, Income and Labour Dynamics in Australia Survey. Mental health was measured using the five-item Mental Health Index (MHI). For each wave, we calculated population-weighted age-standardised estimates of mean MHI scores for people with and without disability and calculated the mean difference in MHI score to determine inequalities. Analyses were stratified by age, sex, and disability group (sensory or speech, physical, intellectual or learning, psychological, brain injury or stroke, other).
Results: From 2003 to 2020, for both people with and without disability, MHI scores decreased over time, reaching the lowest point for both groups in 2020, indicating worsening mental health. In all years, people with disability had worse mental health than people without disability, with average MHI scores 9.8 to 12.1 points lower than for people without disability, representing a large, clinically meaningful difference in mental health. When stratified by disability group, the greatest inequality in mean MHI scores was observed for people with psychological disability, followed by people with intellectual or learning disability, and/or brain injury or stroke. Mental health inequalities for people with disability did not improve over the 18 years, irrespective of sex or age. Moreover, we observed a trend towards worsening mental health scores and increasing mental health inequalities in younger females (15-24 years) with disability and people with intellectual or learning disability.
Conclusion: This study provides strong evidence that people with disability experience worse mental health than people without disability. Furthermore, our study demonstrates that disability-related inequalities in mental health are substantial, persistent, and have not improved between 2003 to 2020, and are worsening in some subpopulations.

Whānau-focused RCT of a health needs assessment and navigation service in paediatrics

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Large and persistent health inequities exist between Māori (Indigenous) tamariki (children) and non-Māori in Aotearoa New Zealand. Inequities result from systems failure, differential access to health determinants (including socioeconomic supports) and unresponsive, poor quality, and siloed health service delivery. A co-design process resulted in the Harti Hauora Tamariki (HHT) programme: a whānau (family) Māori centric multilevel programme to support wellbeing via culturally safe engagement, needs assessment and navigation to wellbeing services.

A randomised controlled trial (RCT) measured the impact of HHT.
Primary measures were hospital readmission risk at 30-days, 6 and 12 months post-hospital discharge. Secondary outcomes included hospital satisfaction with care and comparison of pre-admission to 30-days post discharge service access, including: immunisation; GP enrolment; oral health; Well Child Tamariki Ora; referrals to a healthy home initiative, and smoking cessation.

In total, 965 children were recruited; 485 (50.3%) in the intervention group; 480 (49.7%) in the control group, with 56% recruitment of Māori. There was no significant difference in the 30-day readmission rate between the intervention group (n=57 (11.7%)) and the control group (n=56 (11.7%)); Risk difference +0.04% (-4.02%-4.09%); X2=0.00 p=0.99; Adjusted odds ratio 0.99 (0.66-1.49). We found significant differences for many secondary outcomes including referral to healthy homes and smoking cessation; enrolment in and up-to-date with oral health checks; documentation of unmet needs; and total satisfaction with care.

A robust and whānau-centred RCT is possible even within the tertiary care environment, and with continuous quality improvement. While unable to reduce readmission risk, HHT had positive systems level impacts, with multiple improvements including enhancing access to kai (food), car seats and improving clinical pathways. This study shows that culturally safe racism-free engagement with whānau is crucial for care within the hospital setting, and for enhancing whānau engagement with service providers. Adaptation is also required within the care environment to identify and address emergent needs. Thus, HHT creates equity gains at individual, whānau and systems levels - maximising the value delivered from scarce resources for improving equity in health outcomes.

An emulated trial investigating the association between nitrogen-based bisphosphonates and ovarian cancer.

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: Epithelial ovarian cancer (EOC) is the eighth most common cancer in women, with poor survival outcomes with less than 50% 5-year survival. Observational evidence suggests that use of nitrogen-based bisphosphonates (NBBs) may be associated with a reduced risk of EOC, particularly the endometrioid and serous histotypes; however, confounding by indication is a concern in observational studies. An alternative approach to investigate the chemo-preventive potential of NBBs is to emulate a target trial by identifying all women who initiate use of NBBs (therefore having an indication for use) and investigate the risk of EOC for continued use compared to discontinued use.
Methods: Using population-based linked data, we identified all Australian women over 50 years who first used NBBs from 2004-2012 (n=327,351). Women who discontinued NBB use within six-months were included in the discontinued use treatment group, otherwise as continuing users. We emulated randomisation using stabilised inverse probability weights to balance the treatment groups using covariates including age, comorbidities and socio-economic status indicators. We followed women from treatment assignment until EOC diagnosis, death, or 31/12/2013. We used an intention-to-treat analysis to assess risk of EOC (overall and by histotype) using fitted flexible parametric time-to-event models allowing for time-varying effects and produced time-varying coefficients.
Results: Continued use of NBBs was associated with a reduced, but statistically not significant, risk of EOC overall (HR=0.87, 95%CI:0.69,1.10), and a significantly reduced risk of serous EOC (HR=0.71, 95%CI:0.53,0.96), compared to discontinued treatment.
Conclusions: Results of our emulated trial suggest that in women who initiated NBB treatment, those who continued use had a 29% lower hazard of being diagnosed with serous EOC, compared to women who discontinued use. The lower rate of serous EOC diagnosis for those with continued NBB use remained constant over the nine-year follow-up period.

Associations of neighbourhood greenery with cardiometabolic risk: moderation by recreational walking

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Urban greenery can be beneficial for health; however, there have been inconsistent findings on its relationship to cardiometabolic health. This may be attributable to the definition of the exposure variable (including type and location of greenery). Our study used a novel method of capturing neighbourhood greenery using Normalised Difference Vegetation Index (NDVI) thresholds. We examined potential associations with a cardiometabolic risk index for neighbourhood greenery within park and non-park areas around middle-aged and older adults' residences, and whether such associations may be moderated by recreational walking.
Methods: Participants from the AusDiab3 2011/12 study residing in major cities and inner regional areas were included (n=3,006, 56% women, mean age 60 years). Park and non-park areas within 1km and 2km buffers surrounding participants' residential addresses were identified using Open Street Maps. Within each buffer, the size of park and non-park areas with greenness above specific NDVI thresholds (0.3, 0.4, 0.5, 0.6, 0.7) were calculated. A clustered cardiometabolic risk (CMR) score was calculated from waist circumference, average of systolic and diastolic blood pressure, triglycerides, HDL-cholesterol and fasting plasma glucose; higher CMR values = higher risk. Two-level random intercept models were used to examine associations between standardized greenery measures and CMR, adjusting for potential confounders. Self-reported past week participation in leisure/exercise walking (yes/no) was assessed as a potential moderator.
Results: Within 1km of participants' residences, higher amounts of non-park greenery ≥ 0.6 NDVI (indicating high levels of vegetation) were associated with lower CMR, b=-0.03 (95% CI: -0.05, -0.00). Higher amounts of park greenery with NDVI ≥ 0.6 were also associated with CMR (b=-0.03, 95% CI: -0.06, -0.01), but only within the 2km buffer. Recreational walking was identified as a moderator of both associations, with significant associations between park greenery and CMR for walkers only (b=-0.04, 95% CI -0.07, -0.01); associations of non-park greenery and CMR were only apparent for non-walkers (b=-0.05, 95% CI -0.09, -0.01).
Conclusion: Living in areas with greater levels of concentrated greenery may be beneficial for residents' cardiometabolic health. There is a need to understand potential moderators of this relationship as this could influence the equity of neighbourhood greening strategies.

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Prenatal cannabis use and the risk of neurodevelopmental disorders in offspring: Meta-analysis

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Abstract

Background

It is plausible that exposure to cannabis in utero could be associated with an increased risk of neurodevelopmental disorders [attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD)] during childhood and adolescence; however mixed results have been reported. This study investigated whether there is an association between prenatal cannabis use and neurodevelopmental disorders in offspring using a systematic review and meta-analysis methodology.

Methods

A systematic literature search was conducted in PubMed/Medline, Scopus, EMBASE, Web of Science, Psych-Info, and Google Scholar to identify relevant studies. The study protocol has been preregistered in the Prospective Register of Systematic Reviews (PROSPERO) (CRD42022345001) and the Newcastle-Ottawa Quality Assessment Scale (NOS) was used to assess the methodological quality of included studies. An inverse variance weighted random effects effect meta-analysis was conducted to pool relative risk (RR) from the included studies.

Results

Fourteen primary studies with total participants of 203,783 pregnant women were included in this study (one case-control and thirteen cohort studies). Our meta-analysis found that offspring who were prenatally exposed to cannabis had a 48% and 30% increased risk of ADHD [RR =1.48: 95 % CI 1.23 – 1.79, I2 =66.8%, p = 0.01] and ASD [RR =1.30: 95 % CI 1.03 – 1.64, I2 = 45.5%, p=0.14] compared to those non-exposed offspring, respectively. Subgroup and sensitivity analyses confirmed the robustness of the main analysis.

Conclusion

This study indicated maternal prenatal cannabis exposure is associated with a higher risk of ADHD and ASD in offspring. Based on these findings, comprehensive preventive strategies are needed to cease cannabis use during pregnancy.

The association between physical activity and frailty in community-dwelling older adults

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Abstract

Background: Frailty is a common and increasingly prominent condition as the global older-adult population increases. Physical activity (PA) is a promising potential preventive strategy for frailty during older age. This study explores the association between physical activity intensity and frailty among community-dwelling older adults aged 70 years or older.

Methodology: This prospective cohort study utilises data from 11,570 participants in the ASPirin in Reducing Events in the Elderly (ASPREE) clinical trial and the ASPREE Longitudinal Study of Older Persons (ALSOP). Adults (70+ years) self-reported maximal usual PA intensity (never/rarely, light, moderate, vigorous). Frailty was defined in two ways; i) according to the Fried Phenotype criteria (Fried phenotype) (having 3 or more of the following: shrinking, slowness, weakness, exhaustion, low activity); and ii) scoring more than 0.21 on a 67-item deficit accumulation index (Index). Cox proportional hazards regression explored the association between PA and frailty over a maximum of 6 years, after adjustment for age, sex, education, smoking and alcohol status, living status, area-level socio-economic status, annual income status, remoteness, BMI, diabetes mellitus, dyslipidaemia, hypertension, and baseline frailty status. A competing risk regression was also conducted, adjusting for death. Hazard ratios and 95% confidence intervals (CI) were reported.

Results: 11,570 adults (mean age (SD) = 75.1 (4.2) years, 53.4% females) were followed for a median of 5.2-years during which time 1,202 adults (10.4%) developed frailty according to the Fried phenotype and 3,097 (26.8%) according to the frailty index. Compared with individuals engaging in light PA, the risk of developing frailty was greater among those who reported rarely/never engaging in PA (Fried phenotype: 1.55 (1.18-2.03); Index: 1.12 (0.91-1.37)) and lower among those engaging in moderate PA (Fried phenotype: 0.68 (0.59, 0.77)); Index: 0.87 (0.80, 0.93)) or vigorous PA (Fried phenotype: 0.47 (0.36, 0.60); Index: 0.70 (0.61-0.81)). The results of the competing risk regression analysis were similar.

Conclusions: The study results suggest that PA in older age at any intensity may lower frailty risk in older adults.

Indirect effects of rotavirus vaccination: a systematic review

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: Rotavirus is a major cause of diarrhoea-associated morbidity and mortality in children under five years old. Reductions in diarrhoea morbidity and mortality have been attributed to the introduction of rotavirus vaccines in many national immunisation programs (NIPs). While the direct effects of infant rotavirus vaccination are well described, there is a lack of consolidated data on its indirect effects. This review aims to describe the indirect effects of infant rotavirus vaccination on unvaccinated individuals, stratified by age group, country classification by income level and under-five mortality setting.

Methods: We conducted a systematic search of peer-reviewed journal articles and conference abstracts on MEDLINE, EMBASE and PubMed. Searches were restricted to English-only publications with no time limit. We included observational studies from settings that had national or regional introduction of rotavirus vaccines. We excluded the following study designs: case study/series, ecological, modelling, trials and qualitative. Two reviewers conducted title, abstract and full-text screening. Data extraction will include publication, study and population characteristics, and outcome measures (incidence, proportion, rate ratio and rate reduction of gastroenteritis/rotavirus-specific outpatient attendances, inpatient admissions and deaths). Risk of bias of individual studies will be assessed by both reviewers using the ROBINS-I tool and a meta-analysis will be performed if the data permits.

Results: The search resulted in 699 studies which underwent title and abstract screening and a subsequent 102 studies underwent full-text screening. A total of 17 studies were included in the review. The majority of these studies were from high-income countries (n=10/17), four from upper-middle and three from low-income countries. Most studies focused on paediatric age groups (n=15/17), while six included adult age groups. Subsequent parts of the review are underway and will be completed and presented in full at the conference.

Conclusion: Defining the additional benefits that rotavirus vaccines may provide in the unvaccinated population, including the elderly, will improve our understanding of the overall effectiveness, population-level impact, and cost-effectiveness of rotavirus vaccination programs. This review may support policymakers' decisions on introducing rotavirus vaccines to their NIPs.

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Evaluating the validity COVID-19 vaccine effectiveness estimates from case test-negative studies

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Background: The epidemiological characteristics of COVID-19 might make the vaccine effectiveness (VE) estimates from test-negative design (TND) studies subject to bias. This study aimed to assess the direction and magnitude of potential biases in the COVID-19 VE estimators derived from the TND by simulating synthetic datasets.
Methods: We derived a formula for VE estimates assuming no selection, measurement error or unmeasured confounders. We then added each of the studied parameters to the equation to address a broader range of situations. R statistical packages were used to simulate populations whose members may develop acute respiratory illness (ARI) due to COVID-19 or non-COVID-19 pathogens and the population who belong to the non-ARI category. The observed VE was compared with the true VE to estimate biases associated with confounding, selection bias and misclassification.
Results: In settings with low vaccination coverage, a lower specificity of vaccination status measurement underestimates the true vaccine effect. Because COVID-19 vaccines attenuate the severity of symptoms, the observed VE might be overestimated. Diagnostic test sensitivity exhibited the strongest association with the overestimated observed VE.
Conclusions: We suggest interpreting the VE estimates obtained from TND studies as the vaccine's effectiveness against the medically attended illness rather than VE against infection, which therefore requires careful selection of participants from administrative datasets. We suggest excluding participants who seek medical care more than five days after symptom onset, excluding controls with COVID-19 specific symptoms and choosing controls from swabs testing positive for another respiratory virus to minimise the chance of enrolling true cases as controls.

Impact of pneumococcal conjugate vaccine introduction on pneumonia in children in Mongolia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Background

Pneumonia is the largest infectious cause of childhood mortality globally in children aged 1-59 months. Pneumococcal conjugate vaccines (PCVs) have had a substantial public health impact with reductions in hospitalisation due to invasive pneumococcal disease, clinical pneumonia and radiologically confirmed pneumonia. Mongolia introduced the 13-valent PCV (PCV13) into the routine immunisation programme using a 2+1 schedule, in a phased manner by district. We aimed to describe PCV13 impact on childhood pneumonia incidence over a six-year period.

Methods

During April 2015 to June 2021, hospitalised children aged 2-59 months from four districts in Ulaanbaatar were consented and enrolled if they met a predefined pneumonia case definition. Crude incidence rates and incidence rate ratios (IRRs) comparing pre-PCV13 and post-PCV13 periods were calculated for all cases and stratified by district and age group. Adjusted IRRs for pneumonia endpoints in the pre-PCV13 and post-PCV13 period were calculated using negative binomial models. Models included PCV13 introduction, time period (to account for seasonality), district and age group. Primary endpoint pneumonia (PEP) was the primary outcome. Pneumococcal carriage prevalence ratios were calculated.

Findings

Of 55,691 children admitted with pneumonia, 17,688 (32%) were enrolled and 17,607 met all study criteria. Of 14,184 children with interpretable chest X-rays, 13% (n=1,813) had PEP. Pneumonia incidence rates were highly seasonal with highest case numbers during the winter months. Until February 2020 (excluding the COVID pandemic period), overall adjusted IRRs showed a significant decrease in PEP (0.73, 95% CI 0.57-0.94), very severe (0.77, 95% CI 0.64-0.93) and probable pneumococcal pneumonia (0·78, 95% CI 0·62-0·98), but not severe and hypoxic pneumonia. Results were similar until June 2021. Pneumonia declined in three districts that introduced PCV13 with catch-up campaigns but not the one district that did not. Reductions were larger in the 24-59 month age group than younger children. A 44% reduction was observed in vaccine-type pneumococcal carriage prevalence post-PCV introduction with a 49% increase in non-vaccine type carriage.

Conclusion

Following PCV13 introduction in Mongolia the incidence of more specific pneumonia endpoints declined in children 2-59 months, with additional benefits conferred by catch-up campaigns.

Arterial stiffness and incident chronic kidney disease in a large population cohort

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Chronic kidney disease (CKD) is estimated to affect approximately 11% of the New Zealand population with disproportionately higher prevalences in Māori, Pacific peoples, and South Asians. There is mixed evidence in population-based studies as to whether arterial stiffness, measured by "gold standard" techniques, can predict incident CKD. This study, utilising data from the Vitamin D Assessment (ViDA) Study, a large population-based cohort in Auckland, New Zealand, investigated whether arterial stiffness assessed oscillometrically was associated with incident CKD. The population comprised 4838 participants (mean±SD age = 66.2±8.3; ethnicity = European/other, 4051 (84%); Māori, 249 (5%); Pacific peoples, 301 (6%); South Asian, 237 (5%). Arterial stiffness was assessed from 5 April 2011 to 6 November 2012 by way of aortic PWV (aPWV), estimated carotid-femoral PWV (ecfPWV), and aortic pulse pressure (aPP). Incident CKD was determined by linkage to national hospital discharge registers. Cox proportional hazards regression was used to assess the time to CKD diagnosis in relation to the chosen arterial stiffness measures both overall and over quartiles. During a mean±SD follow-up of 10.5±0.4 years, 376 participants developed CKD. Of those participants, 168 had diabetes or prediabetes at baseline. Following adjustments for potential confounders, arterial stiffness was associated with the incidence of CKD (hazard ratio (HR) per SD increase: aPWV (1.69, 95% CI, 1.45-1.97), ecfPWV (1.84, 95%CI, 1.55-2.20) and aPP (1.37, 95%CI, 1.22-1.53). The risk of incident CKD was, compared to the first quartile of arterial stiffness, higher in the fourth quartile (HR: aPWV (4.72, 95%CI, 2.69-8.27), ecfPWV (4.30, 95%CI 2.46-7.53) and aPP (2.71, 95%CI, 1.88-3.91), P for trend <0.001). Compared to Europeans, CKD risk was 1.66 times higher in Māori, 2.45 times higher in Pacific peoples, and 1.43 times higher in South Asians. These disparities persisted after adjusting for potential confounders including body mass index, cardiovascular disease, and diabetes. Arterial stiffness, as measured by aPWV, ecfPWV, and aPP could be used in clinical practice to help identify people at risk of incident CKD. If applied in non-European populations, it could also potentially lead to early prevention and treatment of CKD in these people, reducing ethnic disparities.

G-computation in practice: a new diagnostic tool to guide outcome model specification

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Causal inference is a central goal of clinical and public health studies, investigating the effect of an exposure on an outcome of interest. For many studies, reliance on observational data is common, requiring confounding-adjustment methods to estimate causal effects. G-computation is one such method, which in the point-exposure setting extends outcome regression by allowing exposure-confounder interactions in the outcome model and predicts counterfactual outcomes across the sample under each exposure. Consistent estimation with g-computation relies on correct specification of the outcome model, which cannot be empirically verified. It is recommended that variables included in the model should be driven by expert-knowledge. However, there is no formal guidance or diagnostic tool available to aid the parametric specification of the outcome model, presenting a challenge when applying g-computation in practice. In this work we aimed to address this gap, proposing a new diagnostic tool to guide the outcome model specification in g-computation.

We propose a diagnostic tool that distinguishes between candidate outcome model specifications based on the expected bias in the resulting g-computation estimator. Implementation of the diagnostic tool utilizes machine learning to ensure flexible estimation of the propensity scores when estimating the expected bias. We investigated performance of the diagnostic tool in a simulation study based on the Longitudinal Study of Australian Children (LSAC), considering a range of true outcome generation models and sample sizes. Results indicated the diagnostic tool was optimised for the correctly specified model in most settings, and appropriately discriminated the model that minimized the bias in effect estimates. The diagnostic tool was illustrated with real data in the LSAC study, with implementation of the tool available as an R function.

The proposed new diagnostic tool offers a promising approach to guide outcome model specification in g-computation, enhancing implementation of this approach in epidemiologic studies, and enabling better estimation of causal effects in practice.

Epidemiologic and economic modelling of optimal COVID-19 policy in Victoria, Australia

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Identifying optimal COVID-19 policies is challenging. For Victoria, Australia (6.6 million people), we evaluated 104 policy packages (two levels of stringency of public health and social measures [PHSMs], by two levels each of mask-wearing and respirator provision during large outbreaks, by 13 vaccination schedules) for nine future SARS-CoV-2 variant scenarios.

We used an agent-based model to estimate morbidity, mortality, and costs over 12 months from October 2022 for each scenario. The 104 policies (each averaged over the nine future variant scenarios) were ranked based on four evenly weighted criteria: cost-effectiveness from (a) health system only and (b) health system plus GDP perspectives, (c) deaths and (d) days exceeding hospital occupancy thresholds.

More compared to less stringent PHSMs reduced cumulative infections, hospitalisations and deaths but also increased time in stage ≥3 PHSMs. Any further vaccination from October 2022 decreased hospitalisations and deaths by 12% and 27% respectively compared to no further vaccination and was usually a cost-saving intervention from a health expenditure plus GDP perspective. High versus low vaccine coverage decreased deaths by 15% and reduced time in stage ≥3 PHSMs by 20%. The modelled mask policies had modest impacts on morbidity, mortality, and health system pressure. The highest-ranking policy combination was more stringent PHSMs, two further vaccine doses (an Omicron-targeted vaccine followed by a multivalent vaccine) for ≥30-year-olds with high uptake, and promotion of increased mask wearing (but not Government provision of respirators).

Integrated epidemiologic and economic modelling, as exemplified in this analysis, can be rapidly updated and used as a framework to assist pandemic decision making. This analysis is accompanied by an online tool allowing policy makers to explore the impacts of future viral evolution and policy priorities (e.g., health system pressure v. economic considerations) on optimal decision making, representing a novel way to communicate modelling data to decision makers and the public.

The sex-steroid hormone pathway and risk of postmenopausal oestrogen receptor-positive breast cancer

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Background: Sex-steroid hormones are associated with postmenopausal breast cancer but are rarely examined in the context of potential confounding from other biological pathways implicated in breast carcinogenesis. We estimated the effects of sex-steroid hormone biomarkers on risk of postmenopausal oestrogen receptor (ER)-positive breast cancer, while accounting for biomarkers from the insulin/insulin-like growth factor signalling and inflammatory pathways.

Methods: This analysis included 1,225 women from a case-cohort study of postmenopausal breast cancer within the Melbourne Collaborative Cohort Study. Weighted Poisson regression with a robust variance estimator was used to estimate risk ratios (RRs) and 95% confidence intervals (CIs) of postmenopausal ER-positive breast cancer, per doubling plasma concentration of progesterone, oestrogens, androgens, and sex hormone binding globulin (SHBG). Analyses included sociodemographic and lifestyle confounders, as well as other biomarkers.

Results: Increased risks of postmenopausal ER-positive breast cancer were observed per doubling plasma concentration of progesterone (RR = 1.22, 95% CI: 1.03 to 1.44), androstenedione (RR = 1.20, 95% CI: 0.99 to 1.45), dehydroepiandrosterone (RR = 1.15, 95% CI: 1.00 to 1.34), total testosterone (RR = 1.11, 95% CI: 0.96 to 1.29), free testosterone (RR = 1.12, 95% CI: 0.98 to 1.28), oestrone (RR = 1.21, 95% CI: 0.99 to 1.48), total oestradiol (RR = 1.19, 95% CI: 1.02 to 1.39) and free oestradiol (RR = 1.22, 95% CI: 1.05 to 1.41). A decreased risk was observed for SHBG (RR = 0.83, 95% CI: 0.66 to 1.05).

Conclusions: Progesterone, oestrogens and androgens increase postmenopausal ER-positive breast cancer risk, whereas SHBG may decrease risk. These findings strengthen the causal evidence surrounding the sex hormone-driven nature of postmenopausal breast cancer.

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Modelling options to prevent occupational hearing loss

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Noise at work is a significant problem, with 11.5% of the working population exposed above the occupational limit (LAeq8h > 85dB) on any single working day. However the approach to occupational noise control often relies on workers themselves wearing correct personal hearing protection. The management of environmental noise control, on the other hand, relies on the reduction of noise at the source (e.g leaf blowers) or physical barriers such as those around highways. This approach needs to be taken with occupational noise as well.
We aimed to model the reduction in the number of workers exposed over the noise limit if noise levels of different sets of specific tools or equipment were reduced.
We collected information on the tools used and tasks performed during each participant's last working shift from 4,977 workers via a telephone survey. We used OccIDEAS, a workplace exposure application which uses a preprogrammed database to assign noise exposure levels to each noisy activity performed by the workers. It then estimates their daily noise exposure level (LAeq8h) based on the noise level and the time doing that task or using that tool. We then determined the most noisy tools/tasks and developed five different simulations of reduction of 10dB in noise emissions for specific tool groups.
Powered tools and equipment were the most common noisy tools and were responsible for 59.3% of all noise exposure. Modelling demonstrated that a 10 dBA noise-level reduction of all powered tools and equipment would lead to a 26.4% (95% confidence interval: 22.7% - 30.3%) reduction of workers with an Laeq8h > 85dB. This could represent over 300,000 Australian workers no longer exposed above the workplace limit and a reduction in the future burden of hearing loss, tinnitus, workplace injuries and other health effects. Initiatives to reduce the noise emissions of specific powered tool groups are warranted.

COVID-19 cases during the Delta wave: Establishing a cohort using linked data

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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Background: COVID-19 can result in longer-term impacts on health however there is limited evidence on patterns of healthcare resource utilisation following a COVID-19 diagnosis, and how this might differ by population groups e.g. by vaccination status, comorbidities, and demographics. The Australian Institute of Health and Welfare (AIHW) has developed a COVID-19 linked data set, encompassing data for COVID-19 cases in Australia linked to a range of administrative datasets.

Aim: To demonstrate the utility of the AIHW's COVID-19 linked data set by creating a cohort of COVID-19 cases during the Delta wave to assess the impact of COVID-19 on the utilisation of healthcare resources among different population groups in Australia.

Methods: Linkage variables for COVID-19 cases were sourced from participating states and territories and linked with information on the AIHW's linkage spine using probabilistic record linkage. Demographic information for the cohort was combined with Pharmaceutical Benefits Scheme (PBS), Medicare Benefits Schedule (MBS), deaths and aged care data to investigate health service utilisation, medication dispensed and outcomes.

Results and Impact: Linkage rates for each participating jurisdiction were high ranging from 93% for NT cases to 99% for Tasmanian cases and did not differ much by age and sex. The study cohort includes all people with a COVID-19 diagnosis in ACT, SA, and NT between 1 July 2021 and 31 December 2021 and people with a COVID-19 diagnosis in NSW and Tasmania between 1 July 2021 and late November 2021 (Delta cohort).

This study will be one of the first to describe the impact of COVID-19 on the utilisation of healthcare resources among different population groups during and after the Delta wave in Australia. It demonstrates the utility of linked data to inform future health management and resource needs by quantifying the impact of a COVID-19 diagnosis. Case data will be updated, and additional jurisdictions included in future to enable research into different waves of the pandemic.

Mapping zero-dose children in East New Britain, Papua New Guinea

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Introduction: Immunisation is a life-saving public health intervention, but coverage varies distinctly across Papua New Guinea. In East New Britain Province in 2021, 72.2% of children under one year received the first dose of the Pentavalent-1 vaccine, while only 53.7% of children received their first dose of measles-containing vaccine.

Methods: Coverage data for 2015 – 2021 was obtained from East New Britain Provincial Health Authority. Data were reported by facility but interventions are targeted at the ward or local-level government (LLG) level, so facilities were mapped and coverage rates averaged between sites to determine coverage at the LLG level. The number of children who had never received Pentavalent-1 or first dose of measles-containing vaccine ("zero-dose") was also calculated for each LLG and district.

Results: In 2021, coverage of pentavalent-1 and measles-containing vaccine first dose at operational health facilities in East New Britain ranged from 22.3% to 161.8%, and 14.5% to 100.9%, respectively. High and low performing clinics were dispersed across all four districts in East New Britain Province, but Rabaul district had the lowest overall coverage of both vaccines. Overall, 17 facilities (46%) reported less than 50% coverage of at least one vaccine in 2021. Coverage in most LLGs has declined over the past five years. There were approximately 3588 and 5976 children across East New Britain in 2021 who had not received their first dose of the Pentavalent or measles-containing vaccine, respectively. Dropout between Pentavalent-1 and first dose measles-containing vaccine was 25.6%. Zero-dose children were disproportionately more likely to reside in Gazelle or Rabaul districts.

Conclusion: Vaccine coverage for Pentavalent-1 and measles-containing vaccine varies across facilities, districts, and LLGs in East New Britain Province. The large dropout rates between Pentavlent-1 and measles-containing vaccine warrants additional attention in children from six months of age. Enhanced understanding of the barriers to routine immunisation is required to develop effective and sustainable interventions. Targeting these activities in Gazelle and Rabaul districts could reach up to 70% of zero-dose children in the province.

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Towards a better asthma monitoring through national asthma indicators

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: The National Asthma Strategy 2018 serves as a comprehensive framework for monitoring asthma and aims to enhance the coordination and targeting of limited health care resources across all levels of government. To facilitate asthma monitoring, 10 indicators were included in the Strategy. Data on these indicators is presented to provide insights into asthma in Australia.

Method: Various data resources have been explored and data extracted to report on indicators on asthma prevalence, mortality, hospitalisation, emergency department (ED) presentations as well as treatment and management. Data on priority groups have been included where possible as well as data available over time so that progress can be assessed.

Results: Approximately 2.7 million Australians (11% of the population) reported having asthma in 2020–21, and represented 2.5% of total disease burden in 2022 (over 138,000 disability-adjusted life years).

Between 2016–17 and 2020–21 hospitalisations due to asthma decreased by over 40%, from 175 to 100 per 100,000. Meanwhile, ED presentations for asthma decreased by around 22% from 297 to 232 per 100,000 between 2018-19 and 2020-21. However, health expenditure on asthma increased between 2015–16 and 2019–20, from $770 million to $900 million. Findings also include the latest updates on mortality, primary care utilisation, medication use and quality of life for people with asthma.

Conclusion: Overall, some of the National asthma indicators demonstrate favourable progress towards the Goals and Objectives outlined in the Strategy. However, it is importance to note that reporting has been indirectly impacted by the COVID-19 pandemic in recent years.

Variation across population groups and regions of Australia are evident. Improved data collections and research is needed to gain a better understanding of prevention, treatment and management of asthma in primary health care settings.

Grant Support: This project was funded by the Commonwealth Department of Health and Aged Care.

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Worldwide data availabilities and gaps in studying healthy ageing and its inequities

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Promoting healthy ageing and reducing its inequities are global priorities. Cohort studies are essential for evaluating healthy ageing and understanding the role of social and environmental factors behind healthy ageing inequities. We aimed to identify and systematise ageing cohorts across the globe; and to provide an overview of data availabilities and gaps.

Method: We searched for ageing cohorts across the globe that include participants aged 60+ at baseline. Studies involving younger cohorts were also incorporated if ageing was a primary focus of data collection or if study objectives evolved over time to include ageing. Building on the World Health Organization's framework on healthy ageing, we extracted data availability on demographics, social and environmental factors, and different healthy ageing domains measured in each cohort study.

Results: We found 287 ageing cohorts worldwide—Europe (n=28), Oceania (n=25), Asia (n=68), North America (n=91), South America (n=7), the Middle East (n=7), and Africa (n=7). Most cohorts collected data on commonly used indicators of socioeconomic conditions, including education, occupation, and income. However, limited cohorts collected data on wealth—one of the most important socioeconomic indicators at older ages—and owning property. Considering environmental factors, around 50% of European, Oceanian, and African cohorts and <30% of Asian, Middle Eastern, and North/South American collected data on housing type. Data on neighbourhood conditions were collected in <30% of included cohorts. Considering social factors, data on social support, social network and social participation were collected in 50 to 70% of cohorts from different nations. Most cohorts had at least one measure for physical (>71%), cognitive (>63%), and psychological functioning (>75%), and disability (>63%); however, the availability of these measures was higher for cohorts with an explicit aim to study ageing compared to those without this aim at baseline.

Conclusions: These results highlight the current wealth of data from cohort studies to provide evidence-based data to promote healthy ageing and reduce its inequities. Of note, these results also highlight the limited data availability in South America, the Middle East, and Africa that need to be addressed. This project has created a novel, comprehensive synthesis of healthy ageing cohorts to inform better research.

Vitamin D testing in Queensland, Australia: 9-year follow-up of QSkin cohort

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Vitamin D testing has gained significant attention in recent years due to growing awareness of the potential health consequences associated with vitamin D deficiency. Between 2001 and 2011, there was a surge in the rate of testing, with the number of tests conducted per capita increasing almost 100 times, accompanied by a corresponding rise in healthcare spending for the service. Concerns were raised about the overuse of vitamin D testing, leading to the introduction in late 2014 of a set of criteria for vitamin D tests that are eligible for government funding through the Medicare Benefits Schedule (MBS). The criteria restrict subsidised testing to people at high risk of vitamin D deficiency or with specific clinical indications. There is evidence that the criteria initially led to a decrease in rates of testing; however, this decline was not sustained. Available evidence indicated that almost three quarters of the people who were tested did not meet any of the MBS criteria.
Using data from the QSkin Sun and Health study, we seek to explore the trends in and determinants of vitamin D testing in Queensland from 2012 to 2020. The QSkin cohort consisted of ~44,000 Queenslanders. Data were obtained from surveys and linkage with cancer registers, MBS, the pharmaceutical benefits scheme (PBS) and pathology companies. We found that the trend in vitamin D testing among QSkin participants followed that of Australian population, which increased until 2013, stabilised between 2014 and 2015, and then increased again from 2015. These tendencies were similar between sexes and age groups. Women and older age groups were more likely to have a vitamin D test compared to men and younger groups, respectively. Analysis of test results showed that the median serum 25-hydroxyvitamin D concentration has not changed significantly over time. Since the introduction of the MBS criteria, the percentage of tests indicating vitamin D deficiency has decreased, suggesting that the policy is not effectively triaging people for vitamin D testing. Further analysis is warranted to understand factors driving the increase in demand and to inform future measures to ensure appropriate use of this service.

Dietary patterns and gastrointestinal cancer risk and mortality: Systematic review

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Abstract
Objective: This review aimed to evaluate the association of dietary patterns derived through principal component analysis (PCA) and reduced rank regression (RRR) methods with gastrointestinal (GI) cancer risk and mortality.
Methods: Medline, SCOPUS, Cochrane Library, PsycINFO, ProQuest, CINHAL, and Web of Sciences electronic databases were searched. The Newcastle Ottawa scale was used to assess the risk of bias in prospective follow-up studies. Pooled risk and mortality estimates were calculated using random-effects models, and heterogeneity across studies was assessed by I2.
Results: Twenty-eight studies with 1,341,169 participants were included. Two dietary patterns were identified: “healthy” characterized by a higher intake of fruits, vegetables, milk, and dairy products, and “western” characterized by a higher intake of red and processed meat, alcohol, and refined and sugar-sweetened beverages. Comparing the highest to the lowest category of dietary patterns, the PCA-derived ‘healthy’ dietary pattern was associated with a 7% reduced risk of GI cancer (RR= 0.93, 95%CI: 0.87, 0.99; I2= 37.8%), while the ‘western’ dietary pattern was associated with a 13% increased risk (RR = 1.13; 95%CI: 1.06, 1.22; I2= 25.4%). However, RRR-derived healthy (RR=0.83; 95%CI: 0.61, 1.12; I2= 41.4%) and Western (RR=0.93; 95%CI: 0.57, 1.52; I2=84.3%) dietary patterns were not associated with GI cancer risk. PCA-derived healthy (RR=0.89; 95%CI: 0.77, 1.02; I2= 13.7%) and Western (RR=1.26; 95%CI: 0.99, 1.60; I2= 71%) dietary patterns were not also associated with GI cancer mortality.
Conclusion: Studies reported PCA-derived ‘healthy’ and ‘western’ dietary patterns have shown a reduced and increased risk of GI cancer, respectively but not with RRR-derived dietary patterns. Although limited studies, there was no association between diet and GI cancer-related mortality. Further prospective studies are required to clarify disparities in the associations between PCA or RRR-derived dietary patterns and the risk of GI cancer.

Keywords: Colorectal Cancer, Dietary Patterns, Principal Component Analysis, Reduced Rank Regression

Self-controlled case series methodology and real-world datasets: lessons learned during COVID

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

The self-controlled case series (SCCS) methodology is an epidemiological study design developed to investigate associations between transient exposures and outcomes. Its strength is that cases act as their own controls, avoiding the complexity of recruiting appropriate controls and accounts for all time-invariant confounding factors. However, it is important that all assumptions required for SCCS are adequately met to have unbiased results. SCCS has been a commonly used analytical method for vaccine safety investigation since the 1950's. However, knowledge gaps remain around its application to varied datasets (including unavailable, encrypted and poorly recorded data fields) and conditions with complex clinical presentations. We describe the learnings and challenges encountered using SCCS in two vaccine safety surveillance systems – SAFESIG-GP and the Vaccine Safety Health Link (VSHL).

SAFESIG-GP utilizes large de-identified general practice datasets with over 12 million patients to monitor adverse events following immunization and VSHL is Australia's largest vaccine safety dataset linking immunization, hospital, general practice, and perinatal datasets.

Our experience applying SCCS methodology has varied between the two systems depending on the data available. For VSHL as date of birth was available, age was used as the primary timeline whereas with SAFESIG-GP calendar time was chosen instead.

Our choice of using SCCS was impacted by data recording, data structure and the clinical presentation of the vaccine adverse event. For example, for some datasets accurate timelines between outcome and exposure were not available because they occurred during the same hospital admission and were recorded as the same date. Similarly, SCCS was not suited for conditions where the presentation may occur long before the confirmation of diagnosis. In both circumstances, traditional epidemiological designs may be more appropriate.

SCCS has been successfully implemented for the analyses of menstrual cycle changes and appendicitis post COVID-19 vaccination. Our experience with SCCS clearly demonstrates that while it is an established study design, it requires careful and tailored implementation.

Subsequent Primary Cancer Risks for Colorectal Cancer Survivors: Systematic Review and Meta-Analysis

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Introduction: Cancer can occur more than once in a person's lifetime, and for colorectal cancer survivors, the risk of developing subsequent primary cancer (SPC) in both primary and other organs is a significant concern. This systematic review aimed to estimate the risks of SPC for colorectal cancer survivors.

Methods: We screened published peer-reviewed articles before September 2022 through four databases to identify studies that used population cancer registries to estimate the standardised incidence ratios (SIRs) of SPC for colorectal cancer survivors compared with the general population. We summarised the reported SIRs and then calculated age-specific cumulative risks of SPCs for colorectal cancer survivors from different regions: North America, East Asia, Europe, and Australasia using the summary SIRs and age-, sex-, region-, calendar- and cancer-specific 5-year incidences for the general population.

Results: Out of 7403 articles identified, we included 47 in the meta-analysis after systematic screenings by two independent reviewers. The risks of any SPC, extracolonic SPC and subsequent colorectal cancer were higher than those for the general population (pooled SIR 1.11, 95% Confidence Interval (CI) 1.04–1.19; SIR 1.18, 95%CI 1.12–1.25; and SIR 1.47 95%CI 1.23–1.70, respectively). For specific organs, we found evidence of increase risks of SPC in the small intestine, testes, ovary, uterus, kidney, Thyroid, and female breast. The estimated cumulative risks of any SPC, extracolonic SPC, and subsequent colorectal cancer to age 75 years for both sexes were: 43.1% (95%CI 40.3–46.2%), 41.3% (95%CI 39.2–43.7%) and 10.5% (95%CI 8.06–12.9%) in Australasia; 39.4% (95%CI 36.9–42.2%), 38.9% (95%CI 36.9–41.2%) and 8.22% (95%CI 3.47–13.0%) in North America; 39.2% (95%CI 36.7–42.0%), 36.7% (95%CI 34.8–38.8%) and 11.5% (95%CI 6.68–16.2%) in East Asia; and 37.2% (95%CI 34.9–39.9%), 35.4% (95%CI 33.6–37.5%) and 5.96% (95%CI 4.41–7.52%) in Europe, respectively.

Conclusion: The findings indicate that individuals who have survived colorectal cancer face a greater likelihood of developing SPC in both primary and extracolonic sites compared with those who have not had the disease. The estimated cumulative risks could be useful in guiding medical professionals in determining the most effective surveillance approaches for colorectal cancer survivors.

Associations between air pollution with eczema and food allergy in early life

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Background: Air pollutants may generate reactive oxygen species, which damage the epithelial cells through oxidative stress. A disrupted skin barrier may lead to increased allergen exposures that contribute to the development of eczema and food allergies. Evidence on this effect and eczema are inconsistent, while the effect of air pollution on oral food challenge-proven food allergy was not assessed before.
Objective: To assess whether exposure to air pollution is associated with eczema and food allergy in early life.
Methods: HealthNuts recruited a population-based sample of 1-year-old infants who were followed-up at ages 4,6 and 10 years. Residential fine particulate matter (PM2.5) and Nitrogen dioxide (NO2) exposures were estimated using a satellite-based land-use regression model at each data point. Eczema was defined at 1 year by parent report and at 4-10 years using the International Study of Asthma and Allergies in Childhood definition. Food sensitisation was defined using skin prick tests, and all infants with detectable (>=1mm) SPT to food allergens were offered an oral food challenge. We fitted multilevel logistic regression models with random intercepts for Australian Bureau of Statistics Statistical Areas Level 2. The associations were adjusted by factors guided by a causal diagram.
Results: 4,668 infants were included in this study. A higher concentration of PM2.5 at 1 year was associated with food allergy prevalence at 4 years (aOR:1.39[95%CI:1.07-1.81]) and at 6 years (aOR:1.32[95%CI:1.02-1.71]) per 1.6 µg/m3 PM2.5 increase. NO2 exposure at 4 years was associated with food allergy prevalence at 6 years (aOR:1.63[95%CI:1.00-2.64], non-linear; lower 25% vs upper 75% of the air pollution marker distribution). PM2.5 and NO2 exposure at 1 year was associated with persistent food allergy (participants with food allergy at 1 year who had food allergy in subsequent follow-ups) at 4 and 6 years. In contrast, there was no evidence of associations between air pollution and eczema at any age.
Conclusions: Early life air pollution exposure was associated with prevalence and persistence of food allergy at 4 and 6 years of life. Avoidance of air pollution in early life could potentially be a food allergy preventive measure.

Translation of trial treatments in the real world: case study of bevacizumab

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: Trial evidence has shown bevacizumab during primary treatment followed by maintenance treatment improves survival in those with ovarian cancer that are at higher risk of progression (FIGO stage IV, and FIGO stage III with >1cm residual disease after cytoreduction). Studies assessing survival benefit in a real-world context are limited and evidence suggests bevacizumab may be underutilised. We aim to (i) identify factors that predict use of bevacizumab; and (ii) investigate the association between bevacizumab use and hypertension incidence, quality of life (QOL) and survival in an Australian cohort of individuals with advanced ovarian cancer.
Methods: We used data from the Ovarian Cancer, Prognosis and Lifestyle (OPAL), a national prospective cohort study of adults diagnosed with epithelial ovarian cancer between 2012 and 2015. Analysis was restricted to those with invasive advanced disease who received primary chemotherapy. We used logistic regression to assess associations between baseline characteristics and bevacizumab use separately by timing of primary chemotherapy initiation before (likely from private scripts or compassionate use only) and after bevacizumab listing on the Pharmaceutical Benefits Scheme (PBS) for those at higher risk of progression. We will conduct regression analyses to assess hypertension incidence (measured via new use of medications), QOL and survival by bevacizumab use. Subgroup analysis restricted to individuals at higher risk of progression will be conducted.
Results: There were 674 participants eligible for analysis. The proportion who received primary bevacizumab was 5% before listing on the PBS and 24% after listing on the PBS. In the group at higher risk of progression, these proportions were 11% and 50% respectively. Factors associated with increased odds of bevacizumab use before PBS listing included greater age, university education, FIGO stage IV disease, and treatment at a private institution. Those with comorbidities were less likely to be treated. After PBS listing of bevacizumab only FIGO stage IV disease remained significantly associated with increased likelihood of use.
Conclusion: Use of bevacizumab increased after it was listed on the PBS, but remained lower than expected in those at higher risk of progression. Further analysis will assess whether bevacizumab use was associated with real-world outcomes.

Participant motivators and expectations in the MEL-SELF trial of melanoma patient-led surveillance.

Dr Deonna Ackermann[1]
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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background:
This study within a trial (SWAT) aimed to determine motivators and expectations among participants in the MEL-SELF randomised trial of patient-led surveillance for melanoma.

Methods:
The MEL-SELF trial is recruiting patients previously treated for localised melanoma, who own a smartphone, have a partner to assist with skin self-examination (SSE), and attend routinely scheduled follow-up at specialist and primary care skin clinics in Australia. The first 100 randomised participants responded to two open-ended questions about their motivations and expectations for participating in the trial, administered through the online baseline questionnaire. Three coders independently coded the free-text responses and resolved discrepancies via consensus. Qualitative content analysis via an iterative process was used to group responses into themes. Coding and analysis were conducted in Excel.

Results:
Of the 100 survey participants, 98 (98%) answered at least one of the two questions. Overall, responses across the motivation and expectation items indicated three broad themes: community benefit, perceived personal benefit, and trusting relationship with their healthcare provider. The most common motivators for participation related to community benefit and included progressing medical research, benefitting future melanoma patients, and broader altruistic sentiments such as “helping others” or “giving back”. The most common expectations from the trial were linked to perceived personal health benefits such as increased SSE knowledge and skills, earlier diagnosis and treatment of melanoma and access to additional care. Patients were also motivated by the opportunity to participate in an emerging telehealth intervention and to take a more proactive role in managing their melanoma risk.

Conclusion:
Understanding common, context-specific, and individual participant determinants of research engagement may guide strategies to improve informed consent processes, recruitment, retention, response to trial tasks and intervention adherence. Implementing SWATs in resource intensive clinical trials is an important innovation to maximise value and prevent research waste.

Health insurance and dentist visits: a comparison of three cohorts of women

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: Oral health has an impact on overall health and well-being, with poor oral health associated with a number of chronic diseases in adults of all ages. People who visit the dentist regularly have better oral health than people who do not. While it is well known that there are socioeconomic barriers to dental care, most research has been cross-sectional or focused on specific age groups (e.g., adults aged over 65 years or adolescents). The aim of this research was to investigate the associations between private ancillary health insurance and dental visits across three cohorts of Australian women of different ages using repeated waves of data over several years.

Methods: We used data from more than 30,000 women born in 1973-1978, 1946-1951 and 1921-1926 participating in the Australian Longitudinal Study on Women's Health. We conceptualised our model using directed acyclic graphs. Poisson regression using generalised estimating equations with robust error variance was used to investigate associations between private ancillary health insurance and self-report of dental visits in the 12 months prior to completing each wave.

Results: Over time, the percent of women who did not visit the dentist decreased in both the 1973–78 cohort (from 46% in 2006 to 33% in 2018) and 1946–51 cohort (43% in 1998 to 30% in 2016) but was stable in the 1921–26 cohort at around 61%.

In all three cohorts, women who did not have private ancillary health insurance were less likely to visit the dentist than women who had insurance. However, the strength of the association was weaker in the 1921-26 cohort (adjusted risk ratio (aRR) 1.32 95% confidence interval (CI) 1.28-1.36) than in both the 1973-78 cohort (aRR 1.52 95% CI 1.48-1.57) and the 1945-51 cohort (aRR 1.45 95% CI 1.41-1.49).

Implications: Even though private health insurance rarely covers the full cost of dental care it is a key enabler of accessing care. This study emphasises that socioeconomic inequities in access to dental care still need to be addressed and that these barriers to care exist for women of all ages.

Mental health impacts of employment precarity and financial insecurity for young Australians

Ms Stefanie Dimov[1], Dr Marissa Shields[1], Dr Alexandra Devine[1], Ms Kristy De Rose[1], Ms Bella White[1], Prof Anne Kavanagh[1], Prof Cathy Vaughan[1]
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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Background: Young Australians, particularly those with disability, have been disproportionately impacted by pandemic-induced job losses, financial insecurity, and mental health issues. This study aimed to investigate the impact of precarious work and financial insecurity on the mental health of young people, including young people with disability, in the context of COVID-19.

Methods: Data for this study was taken from the Youth Employment Study (YES), a mixed-methods study of employment and health experiences of young Australians. Quantitative data is from Wave 3 conducted in 2022 (n=123, aged 15-25). Precarious employment was measured using responses about contract type and financial stress by >1 financial hardship in the last three months. Responses to the K6 scale were coded to generate a measure of probable serious mental illness (SMI). Descriptive and linear regression analyses were used. Qualitative data is taken from interviews conducted in 2021 with 24 young people aged 18-25 with disability and analysed using thematic analysis.

Results: Half of all survey respondents reported precarious employment (52.6%) or at least one financial stressor (51.7%) and 37.4% respondents experienced a probable serious mental illness (SMI). Financial stress was associated with higher levels of probable SMI, with an estimated mean difference in K6 score of 6.3 points between people who experienced financial stress compared to those who did not. There was no evidence of association between precarious employment and SMI. Qualitative findings highlighted similar themes linking financial insecurity with poor mental health. Some young people also spoke about the negative impact that precarious work has on their mental health, suggesting this may be particularly relevant for young people with disability.

Conclusions: This study emphasises the important impact that financial stress has on young people's mental health and suggests that employment precarity may be an important determinant of poor mental health for young people with disability. These findings come at an important policy juncture whereby governments, employment support services and employers are best positioned to collaborate and invest in better employment and mental health outcomes for young people.

Reducing the burden due to overweight (including obesity) and physical inactivity

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Overweight (including obesity) and physical inactivity are key risk factors impacting disease burden in Australia. In 2018, 8.4% and 2.5% of Australia's total disease burden was attributable to these risk factors, respectively. The aim of this project was to investigate the impact of burden saved in the year 2030 under hypothetical scenarios of improving population exposure to these risk factors.
This project uses comparative risk assessment methodology applied to the Australian Burden of Disease Study to estimate population attributable fractions that indicate the proportion of disease burden attributable to a risk factor. Exposure in the population to overweight (including obesity) and to physical inactivity was adjusted to reflect different levels of improved disease risk from these factors, including scenarios of reductions in body mass index (BMI) and of additional exercise.
Compared with exposure levels in 2018, a reduction by one unit of BMI (i.e. 1 kg/m2) – which amounts to about 3kg for Australians of average height – in people living with overweight (including obesity) would result in 60,400 fewer disability-adjusted life years (DALY) and 2,300 deaths attributable to this risk factor in the year 2030. Similarly, if the population at risk did the equivalent of an extra hour of moderate-intensity activity per week, such as taking a brisk walk, and maintained this to 2030, disease burden and deaths could fall by 16% (28,300 DALY) and 13% (1,500 deaths), respectively.
The analysis also found that the most effective interventions for achieving greater improvements in disease burden in 2030 would be those targeting higher levels of BMI (that is, the obese population) and those increasing activity among older people – these are the groups that experience larger disease burden overall.
These results suggest that, if population-wide changes to overweight (including obesity) and physical inactivity occur and are maintained to the year 2030, there would be large improvements in population health, including gains in population-level quality of life and cost reductions for the health system.

Alcohol consumption and cause-specific mortality in an Australian cohort of 180,575 participants.

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Background:
Australia has a relatively high level of alcohol consumption. Alcohol consumption is known to increase the risk of numerous causes of death internationally, but local evidence for Australia and evidence regarding pattern of drinking is limited.

Methods:
Cox proportional hazards regressions were used to calculate hazard ratios (HR) and 95% confidence intervals (CI) for cause-specific mortality risk in relation to overall alcohol consumption (drinks/week) and pattern of drinking among 180,575 of 267,357 participants aged ≥45 years (2005-2009) in the New South Wales (NSW) 45 and Up Study, a prospective cohort study. Pattern of drinking differentiated between participants who concentrated consumption on 1-3 days of the week from those who consumed alcohol on 4-7 days of the week. Cause of death was ascertained to 2019 by linkage to NSW Registry of Births Deaths and Marriages and Australian Bureau of Statistics Cause of Death Unit Record File by the Centre for Health Record Linkage (CHeReL). Secure data access was provided by the Sax Institute's Secure Unified Research Environment (SURE). To limit bias from reverse causation, participants with pre-existing disease at baseline were excluded.

Results:
Over a median 11.4 years, 18,025 deaths occurred to 2019. Every additional seven drinks per week increased risk of death from any cause by 6% (HR=1.06; 95%CI=1.04-1.08). Increased risk of death was observed for alcohol-related cancers combined (HR=1.11; 95%CI=1.05-1.18), mouth, pharynx and larynx cancer (HR=1.31; 95%CI=1.10-1.56), liver cancer (HR=1.23; 95%CI=1.07-1.40), digestive system disease (HR=1.33; 95%CI=1.22-1.45), liver disease (HR=1.64; 95%CI=1.44-1.88), and falls (HR=1.23; 95%CI=1.03-1.46). Participants consuming as low as >3.5 to ≤10 drinks/week had significantly elevated risk of liver disease mortality (HR=2.54; 95%CI=1.05-6.15) compared to light drinkers. Significant interactions with sex and smoking status were observed for certain causes of death, however variation in mortality risk by drinking pattern was not statistically significant (p-interaction=0.08). Results did not change materially when excluding the first three years of follow-up.

Conclusions:
Excess risk of death from alcohol consumption in Australia is significant. As a nation with a relatively high intake of alcohol and a high proportion of drinkers, interventions aimed at reducing overall consumption may translate into significant public health gains.

Vitamin D supplementation and antibiotic use among older Australian adults

Dr Hai Pham[1], Dr Mary Waterhouse[1], Ms Catherin Baxter[1], Ms Briony Duarte Romero[1], Dr Donald McLeod[1], Professor Bruce Armstrong[2], Professor Peter Ebeling[3], Professor Dallas English[4], Professor Gunter Hartel[1], Dr Michael Kimlin[5], Professor Rachel O'Connell[6], Professor Jolieke van der Pols[7], Professor Alison Venn[8], Professor Penelope Webb[1], Professor David Whiteman[1], Professor Rachel Neale[1]

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Infectious diseases contribute greatly to global disease burden, with infants aged <1 year and adults aged ≥65 years experiencing the highest burden. Vitamin D, best known for its role in serum calcium regulation, may also regulate the immune system, upregulating innate immunity and down-regulating aspects of acquired immunity. Observational studies report an inverse correlation between serum 25-hydroxy vitamin D concentration (the most commonly used marker of vitamin D status) and risk and severity of infections. Vitamin D supplementation may reduce the risk or severity of infection, but this has been investigated in few large population-based trials.

Objective: To assess the effect of vitamin D supplementation on infection, using prescription of antibiotics as a surrogate for infection.

Methods: The D-Health Trial is a randomised, double-blind, placebo-controlled trial in which 21,315 Australians aged 60–84 years were randomised to 60,000 IU of supplementary vitamin D3 or placebo monthly for 5 years. For this analysis, the primary outcome was the number of antibiotic prescription episodes; secondary outcomes were total number of prescriptions; repeat prescription episodes; and antibiotics for urinary tract infection. We estimated incidence rate ratios (IRRs) using negative binomial regression, and odds ratios using logistic regression.

Results: Vitamin D supplementation slightly reduced the number of prescription episodes (IRR 0.98, 95% CI 0.95-1.01), total prescriptions (IRR 0.97, 95% CI 0.93-1.00), and repeat prescription episodes (IRR 0.96, 95% CI 0.93-1.00). There was stronger evidence of benefit in people predicted to have insufficient vitamin D at baseline (prescription episodes IRR 0.93, 95% CI 0.87-0.99).

Conclusions: Applying these findings to the Australian population, we estimate that routine vitamin D supplementation of older Australian adults may reduce the total number of antibiotic prescriptions from 1.51 million to 1.46 million per million people per year (i.e., by approximately 250,000 prescriptions per annum). The findings from this study support the hypothesis that vitamin D has a clinically relevant effect on infection.

The role of economic evaluation in modelling non-pharmaceutical interventions for pandemic policy

Miss Shania Rossiter[1], Miss Samantha Howe[1], Dr Joshua Szanyi[1], A/Prof James Trauer[2], Dr Tim Wilson[1], Prof Tony Blakely[1]
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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background: Dynamic transmission modelling of infectious diseases is a tool used to provide epidemiological guidance to decision makers when forming pandemic policy. It is not clear how often and with what methods economic modelling is included to also generate cost-effectiveness estimates for pandemic planning and policy making.

Objective: Investigate how economic evaluation has been incorporated into dynamic modelling studies of non-pharmaceutical interventions (NPIs) for pandemic planning and policy, using a systematic review.

Search strategy: We systematically searched the databases Embase, Pubmed and Scopus for relevant studies, with no date restriction on 23 November 2022.

Selection criteria: Dynamic modelling studies with incorporated economic evaluation of NPIs. Eligible modelled infectious diseases included, Ebola, Zika, Influenza H1N1, Influenza H5N1, MERS, SARS and COVID-19.

Data collection and analysis: Recovered citations were screened and eligible studies were included for extraction. The steps were performed by two independents reviewers.

Main results: A total of 1,804 citations were screened and 63 studies met the selection criteria. All continents were represented among eligible studies and COVID-19 (77%) was the most modelled disease. A range of NPIs were investigated including school closure, testing/screening, lockdown, isolation or quarantine, social distancing and mask use. Most of the studies used an SEIR extension model (63%). The type of economic evaluation was mostly cost-effectiveness analysis (73%; e.g. cost per infection averted), followed by cost-utility analysis (28%; e.g. cost per QALY gained) and cost benefit analysis (25%; i.e. health benefits monetized and costs beyond the health system included). Further analysis of the impact of the modelled interventions will be conducted.

Conclusion: Overall, economic evaluation is heterogeneously incorporated in dynamic modelling, with an increase in studies in this area since the COVID-19 pandemic. The wide coverage of NPIs and diseases provides guidance for pandemic policy going forward.

Co-research with young people with disability: Implications and impact

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Context: Co-research involving young people with disabilities is crucial for ensuring that research accurately reflects their lived experiences and promotes inclusivity, empowerment, and meaningful participation. However, historically, research on disability experiences, including those of young people, has often excluded their involvement. While inclusive research practices have seen some progress, co-research with young people with disabilities remains limited. In this paper, we describe the design and implementation of the Youth Employment Study (YES), a co-designed research project. We discuss methodological, ethical, and practical opportunities and challenges encountered during the study.

Process: YES was conducted between 2020 and 2022 across all States and Territories in Australia. It employed a mixed-methods approach to investigate the employment and health experiences of young Australians during the COVID-19 pandemic. Co-researcher positions were advertised through online employment agencies, youth support services, and word-of-mouth. Young people with physical, cognitive, and psychosocial disabilities were hired as co-researchers, and those interested in continuing their involvement participated in qualitative data collection and analysis training.

Learnings: Based on our experiences, we present key learnings to provide an overview of our co-research approach in the YES study. Firstly, we highlight the positive impact of co-research, including enhanced quality and impact, as well as increased inclusivity and empowerment for co-researchers and team members. Secondly, we address practical challenges including power relations in co-research, which may include issues with expertise and authority, decision-making and control, access to resources, communication and language, tokenism and representation. Conducting co-research also requires additional time, resources, and expertise; as well as complex ethical considerations. We also discuss funding priorities and the importance of dedicated funding allocation. Finally, we address the potential personal costs to co-researchers, such as re-traumatization, stigma, discrimination, burnout, and fatigue resulting from sharing their lived experiences.

Conclusions: By involving young people with disabilities as co-researchers, we ensure that their perspectives are heard and that research aligns with their lived experience. While progress has been made, further efforts are needed to expand co-research opportunities. The YES study serves as a valuable example of how co-research can be effectively implemented to promote inclusivity and empower young individuals with disabilities.

Disparities in patterns of medication use following an Acute Coronary Syndrome hospitalisation

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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Background:
Australian Clinical Guidelines for the Management of Acute Coronary Syndromes (ACS) recommend that people who survive an ACS event be prescribed a multi-drug regime. Despite evidence that this substantially reduces the risk of future cardiovascular events, research indicates that not all patients are being prescribed and/or are taking these medicines. The project used data held in the National Integrated Health Services Information Analysis Asset to examine patterns of medication use among a cohort of people who survived an ACS hospitalisation. This dataset allowed us to identify subgroups of the population who had suboptimal patterns of medication use and may inform future strategies to improve secondary prevention.
Methods:
The cohort included 35,200 people who were hospitalised due to ACS between 1 July 2016 and 30 June 2017. The medication classes were statins, beta blockers, angiotensin-converting enzyme inhibitors/angiotensin receptor blockers and antithrombotics. Measures of medication use in the year following discharge were derived using PBS data and included medication initiation, persistence and adherence. Logistic regression was used to assess demographic, clinical and health care factors associated with measures of medication use.
Results:
3 in 5 people with ACS were dispensed 3 or more of the recommended cardiovascular medicines within 40 days of leaving hospital. Women were less likely than men to be dispensed recommended medications following discharge, with the largest gap among those aged 45–54 years (68% of males vs 48% of females). However, once initiated to in-scope medications, a similar proportion of men and women were persistent and adherent to medications at one year post hospitalisation.
Those in older age groups, had previously taken cardiovascular medications and who regularly accessed community-based healthcare services following hospital discharge were more likely to be classified as persistent and adherent to medications following an ACS event.
Conclusions:
Patterns of medication use following an ACS hospitalisation are suboptimal. Specific subgroups are less likely to initiate recommended medications for secondary prevention and/or continue to take them over the long term. These groups may need additional support to improve medication use in the transition from hospital to the community.

Discharge against medical advice in Western Australian Aboriginal children, 2002-2018

Mr Daniel Christensen[1]
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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Background: Discharge against medical advice (DAMA) is a priority issue for the health system as it represents an interruption to usual care and can negatively impact patient well-being. However, little is known about the factors associated with DAMA in paediatric populations, particularly among Aboriginal children in Australia.
Objectives: Determine the child, family, and episode of service specific characteristics associated with DAMA hospital admissions and emergency department (ED) presentations in Aboriginal children aged < 5 years old for and the odds of 30-day readmissions/re-presentations.
Participants: Aboriginal children born in Western Australia (n=29,319) between 1 January 2002 and 31 December 2013 were included. A Hospital Cohort (n = 16,931), comprising of all children < 5 years who had one or more hospital admissions, and an Emergency Department Cohort (n = 26,546) comprising all children < 5 years who had one or more emergency department presentation.
Methods: Associations were tested using multilevel logistic regression.
Results: The odds of hospital DAMA decreased over time (year of admission: aOR 0.91, 95% CI 0.89, 0.93), while the odds of ED DAMA increased over time (aOR 1.03, 95% CI 1.02, 1.03). Hospital admissions in regional and remote areas were more likely to DAMA than those in Perth metropolitan area (aOR 5.71, 95% CI 4.04, 8.08). ED presentations in regional and remote areas were less likely to DAMA than those in the Perth metropolitan area (aOR 0.77, 95% CI 0.72, 0.82). Emergency hospital admissions (aOR 6.19, 95% CI 3.04, 12.61) were more likely to DAMA than elective admissions from hospital waitlists. There was a no evidence of an association between hospital DAMA and 30-day readmission (aOR 1.19, 95% CI 0.95, 1.50), however, there was evidence of a 5% decrease in the odds for 30-day re-presentation following ED DAMA (aOR 0.95, 95% CI 0.91, 0.99).
Conclusions: The study identified several important determinants of DAMA, including admission status, triage status, location, and year of admission. These findings could inform targeted measures to decrease DAMA, particularly in regional and remote communities.

The efficacy of diabetes self-management in low- and middle-income countries: A meta-analysis

Ms Hasina Akhter Chowdhury[1], Dr Cheryce L Harrison[1], Dr Badrun Naher Siddiquea[1], Miss Sanuki Tissera[1], Dr Afroz Afsana[2], Professor Liaquat Ali[3], Dr Anju E Joham[1], Dr Baki Billah[1]
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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Aims: To summarise the effect of diabetes self-management education interventions on glycaemic control, cardiometabolic risks, self-management behaviours and psychosocial well-being among people with type 2 diabetes mellitus (T2DM) across low- and middle-income countries (LMICs).

Methods: The MEDLINE, Embase, CINAHL, Global Health and Cochrane databases were searched on 02 August 2022. The included studies were randomised controlled trials (RCTs) and quasi-experimental studies. The quality of the studies was assessed, and a random-effect model was used to estimate the pooled effect of diabetes self-management education (DSME) intervention. Heterogeneity was tested, and subgroup analyses were performed. The risk of bias was evaluated using Eager's regression test and funnel plot.
PROSPERO (CRD42022364447).

Results: A total of 43 studies (n=40 RCTs and n=3 quasi-experimental studies) were conducted in 20 LMICs that involved 11,632 participants, 5,784 in the intervention arm and 5,848 in the comparator arm were included in the analyses. Compared with standard care, DSME effectively reduced the HbA1c level by 0.65% (95% CI: 0.45% to 0.85%) and 1.27% (95% CI: -0.63% to 3.17%) for RCTs and quasi-experimental design studies, respectively. Further, the findings showed an improvement in cardiometabolic and diabetes self-management behaviours and psychosocial well-being. In terms of intervention characteristics, DSME intervention with a variety of educational components performed better in relation to body mass index, glycaemic control measured by glycosylated haemoglobin (HbA1c), low-density lipoprotein and triglycerides compared to lifestyle modification educational interventions alone. Face-to-face intervention with periodic telephone follow-up had a higher efficacy on HbA1c, low-density lipoprotein and high-density lipoprotein control compared with studies that used a face-to-face or text message/web-based mode of intervention alone.

Conclusion: This systematic review and meta-analysis found a positive effect of DSME intervention on clinical and cardiometabolic risks, diabetes self-management behaviours and psychosocial well-being. Further, face-to-face delivery interventions with periodic ongoing support performed better for improved glycaemic and lipid control as well as anthropometric measures. This suggests that ongoing support alongside individualised face-to-face intervention delivery is favourable for improving overall T2DM management in LMICs with special emphasis on countries in the lowest income group.

Intra-urban risk assessment of occupational injuries and illnesses associated with hot weather.

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Abstract
Increased risk of occupational injuries and illness (OI) is found to be associated with extreme weather conditions. However, most studies have reported the average impacts at broader scales within cities states, or provinces.
Methods
We assessed the intra-urban risk of OI associated with temperature in three major cities of Australia including Greater Brisbane, Greater Melbourne, and Greater Sydney from a period of July 1, 2005, to June 30, 2018. The risk was estimated at moderate heat (90th percentile) and extreme heat (99th percentile). We used distributed lag non-linear models to estimate the intra-urban risk and attributable fraction of OI at the statistical area level 3. Gridded meteorological data were acquired at 5 Km spatial resolution. Multivariate meta-regression was used to pool the effect estimates. Subgroup analyses were carried out to identify vulnerable groups of workers. Further, the risk of OI was estimated in the future (2016-2045 and 2036-2065) using future projected data.
Results
The cumulative risk of OI was estimated to be 3.4% in Greater Brisbane, 7.7% in Greater Melbourne, and 8.9% in Greater Sydney at extreme heat. There was an increased risk of OI in the western inland regions in Greater Brisbane (17.4%) and Greater Sydney (32.3%) for younger workers, workers in outdoor and indoor industries, and workers reporting injury claims. The coastal areas posed a higher risk for workers in Greater Melbourne at moderate heat (23.4%) and in northern outer fringes at extreme heat (16.5%). The coastal SA3 regions in Greater Melbourne were generally at high risk for the majority of subgroups. The risk of OI increased further in climate change scenarios.
Conclusions
This study provides a comprehensive spatial profile of OI risk associated with hot weather conditions across three major cities in Australia. Risk assessment at the intra-urban city level revealed strong spatial patterns in OI risk distribution due to heat exposure. These findings will provide much-needed scientific evidence for Work Health and Safety regulators, industries, unions, and workers to design and implement location-specific preventative measures.

Inequalities in suicide deaths for people with disability in Australia

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Background
People with disability experience poor mental health and large inequalities relative to people without disability. However, no Australian studies have compared suicide deaths between people with and without disability. This study addresses this evidence gap utilising newly available whole-population linked administrative data to estimate suicide rates for people with and without disability.

Methods
We used data from the Multi-Agency Data Integration Project (MADIP), which brings together whole-population linked data from various administrative sources. This analysis used data from the 2011 Census of Population and Housing linked to death records from the National Mortality Database from 2011 to 2019. We identified people who reported requiring assistance with core activities in the Census, representing people with severe or profound disability. ICD-10 codes were used to identify people who died by suicide. We calculated age-standardised suicide rates for men and women with and without disability. Poisson regression models were used to estimate the relative rate of suicide for people with disability compared to people without disability, including results disaggregated by sex, adjusting for age group, ethnicity, and Indigenous status.

Results
Suicide rates were two-times higher for people with disability compared to people without disability (IRR=2.05, 95% CI 1.92, 2.19). The magnitude of the relative difference was larger for women compared to men, with suicide rates 2.90-times higher for women with disability compared to women without disability (95% CI 2.61, 3.21) and 1.75-times higher for men with disability compared to men without disability (95% CI 1.61, 1.89), though the absolute rates of suicide were larger for men.

Conclusion
The findings of this study describe, for the first time, the large inequalities in suicide deaths for people with disability relative to those without disability. Reducing deaths by suicide among Australians with disability needs to be a public health priority. Future research should examine the causes of the large inequalities, including understanding the contribution of the social determinants of health since these are known to be important determinants of mental health for people with disability. The results also suggest the need to increase availability of accessible and inclusive mental health services for people with disability.

Prevalence and risk factors of cow's milk allergy in south-east Australia

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Introduction
There is limited data on the prevalence of challenge-confirmed cow's milk allergy globally and none in Australia, and risk factors for cow's milk allergy are incompletely understood.
Objective
To determine the prevalence and risk factors of IgE-mediated cow's milk sensitization and allergy in one year old infants in Melbourne, Australia.
Methods
One year old infants were recruited to the EarlyNuts study from 2017-2019. Parents completed questionnaires and infants underwent skin prick tests (SPT) and, if SPT wheal was detectible, oral food challenges to milk. Sensitization was defined as wheal ≥2mm and allergy as a positive challenge or recent reaction.
Results
Of 1,933 infants recruited, 1,419 underwent SPT to milk. The prevalence of milk sensitization was 2.8% (95% CI, 2.0-3.9) and allergy 1.4% (95% CI, 0.8-2.2). Early eczema, East Asian parent country of birth, and parent history of food allergy were associated with milk sensitization (aOR [95% CI]: 4.7 [2.2-10.1], 6.5 [2.7-15.2], and 3.2 [1.4-7.4]) and milk allergy (aOR [95% CI]: 6.5 [2.4-17.6], 10.0 [2.7-36.5], and 6.0 [2.1- 17.0]). Attending childcare in the first year of life was associated with a reduced likelihood of milk sensitization (aOR, 0.4; 95% CI, 0.1-1.0). Sex, siblings, pets, age at introduction of milk, breastfeeding, and socioeconomic status were not associated with either milk sensitization or allergy.
Conclusion
This is the first study of the prevalence of milk allergy using challenge-proven outcomes in Australia. Early eczema, parent country of birth, and parent history of food allergy were risk factors for milk allergy at age one.

Strengthening national COPD monitoring using linked health services data

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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Background: Monitoring the prevalence of Chronic Obstructive Pulmonary Disease (COPD) annually is important for assessing the health and economic burden of the condition, health service planning and evaluating progress in prevention and management. Current monitoring efforts rely on survey data that is time consuming and expensive to collect which prevents annual updates. Linked health administrative data provides a cost-efficient alternative that can be updated regularly.

Aim: To develop methods to estimate COPD prevalence using the National Integrated Health Services Information Analysis Asset (NIHSI AA) data and compare with estimates from other sources.

Methods: Prevalence estimates are of the number of people alive at each 30 June reference date who had markers of COPD in PBS, ED or hospitalisations data in the year prior.

Findings: 2.7% of people aged 35 and over were identified as having COPD at 30 June 2019 based on their health service use in the year prior. After age-standardisation, COPD prevalence was:

- higher among men than women
- higher among those living in the lowest socioeconomic areas compared with the highest
- lower in Major cities compared with Inner regional areas and Outer regional, remote and very remote areas.

Linked data estimates of COPD prevalence are slightly lower than survey-based estimates. This suggests that some people captured by survey estimates are not using the health services used to identify people with COPD in the linked data.

Implications: While undiagnosed COPD and mild COPD that is not managed with specific health services cannot be captured, linked data estimates provide a valuable source of information to monitor the prevalence of diagnosed COPD that is managed with specific medications or requires ED or hospital care. People with diagnosed COPD using these health services are an important group for population monitoring to inform health service planning.

Methodology for systematic identification and analysis of multiple biases in causal inference

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Observational studies examining causal effects rely on unverifiable causal assumptions, the violation of which can induce multiple biases due to confounding, measurement, and selection processes. Quantitative bias analysis (QBA) aims to examine the sensitivity of findings to such violations, generally by producing bias-adjusted estimates under alternative assumptions. Most QBA in practice addresses either a single source of bias or multiple sources considered separately, which does not address the overall impact of the potential biases.

Objective: We propose an approach for systematically identifying multiple biases and provide guidance regarding the most appropriate way to analyse these together.

Methods: We propose the “target trial” approach as a tool to help systematically list all potential biases in a study. This approach defines the causal effect of interest by specifying the protocol components of the hypothetical randomised trial that would ideally be conducted to estimate it, and then specifies how each of these components is emulated with the observational data. The emulation of each component is perfect only under certain assumptions, so considering the potential violation of each assumption allows systematic identification of all biases.
Within this framework, we proposed and evaluated three possible approaches for analysing multiple biases via a simulation study: (i) individually analysing each source of bias, producing multiple bias-adjusted estimates, (ii) sequentially adjusting for biases in the assumed order in which they occurred, (iii) simultaneous adjustment for multiple biases, via weighting and imputation bias-adjustment methods. Approaches were assessed in terms of how well they estimate the true causal effect across different causal structures, strengths of bias and misspecification of bias parameters. Simulations were based on a case study from a population-based investigation of food allergy in children, which is also used to illustrate the target trial and bias analysis approaches.

Results and conclusions: The methodology proposed enables researchers to systematically identify all biases in their study. Preliminary simulation findings suggest that a simultaneous adjustment approach is the most appropriate, allowing assessment of overall impact whilst not relying on bias ordering assumptions. This methodological work will facilitate the conduct of high-quality multiple bias analyses in causal inference using observational data.

Maximising resources for epidemiology practice: lessons from using Big Data in Stroke

A/Prof Monique Kilkenny[1,2], Dr Lachlan Dalli[1], Dr Muideen Olaiya[1], A/Prof Nadine Andrew[3,4], Dr David Ung[3,4], Dr Joosup Kim[1,2], Ms Ailie Sanders[1], Dr Lee Nedkoff[5,6], A/Prof Seana Gall[7], Prof Amanda Thrift[1], Prof Dominique Cadilhac[1,2]
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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

CONTEXT:
Since 2012, we have undertaken projects linking the Australian Stroke Clinical Registry with administrative datasets (e.g. Medicare). This presentation will highlight ten lessons/successes from our ten years of experience in developing the National Stroke Data Linkage Program for Big Data research in stroke.

PROCESSES:
1) Time and patience: Data acquisition for linkage projects takes time and patience is required. There is variation in time from application to receipt of data.
2) Merging issues: Ensure standardised data preparation processes.
3) Safe data access and dissemination: Optimal use of secure environments, ensuring no small cell counts, receiving permissions for data exports from data custodians takes time.

ANALYSIS:
4) Missing data: Imputation methods can be used to account for missing data.
5) Major biases from using big data, i.e. selection bias and misclassification bias, can be minimised through propensity score adjustments and quantitative analysis of bias.
6) Reporting checklists: Standardised checklists for publication of studies using Big Data (e.g. RECORD, TEN-SPIDERS).
7) Validation studies to assess accuracy of registry, hospital coded or claims data.
8) Community of practice for data linkage: We established the National Stroke Data Linkage Working group as a community of practice for people to a) provide advice on processes for linking data to externally-held datasets; b) collaborate on data transfer processes and c) share knowledge on data coding for the preparation and analyses of linked datasets. Our group have expertise in the areas of data linkage, epidemiology, and health services research.
9) Community of practice to improve clinical documentation and diagnostic coding for stroke. The Australia and New Zealand Stroke Coding Working Group was established for this purpose. An education program was developed, implemented and evaluated in both countries.

OUTCOMES:
10)Elements of success: A core success factor has been having the national registry and the ability to augment government-held data. Other successes include grants ($6.5M); training of students and post-docs (n=43); National data platform (n=7 projects; 22M records); publications (n=37) and media reports (n=5).
Ongoing collaborations with State/Commonwealth governments, Stroke Foundation, industry, and stakeholders ensures findings from Big Data research in stroke are translated into policy and practice.

Preoperative factors of 30-day mortality and Percutaneous Coronary Intervention: A systematic review

Mr Mohammad (Rocky) Chowdhury[1], Dr Dion Stub[1], Dr Diem Dinh[1], Dr Nazmul Karim[1], Dr Bodrun Naher Siddiquea[1], Dr Baki Billah[1]
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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Introduction: Risk adjustment following Percutaneous Coronary Intervention (PCI) is vital for clinical quality registries and performance monitoring. There remains significant variation in the accuracy and nature of risk adjustment models utilised in international PCI registries. Therefore, the current systematic review aimed to summarise preoperative variables associated with 30-day mortality among patients who underwent PCI, and the methodologies used in risk adjustments.

Methods: The Medline, EMBASE, CINAHL, and Web of Science databases until October 2022 without any language restriction were systematically searched to identify preoperative independent variables related to 30-day mortality following PCI. The quality and risk of bias (ROB) of all included articles were assessed using the Prediction Model Risk Of Bias Assessment Tool (PROBAST). Two independent investigators took part in screening and quality assessment.

Results: The search yielded 2,941 studies, of which, 47 articles were included for the final assessment. Logistic regression, Cox-proportional hazard model, and Machine learning (ML) were utilized by 30 (363.8%), 15 (31.3%), and 1 (2.1%) articles respectively. A total of 83 independent preoperative variables were identified that were significantly associated with 30-day mortality following PCI. Variables that had clinical importance and were used in various models are, but not limited to, age (n=39, 83.0%), renal disease (n=27, 57.4%), diabetes mellitus (n=17, 36.2%), acute coronary syndrome (n=15, 32.0%), cardiogenic shock (n=15, 32.0%), gender (n=14, 29.2%), ejection fraction (n=13, 27.1%), and heart failure (n=12, 25.5%). Four (8.5%) studies validated the model on external/out-of-sample data, 11 (23.4%) studies used missing values imputation, and 16 studies (34.0%) reported the model's discrimination power performance with values ranging from 0.501 (95% CI: 0.472-0.530) to 0.928 (95% CI: 0.900-0.956).

Conclusion: Variation in risk adjustment following PCI remains across registries. Risk adjustment models need further improvement in their quality through the inclusion of a parsimonious set of clinically relevant variables, appropriately handling missing values and model validation, and utilizing ML methods.

The impact of food allergy on growth at ages 6-10 years.

A/prof Rachel Peters[1], Hugh Attard, Dr Victoria Soriano, Prof Adrian Lowe, A/Prof Kirsten Perrett, Prof Shyamali Dharmage, Dr Vicki McWilliam
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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Background: We previously showed that infants with both food allergy and eczema had lower height and weight at age 1 year, compared to infants without allergic conditions. These differences persisted to age 4 years in children with persistent food allergy. Reduced childhood growth has been linked to poorer lung growth, cognitive development and school performance. This study assessed whether reduced growth outcomes observed in infants with allergic disease, persisted to age 10 years.
Methods: HealthNuts recruited 5276 one-year-old infants who underwent skin prick testing (SPT) and oral food challenges (OFC) to determine food allergy at age 1 and 6 years. Height and weight were measured by research assistants at age 6 and 10 years. Linear regression modelled the association between food allergy at ages 1–6 years (never, resolved and persistent allergy) and height-for-age and weight-for-age z-scores using CDC growth standards. Analyses were adjusted for socioeconomic status, parent country of birth, family history of allergy, gestational age, birth weight, breastfeeding duration, and timing of solids introduction, informed by a directed acyclic graph.
Results: At age 6 years, n=4222 individuals participated of which, n=2257 had complete data on growth, food allergy and other covariates. For age 10 years, n=1512 had complete data on growth, food allergy and other covariates. There was weak evidence that children with food allergy at age 1 year had lower weight and height at age 6 years, compared to children without food allergy (adjusted mean difference -0.10, 95% CI -0.22, 0.02 and -0.08, 95% CI -0.19, 0.03, respectively), however these differences attenuated by age 10 years (-0.06, 95% CI -0.20, 0.08 and -0.06, 95% CI -0.19, 0.08, respectively). Children with egg allergy that persisted to age 6 had reduced weight compared to children who never had an egg allergy, (age 6: -0.36, 95%CI -0.76, 0.04 and age 10: -0.43, 95%CI -0.89, 0.04). There was little evidence of an association between persistent peanut allergy and childhood growth.
Conclusions: Children with food allergy and particularly those with persistent egg allergy were shorter and lighter, highlighting the importance of nutritional guidance for these children to support healthy growth and development.

Prevalence of Toddlers Meeting 24-Hour Movement Guidelines and Associations with Parental Practices

Dr Elise Rivera[1], Professor Kylie Hesketh[1], Professor Liliana Orellana[1], Professor Valerie Carson[2], Professor Rachael Taylor[3], Professor Jan Nicholson[4], Professor Lisa Barnett[1], Ms Denise Becker[1], Dr Harriet Koorts[1], Professor Marie Löf[5], Professor Jo Salmon[1], Professor Barbara Galland[3], Dr Katherine Downing[1]
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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Limited research exists concerning the degree to which toddlers' (1-2 years) meet Australian 24-hour Movement Guidelines for screen time, sleep, and physical activity. Parenting perceptions and practices may influence toddlers' adherence to movement guidelines. This study aimed to a) estimate the proportion of toddlers adhering to individual and combined movement guidelines and b) examine associations between parental perceptions and practices and toddlers' adherence to individual and combined movement guidelines.

Parents self-reported their parental practices and perceptions (routines, restrictions, knowledge, concerns, co-participation) and toddlers' movement behaviours in a baseline assessment of the Let's Grow study (randomised trial that recruited families with toddlers throughout Australia). Baseline survey data were used to estimate the prevalence of toddlers complying with the physical activity (minimum 180 minutes/day with energetic play), screen time (maximum 1 hour/day for 2 years; zero minutes/day for 1 years), and sleep guidelines (11-14 hours/day), and toddlers' adherence to combined (all three) movement guidelines. Logistic regression models were fitted to assess the associations between each parental practice and perception and toddlers' adherence to individual and combined movement guidelines after adjusting for covariates.

The sample included 1,147 toddlers with an average age of 27 months (SD = 4.0). Most toddlers met the sleep (82.3%) and physical activity (81.5%) guidelines, while 30.9% met the screen time guideline. A fifth (20.1%) met all guidelines, while 2.1% met none. For physical activity and screen time, having routines, greater restrictions, knowledge of guidelines, fewer concerns, and less co-participation in screen time and more co-participation in physical activity were each associated with greater adherence to their respective guideline. Having fewer concerns about sleep was associated with greater compliance with this guideline. Having routines, greater restrictions, knowledge of guidelines, fewer concerns, and co-participation in combined behaviours were each associated with greater adherence to combined movement guidelines among toddlers.

Only a fifth of toddlers met all guidelines, indicating the need for strategies to promote health movement behaviours early in life. Future research should consider the parental practices and perceptions identified in this study to encourage toddlers to develop health lifestyles with reduced screen use and optimal physical activity and sleep.

Mortality impacts of NO2 emissions controls in Melbourne, Australia

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Ambient nitrogen dioxide (NO2) is primarily produced by fossil fuel combustion and has been associated with loss of life expectancy. In 2005 and 2013, Australia adopted Euro4 and Euro5 emissions standards, respectively, for all new vehicles, contributing gradual decreases in NO2 concentrations thereafter.

We performed health burden and impact analyses of NO2 in the Melbourne metropolitan area using established life table methods. Population data in 5-year age groups were retrieved from the Australian Bureau of Statistics (ABS) 2016 census at the statistical area 2 (SA2) level. Mortality rates were calculated from statewide deaths data in 5-year age groups and were applied to SA2 populations. Population weighted annual average exposures were determined using gridded annual NO2 concentrations from a satellite and land use regression (LUR) model covering the years 2005-2022. A spatial linear model of road and traffic density was used to portion NO2 concentrations by traffic and other sources. We used the WHO guideline concentration-response coefficient for NO2-attributable mortality (1.023, 95% CI: 1.008–1.037, per 10 µg/m3 annual average) to compare annual years of life lost (YLL) under the scenarios of 2005 and 2022. Finally, we calculated health impacts as incremental gains in life years during the study period based on annual changes in NO2 exposures and USEPA's 'cessation lag' structure.

In SA2's across Metropolitan Melbourne, annual average NO2 exposures were 2.0-21.3 µg/m3 in 2005 and were 2.2 µg/m3 lower on average in 2022. Under sustained NO2 exposures at 2005 and 2022 levels, we attribute 4495 and 2733 YLL annually, respectively. Linear regression analysis of NO2 over the study years revealed a negative correlation ($p < 0.0001$, $r = -0.85$) with a cumulative 3.6-µg/m3 decrease, but this observation was spatially heterogenous. Based on residential NO2 exposures, the sum of consequent incremental gains in life years came to 5679 over the 17 study years. These gains were concentrated in denser urban statistical areas.

These data indicate the mortality benefits of current and future NO2 emissions reductions and identify subpopulations for whom these benefits will be greatest.

Young carers, bullying and mental health – a causal mediation analysis.

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Young carers are people aged under 25 who support a family member or a friend living with a long-term health condition or disability. Young caring exerts adverse effects on the mental health of adolescents. Understanding the mechanisms underpinning such effects is imperative to provide evidence-based interventions to reduce the mental health inequalities between young carers and non-carers. Little is known about the pathways through which young care may lead to poor mental health. Bullying victimisation is a key determinant of poor psychological outcomes, and young carers are at elevated risk of bullying. This study assesses the extent to which the mental health effects associated with young caring are explained by school bullying.

Methods: We used data from the Longitudinal Study of Australian Children. Participants were categorised as non-carers, light carers, and moderate-to-heavy carers when participants were aged 14 to 15 years. Experiences of bullying victimisation at school were reported by adolescents at ages 16 to 17 years and coded as a binary variable (no/yes). Mental health was measured at 18 to 19 years using the Kessler Psychological Distress Scale (K10, continuous). We used a counterfactual approach to mediation analysis to account for mediator-outcome confounding and allow for exposure-mediator interaction. Total effects (TE) of young care on mental health were decomposed into natural direct effects (NDE –mental health effects not transmitted through school bullying) and natural indirect effects (NIE – mental health effects transmitted through school bullying). All models accounted for confounding factors identified as common causes of young care, school bullying and mental health.

Results: The TE of young care was 0·71 (95%CI: -0·03, 1·49) for light carers and 1·72 (95%CI: 0·45, 3·02) for moderate-to-heavy carers. School bullying explained 27% of the TE among moderate-to-heavy carers with (NIE:0·46; 95%CI:0·12, 0·91). There was weak evidence of mediation for light carers (NIE: 0·09; 95%CI: -0·05, 0·25).

Conclusion: A proportion of the mental health effects observed among moderate-to-heavy carers is mediated by school bullying, indicating that school bullying interventions may reduce the mental health effects of young caring among this group.

Gendered effects of adolescent care on mental health

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background: Young carers are people under 25 years who deliver informal care to someone with a long-term condition or disability. Young caring has detrimental mental health effects among adolescents. Young females are known to experience poorer mental health than males, but gender patterns underpinning the association between care and mental health have not been explored longitudinally. Understanding such differences is crucial to informing targeted approaches to reduce the mental health inequalities between young carers and their non-caring peers. To address this, we examined gender differences in the mental health effect of informal care among Australian adolescents.

Methods: Using the Longitudinal Study of Australian Children (LSAC) data, adolescents were categorised as non-carers or carers at ages 14/15. Gender, reported at 14/15 years, was used to categorise adolescents as boys or girls. Mental health was measured using the Kessler Psychological Distress scale (K10) at ages 18/19. We conducted multivariable linear regression models and assessed effect modification by fitting an interaction term between gender and care. Using this model, we calculated gender-stratified mental health effects of informal care for boys and girls and stratum-specific effects for each joint category of gender and care.

Results: Informal care was associated with poorer mental health among boys (β: 0.97, 95%CI: -0.01, 1.95) and girls (β: 1.66, 95%CI: 0.63, 2.69). Compared to boy non-carers, girl carers had the highest level of distress (β: 4.47; 95%CI: 3.44, 5.51). Gender-stratified results showed that while the mental health effects of informal care were stronger for girls (β: 1.66, 95%: 0.63, 2.69) than boys (β: 0.97, 95%CI: -0.01, 1.95), there was limited evidence of effect modification as the difference in mental health disparities due to informal care between girls and boys was small (β: 0.69) with high uncertainty levels (95%CI: -0.72, 2.11).

Conclusion: Although informal care had larger mental health effects for girls than boys, there was little evidence of effect modification by gender. Support strategies to reduce young informal care's adverse mental health impact should focus on identifying and supporting boy and girl carers equally.

Effectiveness of electronic job aid-supported counselling in improving infant feeding practices

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Age-appropriate infant feeding practices including exclusive breastfeeding in 0-5 months and complementary feeding with adequate dietary diversity from six months onwards remain suboptimal globally, especially in resource limited settings. From a multi-arm cluster randomised trial conducted in a rural district of Bangladesh, we assessed the effectiveness of an electronic job aid-supported nutrition counselling intervention in improving infant feeding practices. Of a total of 1500 pregnant women enrolled in 125 clusters, 1000 women received one-to-one infant feeding counselling by community health workers (CHWs) at home visits starting from the third trimester of pregnancy to two years of child's age. The electronic job aid acted as a real-time digital guide for the CHWs for scheduling the home visits, promoting time-tailored counselling cues and integrated visual illustrations to facilitate counselling. Half of the intervention children also received small quantity lipid-based nutrient supplements containing selected micronutrients. Mother-child dyads in the control group received the usual care. Data on infant feeding practices were collected by structured 24-hour dietary recall interviews in up to 12 scheduled visits between birth and 24 months of the child's age. Multi-level models were used to estimate the intervention's effect on infant feeding outcomes adjusting for trial design and repeat measures. Compared with usual practice the counselling intervention prevented prelacteal feeding at birth by half, relative risk (RR) 0.54 (95% confidence interval (CI) 0.34-0.76), and improved exclusive breastfeeding by 22% (RR 1.22; 95% CI:1.12-1.33) at 5 months. Children's mean dietary diversity score, the number of food groups a child consumed out of 7, was improved by 0.24 (95% CI: 0.11-0.37) at nine months of age. Among the food groups, the consumption of animal meat and fish showed the highest impact of 32% increased consumption among intervention children. However, the effect of the intervention on infant feeding varied by children's age. Also, household food security modified the intervention's effect on dietary diversity, showing improved practices among households with mild to moderate compared to low food insecurity only. The electronic job aid-supported counselling intervention demonstrated a promising effect on improving age-appropriate infant feeding practices and should be promoted in community nutrition programs.

The impact of Australia's Indigenous Practice Incentives Program on mortality

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Background: Globally, Indigenous populations experience poorer health but use less primary healthcare than their non-Indigenous counterparts. With the explicit aim of reducing these inequities, in May 2010, the Australian government introduced the Indigenous Practice Incentives Program (IPIP). This reform reduced prescription medicine co-payments and provided financial incentives for GPs to manage chronic disease care for Indigenous peoples with, or at risk of developing, chronic conditions. Using newly available whole-of-population death records, this study aimed to identify whether this reform did indeed close the gap in life expectancy among Indigenous peoples.
Methods: We source whole-of-population death records from the Australian Bureau of Statistics' Multi-Agency Data Integration Project (MADIP) between 2007 to 2019. Applying a difference-in-difference design, we compare trends in age at death among Indigenous peoples (n=37,416) pre and post reform to non-Indigenous Australians (n=2,019,927) over the same period. We additionally investigate whether the reform effects varied by cause of death (chronic or non-chronic) and level of IPIP uptake.
Results: Preliminary results indicate that post IPIP the mean age at death increased among Indigenous peoples from 53.00 [95%CI 51.18; 54.18] years pre-reform to 57.90 [95%CI 51.18; 54.18] years post-reform. The concurrent trends among non-Indigenous Australians were 76.08 [75.09;76.90] years pre-reform and 77.39 [76.36;78.66] post-reform, yielding a difference-in-difference estimate of 3.58 [2.78;4.66] years, or 16% of the pre-reform gap. Absolute improvements in age at death were more pronounced for chronic conditions than non-chronic conditions (20% and 12% of pre-reform age at death gap respectively) as well as in areas with moderate, but not high, uptake of IPIP. Extended models suggest that areas with higher pre-reform gaps in age at death benefited the most, suggesting that the reform was generally well targeted in terms of reducing health inequities.
Conclusions: We find evidence that the IPIP closed the gap in mean age at death between Indigenous and non-Indigenous Australians, with greater benefits for those with chronic conditions. While disparities remain, and appear to vary by uptake, on aggregate, enhancing access to primary healthcare and prescription medications among Indigenous peoples appears to be an effective strategy to improve health outcomes among Indigenous peoples.

Association of Smoking Cessation with Subsequent Risk of Cancer

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
Tobacco smoking is a well-established risk factor for cancers. We aimed to investigate the risk trajectories of major cancers according to the time elapsed since quitting.

Methods
Our study was conducted on 2,716,075 Korean participants aged 30+ years who underwent consecutive health examinations from the National Health Insurance Service from 2002 to 2017 without a previous diagnosis of cancer. Participants were followed up to 2020, and cancer cases were ascertained by the cancer registry. Participants were classified into five categories based on changes in their smoking behavior: complete quitters, transient quitters, relapsed smokers, continuous smokers, and never smokers. Years since quitting were defined as the time elapsed from the onset of quitting to the occurrence of cancer or the end of follow-up. To assess the association of smoking cessation with cancer, we estimated hazard ratios (HRs) and 95% confidence intervals (CI) using the Cox proportional-hazards regression model with person-years as the time scale. Furthermore, we investigated the risk trajectories of cancer according to years since quitting among men, by applying restricted cubic spline (RCS).

Results
During the 17 years of median follow-up, 96,073 incidence cases of all cancer (57,986 men, 38,087 women) were confirmed. Compared with continuous smokers, complete quitters had a significantly lower risk of cancer at all sites (HR, 0.84; 95% CI, 0.82 to 0.86), lungs (HR, 0.61; 95% CI, 0.57 to 0.65), liver (HR, 0.72; 95% CI, 0.65 to 0.79), stomach (HR, 0.88; 95% CI, 0.83 to 0.94), and colorectum (HR, 0.82; 95% CI, 0.76 to 0.88) among men. Among women, lung cancer risk was reduced by quitting (HR, 0.40; 95% CI, 0.24 to 0.69), but the other cancers did not. In RCS analyses, the risk of cancers at all sites, liver, stomach, and colorectum decreased since quitting and reached half that of continuous smokers after 15 to 20 years, while the lung cancer risk reached after 10 years.

Conclusion
Our finding suggests that sustained smoking cessation can lead to reduced cancer risk by half the risk of continuous smokers after 15 years or more since quitting, especially for lung cancer risk, after 10 years.

Impact of lifetime body mass index trajectories on obstructive sleep apnoea

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Background: Despite evidence for an association between short-term weight changes and obstructive sleep apnoea (OSA), the impact of changes in body mass index (BMI) over the life-course on OSA is poorly documented. Given that this knowledge is vital to inform preventive interventions, we investigated the association between BMI trajectories from childhood to middle age and adult OSA.
Methods: Five BMI trajectories were previously identified in the population-based Tasmanian Longitudinal Health Study (TAHS), using eight-time points from age 5 to 45 years. At 53 years, probable OSA was identified using STOP-Bang questionnaire, a screening tool with the optimal cut-off score ≥ 5 in TAHS. Clinically-relevant OSA was defined as moderate-to-severe OSA (oxygen desaturation index ≥15 events/hour) from type 4 sleep studies. We used multivariable logistic regression models to investigate the association of BMI trajectories with probable and clinically-relevant OSA. For secondary analyses, the models were re-run using self-reported medically-diagnosed OSA and probable OSA, as defined using Berlin and OSA-50 questionnaires.
Results: Compared with the average BMI trajectory, the child average-increasing trajectory was associated with increased risk of STOP-Bang defined probable OSA (aOR=5.43, 95%CI: 3.36, 8.80), clinically-relevant OSA (aOR=4.38, 95%CI: 1.12, 17.17), and self-reported medically diagnosed OSA (aOR=2.83, 95%CI: 1.28, 6.24). The high trajectory was associated with probable OSA (aOR=5.20, 95%CI: 2.78, 9.73). Individuals in the low trajectory were less likely than those in the average trajectory to have probable OSA (aOR=0.68, 95%CI: 0.47, 0.98). Notably, there was no association between the child high-decreasing trajectory and OSA with any definition (aOR=1.07, 95% CI: 0.71, 1.62 for STOP-Bang defined probable OSA). The associations between BMI trajectories and probable OSA were consistently observed when Berlin and OSA-50 questionnaires were used in place of STOP-Bang.
Conclusion: Obese children who subsequently lost weight are not at higher risk of OSA in middle age, a key message that should be communicated to parents, health professionals, and the public. Medical practitioners and patients should be aware of the potential of OSA in middle-aged adults, when there is continuously increasing or persistently high BMI from childhood to adulthood.

Life expectancy stagnates in Fiji and Tonga, 2008-2018

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Background:
Fiji, population 884,887 (2017 census), and Tonga, population 100,651 (2016 Census), are middle-income Pacific Island countries, which have experienced prolonged epidemiological transitions. Empirical estimates of life expectancy (LE) at birth by sex were examined and compared with published estimates.
Methods:
LE (at birth) by sex were calculated from unit records of empirical mortality data (>90% complete) for Fiji (2008-2017) and Tonga (2010–2018). After de-duplication and correcting for age, sex and period, data were aggregated into triennia to reduce stochastic variation.
Results:
In Fiji and Tonga, LE at birth remained constant over the study period; for Fiji the plateau in LE extends back to the mid-1980s. For males (M) in both countries, LE remained at 64-65 years. For females (F), LE was 67-68 years in Fiji and slightly higher at 69-70 years in Tonga. High probability of dying (PoD) between ages 35 and 59 years has limited improvements in LE; for men across both countries, PoD35-59 years was 24-26% and for women it was 18-19% in Fiji and 17-20% in Tonga. WHO reports average LE in upper-middle income countries increased from 71 to 73 years (M) and 77 to 79 years (F) over 2010 to 2019. Historical LE gains of 2.5 years/decade have occurred in best performing countries.
Empirical LE estimates are lower than indirect and modelled estimates. For Fiji: WHO LE estimates were 66-67 (M) and 72-73 years (F) over 2008-2016; GBD modelled LE estimates were 66 (M) and 70 years (F) in 2017, with LE for males increasing less than 10 years since 1950. For Tonga: census LE estimates for 2011 and 2016 were 69 (M) and 73-75years (F); WHO (2015) and GBD (2017) modelled LE estimates were 69 (M) and 75-76 years (F).
Conclusions:
LE at birth in Fiji and Tonga has stagnated over at least 10 years, and at lower-than-expected levels for countries of similar income levels. Continued monitoring of the impact of premature adult mortality is required to inform targeted population health interventions.

Prognostics factors for regression from prediabetes to normoglycaemia: Individual participant data meta-analysis

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background
Prediabetes, a subclinical precursor to diabetes that currently affects approximately 374 million adults worldwide, is a risk factor for the development of cardiovascular disease and stroke in addition to diabetes. Prediabetes can be reversed to normoglycaemia; hence, we aimed to quantify the role of the modifiable risk factors on prediabetes regression to normoglycaemia.

Methods
We used the Obesity, Diabetes, and Cardiovascular Disease Collaboration database for our individual participant data meta-analysis. This database includes 19 prospective cohort studies involving 113,296 adults across various ethnicities and age groups. We included individuals with prediabetes with at least one follow-up in the analysis. We utilized Discrete-Time Hidden Markov Models to estimate hazard ratios for prognostic factors of prediabetes regression in each cohort study. These estimations were then pooled in the random-effects meta-analysis model.

Results
We included 19,255 participants with prediabetes at baseline; median follow-up 9.8-year (IQR 5.8–12.3); 53% were women, mean age of 51 years for both sexes. Being former smokers (hazard ratio 0.98, 95%CI 0.89-1.06), higher waist-to-hip ratio (0.86, 0.79-0.93), higher waist-to-height ratio (0.83, 075-0.92), higher value of waist-circumferences (0.87, 0.71-1.06), overweight (0.88, 0.81-0.96) and obese (0.86, 0.71-1.04) body mass index, high diastolic (0.93, 0.87-0.99) and systolic (0.96, 0.91-1.01) blood pressure, low serum HDL-cholesterol (0.87, 0.81-0.92) and high serum triglyceride (0.88, 0.81-0.96), were associated with the lower chance of an individual reaching normal glucose regulation status.

Conclusions
We showed several lifestyle and biomarker factors were associated with the likelihood of achieving normoglycaemia. Accordingly, we suggest focusing on restoring normoglycaemia through modifications of lifestyle risk factors.

Effectiveness of the Community-delivered Integrated Malaria Elimination intervention: a stepped-wedge cluster-randomised trial

Associate Professor Paul Agius[1,2,3], Doctor Win Han Oo[2,4], Doctor Win Htike[4], Doctor May Chan Oo[4], Doctor Ei Phyu Htwe[4], Doctor Aung Khine Zaw[4], Doctor Kaung Myat Thu[4], Doctor Galau Naw Hkawng[4], Doctor Nilar Aye Tun[4], Doctor Julia Cutts[2], Associate Professor Nick Scott[2], Doctor Katherine O'Flaherty[2], Professor Freya Fowkes[2,3]
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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background. Village health volunteers providing malaria services in the Greater Mekong Subregion have contributed significantly to reducing the burden of malaria disease across the region, making significant progress towards meeting the goal of malaria elimination by 2030. As Mekong countries approach malaria elimination and the malaria burden decreases, declines in the levels of motivation and community engagement of malaria volunteers has been observed, in turn negatively affecting rates of malaria testing. To address this issue, the Community-delivered Integrated Malaria Elimination (CIME) model was developed from an evidence-base. The CIME model was developed ultimately to integrate services for malaria, dengue, tuberculosis, childhood diarrhoea and non-malaria fever.

Methods. We performed a 24-week stepped-wedge cluster-randomised controlled trial where the CIME model was introduced sequentially, in a blocked fashion, across 72 villages in Yangon Region Myanmar, between November 2021 and April 2022. Crossed-random effect generalised linear mixed modelling (Log link function, Poisson distribution) was performed to estimate the effectiveness of the introduction of the CIME model in increasing village testing for malaria by rapid diagnostic test (RDT).

Results. A total of 1656 weekly testing measurements were observed and 2886 RDT tests (control: 1365; intervention: 1521) were undertaken across the 72 villages during the 24-week study period. The mean testing rate for RDTs was 1.7 tests per village per week and the majority of measurements (70%) and tests (68%) were undertaken during the 'cool' season. Compared to the existing integrated malaria volunteer model, a 23% relative increase in village RDT testing for malaria was observed with the introduction of the CIME model, in both intention-to-treat (adjusted incidence rate ratio [aIRR] = 1.23, 95%CI = 1.01, 1.50, p = 0.036) and as-treated analyses (aIRR = 1.23, 95%CI = 1.01, 1.49, p = 0.042), adjusting for time and season.

Conclusion. The CIME model is effective in increasing the blood examination rate by RDT at the village level, an important requirement for malaria elimination accreditation.

Sexual function outcomes 12 months after treatment in men with prostate cancer

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background: Prostate cancer is the most diagnosed cancer among men in Australia, leading to reduced quality of life. Sexual function problems are a major concern for prostate cancer patients who have undergone surgery. However, there has been no investigation into the extent, spatio-temporal distribution, and associated factors of sexual function problems in Victoria. This study aimed to investigate the magnitude, spatio-temporal distribution, and factors associated with sexual function problems among men 12 months after surgery.
Method: This study used data from the Prostate Cancer Outcomes Registry–Victoria (PCOR-VIC), a population-based registry that captures 90% of newly diagnosed cases of prostate cancer in Victoria. Data was collected via telephone, email, and paper 12 months after treatment in men with prostate cancer who underwent surgery in Victoria. A total of 5,977 prostate cancer patients who completed the EPIC-26 quality of life questionnaire. Sexual function outcome problems were mapped at the LGA level using Bayesian spatio-temporal models. Descriptive statistics and geographical data exploration of sexual function problems were conducted.
Result: The median age of patients was 64 years with an interquartile range of 9. Of the 5,977 prostate cancer patients, 2,069 (43.65%) reported a significant problem with their sexual function after surgery, with a 95% confidence interval of 42.38% to 44.91%. Sexual function problems were 47.03% in 2018 with a 95% confidence interval of 43.85% to 50.21%, and 38.44% in 2016 at with a 95% confidence interval of 35.58% to 41.55%. The exploratory spatial analysis revealed that there were geographical variations in sexual function problems among prostate cancer patients who underwent surgery in Victoria. Determinants of the geographic relationship will be presented.
Conclusion: This study identified the spatial and temporal distribution of sexual function problems in Victoria. This could allow for targeted interventions to address inequities and design effective interventions to improve sexual function problems among prostate cancer patients who have undergone surgery.

Bayesian spatio-temporal modelling of child anemia in Ethiopia using Conditional Autoregressive Model

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background: - Anemia is a common health issue affecting women and children under the age of five in low-income countries. According to the World Health Organization (WHO), anemia is considered a severe public health problem when its prevalence is greater than 40%. The prevalence of anemia among under five children in Ethiopian fluctuates over time and linked to spatial, environmental, socio-economic, and other factors. However, to the best of our knowledge, there are no small area level estimates in Ethiopia. Therefore, this study aimed to assess zonal level estimates of anemia using a Bayesian spatio-temporal conditional autoregressive modeling approach.
Method: -The data was sourced from the Ethiopian Demographic and Health Surveys (EDHS) conducted between 2005 and 2016. A total of 18,939 children aged 6-59 months were included in the study. A Bayesian spatio-temporal conditional autoregressive model was utilized to identify the risk of child anemia. Smoothed relative risks along with the 95% credible interval were reported. Spatial smoothing was done using the queen's adjacency matrix method to estimate the smoothed relative risk.
Result: -The study found that the prevalence of anemia among Ethiopian children aged 6-59 months was 54% in 2005, 44% in 2011, and 57% in 2016. Low maternal education (relative risk [RR] = 1.16, 95% credible interval [CI] = 1.01–1.35), low socioeconomic status of women (relative risk [RR] = 1.17, 95% credible interval [CI] = 1.09–1.25), and maternal anemia (relative risk [RR] = 1.23, 95% credible interval [CI] = 1.12–1.36) at the zone level were strongly associated with child anemia in Ethiopia.
Conclusion: -The study indicates that childhood anemia is widespread and geographically variable across zones in Ethiopia. Therefore, it is crucial to improve education for women, enhance women's socioeconomic status, and mitigate maternal anemia to reduce the prevalence of childhood anemia in Ethiopia.

Maximising the Impact of Epidemiological Research: considerations in variable categorisation

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

BACKGROUND
In epidemiological research, measurements are often classified as "healthy" or "unhealthy" based on the associated risk of developing diseases. Continuous, linear measurements with equal magnitude between units, such as blood pressure, are ideal for defining these "healthy/unhealthy" categories. However, categorising variables that are ordinal (e.g., Modified Rankin Score), categorical (e.g., partner status), non-linear (e.g., body mass index), or have unequal magnitude between units (e.g., years of education) are more challenging. It is also common to generate ordered “higher/lower” categories (e.g. dichotomisation or quartile) from continuous measures. However, these “higher/lower” categorisations are only useful for making comparisons within the sample the data were generated, and generalisability to a wider population is likely limited. Composite scores (e.g. Framingham risk score) can be useful for determining the risk of developing diseases. However, composite scores can also limit impact as it can be difficult to ascertain a public health message (e.g. social support measures).

METHODS
In this study, I will:
•Demonstrate, with examples, the impact of different categorisation methods on research findings, interpretations, and potential policy/public health messages.
•Propose options to enhance research impact by considering measurement categorisation.
•Introduce X-Tile programme, a machine learning program that generates algorithms that can assist with variable categorisation and automatically determines optimal cut-off points.

RESULTS
Practical examples will include:
•A retrospective examination of how the Socio-Economic Indexes for Areas (SEIFA) measurement of socioeconomic position, based on residential postcode, has been interpreted, and current preferred practices.
•A demonstration of the limitations imposed by varying definitions and measurements of social isolation on the development of a public health message.
•A comparative example focusing on blood pressure, which should be continuously retested to ensure accurate and evidence-based guidelines evolve over time as big data become available.

CONCLUSIONS
To maximise the impact of research findings, it is essential to carefully consider how variables are incorporated into all analyses. Methods used to categorise variables significantly influence the interpretation of findings, and the usefulness of generating evidence for policy and public health messages. Machine learning in combination with big data provide an opportunity to reassess current recommendations through alternative discretisation techniques.

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Heat exposure and unplanned hospital admissions in New South Wales children

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background
Extreme heat exposures are increasing with climate change. The health effects of heat exposure are well studied in adults, but the risks to children are less studied. This study aims to investigate the association of exposure to extreme heat and heat waves with any and cause-specific unplanned hospital admissions among children and adolescents in New South Wales, Australia.
Method
The study included all children born in New South Wales from July 2001 to December 2019 with at least one unplanned hospital admission from July 2001 to June 2020. Daily maximum temperature (based on Universal Thermal Climate Index, UTCI) was estimated in the Statistical Area level 2 (SA2) of the children's residential address. We used distributed-lag nonlinear models with a quasi-Poisson distribution to estimate the association of heat wave (defined as >=2 consecutive days with daily maximum UTCI>=95th percentile in each SA2) with the relative risk (RR) of unplanned hospital admission, adjusting for temporal trends.
Results
A total of 818,501 unplanned hospital admissions were identified among 490,647 children and adolescents in the study period. Exposure to heat wave was associated with increased risk of unplanned admissions of 1.15 (95% CI: 1.11-1.20) relative to non-heat wave days. Associations were stronger for unplanned hospital admission due to heat-related illness including dehydration and electrolyte disorders (RR=1.31, 95%CI, 1.19-1.44) and bacterial enteritis (1.17, 95%CI 1.06-1.29 for heat wave). Risk of unplanned admission by socio-demographic characteristics (age, sex, socioeconomic status, metro/ regional areas) will be assessed in future analyses. Heat wave accounted for an estimated 13.0% of unplanned hospital admission for any cause and 23.7% of hospital admission for heat-related illness.
Conclusion
Exposure to heat waves were associated with increased risk of acute hospitalisation of children and adolescents. This finding may shed light on developing appropriate intervention strategies to prevent and mitigate the impact of extreme heat exposure on young children.

Handling missing data in causal inference: Recoverability, estimation and implications for practice

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Epidemiological studies often aim to estimate causal effects using longitudinal data, for example, the effect of adolescent cannabis use on mental health in young adulthood, but commonly face the challenge of missing data. Whether a causal effect is “recoverable”, meaning it is estimable from observable data, relies on causal and missingness assumptions. Like causal assumptions, missingness assumptions can be depicted using causal diagrams by adding variable-specific missingness indicators. Previous research described a class of canonical “missingness-directed acyclic graphs” (m-DAGs), representing typical multivariable missingness mechanisms in epidemiological studies and examined the recoverability of the exposure coefficient in an outcome regression. Although this estimand can be interpreted as the average causal effect (ACE) under no effect modification, results regarding the recoverability of the ACE more generally are lacking. In the new work, we first determined the recoverability of the ACE theoretically in settings with effect modification in simplified versions of the canonical m-DAGs that excluded unmeasured common causes of missingness indicators. We showed that the ACE is recoverable when no incomplete variable (exposure, outcome or confounder) causes its own missingness and is non-recoverable otherwise. Secondly, drawing on a case study within the Victorian Adolescent Health Cohort Study (VAHCS), we conducted a simulation study to evaluate the performance of widely used missing data methods when estimating the ACE using correctly specified g-computation. Methods assessed were complete case analysis (CCA), multiple imputation (MI) using default settings provided in standard software, MI using the imputation model compatible with the analysis model, and MI using machine learning approaches. Our results showed that compatible MI may enable approximately unbiased estimation across all canonical m-DAGs considered, except when the outcome causes its own missingness or causes missingness in a variable that causes its own missingness. In the latter settings, researchers need to consider sensitivity analysis approaches incorporating external information (e.g. delta-adjustment methods). Thirdly, we have also proposed two new approaches to sensitivity analysis that address compatibility, which will be briefly described. Lastly, we use the VAHCS case study to illustrate the practical implications of using these different analytic approaches.

Factors associated with high antibiotics-use among New Zealand children: A linkage study

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background: Antibiotics are frequently prescribed for childhood infections; however, inappropriate use can lead to both antimicrobial resistance and gut microbiome dysbiosis.
Objective: To describe antibiotic dispensing patterns during gestation and in the first five years of life in a large cohort of New Zealand children, and to explore factors associated with high-use of antibiotics.
Methods: We used administrative, demographic, health, and pharmaceutical dispensing data available through the Integrated Database Infrastructure (IDI) of Stats New Zealand. A cohort of children born between October 2005 to December 2010 was established and linked to gestational antibiotics (antibiotics dispensed to mothers during pregnancy) and post-natal antibiotic dispensing until the age of five years. Patterns of antibiotic dispensing and associated factors were assessed using descriptive statistics and multivariable regression.
Results
Of the 315,749 children in the cohort, 29.2% were dispensed at least one course of antibiotics during gestation and 96.0% in the first five years of life. The most dispensed class of antibiotic was amoxicillin in both time periods i.e., 33.9% and 49.4%, respectively. Most children (70.1%) were dispensed at least one antibiotic in the second year of life.
Multivariable negative binomial regression showed that post-natal antibiotics dispensing was significantly higher for Māori (regression coefficient 1.15, 95% CI (1.14-1.16), Pacific peoples (1.35, 1.33-1.37) and those of Middle Eastern/Latin American/African (MELAA) descent (1.17, 1.13-1.21) compared to NZ Europeans; Asians & Others had fewer courses. Children resident in the most deprived area-deprivation decile (1.21, 1.19-1.23) and those born pre-term (1.05, 1.04-1.05) were dispensed more antibiotic courses compared with least deprived and full-term births, whilst rural children had fewer courses (0.82, 0.81 - 0.83). During the post-natal period, males were dispensed more antibiotics whilst there were no gender differences in utero. Further, a distinct seasonal pattern in antibiotic dispensing was observed with, as expected, the highest frequency during winter.

Conclusion
Antibiotic dispensing is high during early life in New Zealand, particularly among specific ethnic groups (Māori, Pacific people, MELAA), the most deprived, those who were born prematurely, and urban dwellers. The high use of antibiotics suggests a need for improved antibiotic stewardship in New Zealand.

General anaesthesia duration in early childhood and subsequent neurodevelopment and school performance

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Aims: We investigated the effect of general anaesthesia (GA) duration in early childhood on school entry development and school performance outcomes
Methods: We included children term-born in New South Wales, Australia without major congenital anomalies or neurodevelopmental disability with either a school-entry developmental assessment or Grade-3 (aged 8-9 years) school test results in 2008-2019. We compared children exposed to general anaesthesia aged <4 years in the state's largest tertiary paediatric hospital to a propensity score-matched group without any hospitalization, and with biological siblings. We used operating room data to ascertain GA duration linked to birth, hospital admission, developmental assessment and school performance information. Outcomes included developmental vulnerability in five domains and scoring below the national minimum standard in five school performance domains.
Results: We included 9,961 children (exposed n=3,334; unexposed n=6,627) with developmental assessment and 21,104 (exposed n=7,071; unexposed n=14,033) with school performance information. The median cumulative GA exposures for both cohorts were 57 (43-77) and 55 (42-75) minutes, respectively. Children exposed for <90 minutes and ≥90 minutes had 18% and 42% increased odds of being developmentally vulnerable in physical health and wellbeing, respectively (adjusted odds ratio (aOR) 1.18; 95%CI 1.00-1.40; aOR 1.42; 95%CI 1.10-1.85) with no association with other domains. Exposure to ≥90 minutes of GA was associated with between 38% and 80% increased odds of poor scores in numeracy (aOR, 1.80; 95% CI 1.32-2.46), reading (aOR 1.38; 95%CI 1.01-1.89), writing (aOR 1.78; 95%CI 1.23-2.56) and spelling (aOR 1.50; 95%CI 1.11-2.03). These results were not consistent when comparing biological siblings.
Conclusion: Although children exposed to GA for more than 90 minutes had increased risk of poor development and poor numeracy scores, no effects were found in biological siblings. Findings suggests effects be all or partially attributable to unmeasured confounding. The uncertainty of the effects of long exposure warrants caution from parents and clinicians when deciding to undergo procedures in the child that may be avoided or delayed.

Early life socioeconomic factors and cardiometabolic disease in adulthood amongst Aboriginal Australians

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

--- We recognise the diversity of Aboriginal and Torres Strait Islander peoples across Australia, respectfully referred to as Aboriginal peoples in this abstract. This research sought to build upon the strengths of Aboriginal place-based connections to Country, kin and community. ---

Background: Aboriginal people in Australia's Northern Territory (NT) have amongst the highest rates of cardiometabolic disease (CMD) in the world. However, the differences in CMD rates among different demographic subgroups of the NT Aboriginal communities remain unknown. It has previously been proposed that differences in CMD rates in this population may be due to differences in individual material and area-level socioeconomic position (SEP).

Aims and objectives: The aim of this study was to analyse associations between SEP (individual/family material and area-level deprivation) in early childhood and CMD markers in early adulthood in Aboriginal people in the NT, and whether these are explained by behavioural, psychosocial, educational, or contextual environmental pathways.

Methods: Multivariate linear regression models were performed between several markers of SEP in early life and multiple CMD markers in early adulthood using imputed data from participants in the Aboriginal Birth Cohort Study.

Results: CMD outcomes were best predicted by area-level deprivation; the outcomes were less well predicted by individual- or family-level deprivation measures,
(i) These associations were completely or partially mediated by contextual environmental factors and educational factors
(ii) A social gradient with higher deprivation being associated with decreased CMD risk was seen, except for the associations with High-Density Lipoprotein or Lipoprotein A

Conclusions: This research highlights that amongst the NT Aboriginal population, there is an increasing likelihood of CMD amongst those that are socioeconomically advantaged. However, the direction of social gradients in CMD for this population is complex. Public health policies and programs need to consider these nuanced associations and the importance of addressing area-level factors, to address Aboriginal CMD inequalities.

Causal machine learning methods to tackle high-dimensional confounding in modern observational studies

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

In health research we often seek to estimate the causal effect of an exposure on an outcome using data from observational epidemiological studies. Adjustment for potential confounding bias is challenging in the context of high-dimensional confounding, by which we mean many confounders relative to limited sample size, or complex relationships between a number of confounders and exposure and outcome. Doubly robust methods (Augmented Inverse Probability Weighting (AIPW) and Targeted Maximum Likelihood Estimation (TMLE)) are a promising avenue as they enable the use of machine learning approaches to fit the two models they involve, but questions remain regarding their implementation in high-dimensional settings. In particular, biased standard errors may result when the machine learning approaches used are very complex. Cross-fitting, where outcome and exposure models are fitted in different subsets of the data, has been proposed to tackle this.

We conducted a simulation study based on an investigation within the Barwon Infant Study that examined the effect of early life inflammation on later cardiovascular risk with metabolomic data inducing high-dimensional confounding. We compared the relative performance of AIPW and TMLE with machine learning, and evaluated the benefits of using cross-fitting with a varying number of “folds”. We considered a range of scenarios and sample sizes, and varied the diversity of the Super Learner library.

AIPW and TMLE performed similarly across most scenarios. Underestimation of standard errors and undercoverage were observed without the use of cross-fitting, while the use of cross-fitting led to reduced bias in standard errors and nominal coverage. The effect of varying the number of folds within cross-fitting differed by sample size, library used and the complexity of the scenario. We illustrated the methods in application to the case study.

Our findings provide guidance on how to implement these computationally intensive methods successfully in practice. In applications where high-dimensional confounding is present, causal machine learning methods provide powerful tools for the estimation of causal effects. Our study showed that the use of cross-fitting is important to improve the estimation of standard errors, although the optimal number of folds to use will depend on the setting.

Labour interventions patterns and associated biopsychosocial factors: path analysis of cohort study

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: In Australia, nearly half of births involve labour interventions. Prior research in this area has relied on cross-sectional and administrative health data and has not considered a comprehensive set of risk factors. The current study examined associations between biopsychosocial factors and labour interventions using 19 years of prospective population-based data.
Methods: Singleton births from primiparous women of the 1973-78 cohort of the Australian Longitudinal Study on Women's Health were included. Data from 5459 women who initiated labour were analysed using path analysis.
Results: 42.2% of babies were born without intervention (episiotomy, instrumental, or caesarean delivery): 37% reported vaginal birth with episiotomy and instrumental birth interventions, 18% reported an unplanned caesarean section without episiotomy and/or instrumental interventions, and 3% reported an unplanned caesarean section after episiotomy and/or instrumental interventions. Vaginal births with episiotomy and/or instrumental interventions were more likely among women with chronic hypertension (aRRR(95%-CI):1.50(1.12-2.01)), a perceived length of labour of more than 36 hours (aRRR(95%-CI):1.86(1.45-2.39)), private health insurance (aRRR(95%-CI):1.61(1.41-1.85)) and induced labour (aRRR(95%-CI):1.69(1.46-1.94)). Assisted vaginal births with episiotomy and/or instrumental birth intervention were less likely (aRRR(95%-CI):0.78(0.63-0.98)) among women who were obese pre-pregnancy. Risk factors of unplanned caesarean section without episiotomy and/or instrumental birth intervention included being overweight (aRRR(95%-CI):1.30(1.07-1.58)) or obese pre-pregnancy (aRRR(95%-CI):1.63(1.28-2.08)), aged ≥35 years (aRRR(95%-CI):1.87(1.46-2.41)), having short stature (<154cm) (aRRR(95%-CI):1.68(1.16-2.42)), a perceived length of labour of more than 36 hours (aRRR(95%-CI):3.26(2.50-4.24)), private health insurance (aRRR(95%-CI):1.38(1.17-1.64)) and induced labour (aRRR(95%-CI):2.56(2.16-3.05)). Factors increasing unplanned caesarean section after episiotomy and/or instrumental birth intervention were being overweight pre-pregnancy (aRRR(95%-CI):1.54(1.02-2.32)), being aged ≥35 years (aRRR(95%-CI):2.56(1.57-4.16)), short stature (aRRR(95%-CI):2.16(1.07-4.34)), gestational/chronic diabetes (aRRR(95%-CI):1.83(1.01-3.32)), gestational hypertension (aRRR(95%-CI):2.01(1.18-3.41)), and a perceived length of labour of more than 36 hours (aRRR(95%-CI):3.68(2.24-6.03)).
Conclusion: Our data showed that being overweight or obese was associated with lower risk of episiotomy/instrumental assisted vaginal births and higher risk of caesarean section. Diabetes or hypertension was associated with a higher risk of labour interventions. These results suggest that supportive interventions aimed at modifiable risk factors of labour interventions (i.e. weight management programs and prevention/management of chronic diseases during preconception care and antenatal care) may reduce the risk of complex labour interventions including caesarean section.

Environmental Health Tracking and Translation at the Environment Protection Authority Victoria

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

The Environment Protection Authority Victoria (EPA Victoria) regulates pollution and waste to protect human and environmental health. Since its inception in 2016, the Environmental Public Health (EPH) Branch at EPA Victoria supports EPA through scientific and public health technical capability, risk assessment and analysis, and public health communication. But to meet future health surveillance requirements and improve regulatory outcomes, an Environmental Health Tracking Network (EHTN) was conceived to link environmental, pollution, health and demographic data. Academic partnerships were established to model noise and air pollution and health relationships. Concurrently, the business requirements, architecture and framework of an EHTN system were designed and documented in consultation with the US Centre for Disease Control and Data Agility group.

The current EHTN has access to hospitalisation and emergency admissions data from the Department of Health and cause of death data from the registry of Births, Deaths and Marriages. The first suite of EHTN dashboards have been created to co-visualise indicators at multiple spatial scales, identify clusters of disadvantage and pollution exposure and assemble multivariate indicators in response to EPA priorities. Spatially explicit interactive tools have been developed to attribute mortality and morbidity to chronic and acute pollution exposures using WHO recommended concentration response functions, and to model years of life gained from policy scenarios that limit air pollution from fossil fuel combustion and/or biomass burning.

Next steps are to expand types of data included in the tracking network (e.g., soil contamination, water quality) and to undertake epidemiological analyses to fill knowledge gaps relating to direct and indirect physical and psychosocial effects of air, land and water pollution.

In summary, the EHTN enables its users to better understand the human health impacts of pollution and waste for Victorian communities and vulnerable subpopulations. It will enable prevention, early warning, strategic direction and monitoring of health risks and inform targeted interventions to prevent health impacts from pollution and waste.

Identifying aspects of socialisation that predict cardiovascular disease: A machine learning approach

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Globally, cardiovascular disease (CVD) is the greatest contributor to morbidity and mortality. There is increasing evidence that a person's degree of socialisation, mostly measured as social isolation, support, and loneliness, affects CVD risk. However, it is uncertain which specific social factors are important predictors for CVD and whether they are gender-specific.
Aim: To identify aspects of socialisation that predict CVD using a machine learning approach.
Methods: This is a secondary analysis of 9,936 (5,231 women and 4,705 men) community-dwelling Australians aged ≥70 years in the ASPirin in Reducing Events in the Elderly (ASPREE) trial and ASPREE Longitudinal Study of Older Persons (ALSOP) sub-study. They were free of CVD, dementia, and independence-limiting physical disability at recruitment and the maximum follow-up was ten years. Twenty-five social variables (spanning family and social support, social interaction and community engagement, employment, and caring and volunteer work) were included for this study. Using the X-Tile programme, we determined the optimal cut-off point for the seventeen social variables. To identify the important predictive social variables in relation to CVD events, we used two machine learning approaches; Elastic Net and Random Survival Forest. Finally, we fitted both unadjusted (with only the identified predictive social variables) and adjusted (by traditional risk factors) Cox regression models. All analyses were stratified by gender.
Results: After the machine learning approaches identified the important social variables for CVD, Cox models were used to ascertain the direction of effect. For both women and men, being married/partnered and undertaking babysitting or child-minding during the past year were among the top protectors of CVD. Additionally, among men, having ≥2 friends that they feel close to and call on for help, playing games such as cards or chess, and being currently in paid employment were also strong protectors of CVD. Among women, living alone was among top protector of CVD.

Conclusion: Applying two machine learning methods and then the Cox model, our initial analyses found gender-specific social predictors of CVD events in older adults. Our findings indicate that engaging with people could be considered a modifiable risk factor for CVD.

Using administrative data to ascertain cancer treatment information: validation against medical records

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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Background
Collecting information from medical records is considered the gold standard for obtaining cancer treatment data for research purposes, however this process is costly and time-consuming. Linked administrative health datasets provide an alternative option that could reduce costs, but may not provide as comprehensive information as medical records. Our aim was to determine the validity of using health administrative data to identify treatment patterns for women with ovarian cancer, using data from an established cohort study for comparison.

Methods
We used data from the Ovarian cancer Prognosis And Lifestyle (OPAL) study – a national prospective cohort study including women diagnosed with ovarian cancer between 2012 and 2015. Treatment information collected via medical records was used as the gold standard. Linked administrative data were obtained from national (Medicare Benefits Schedule, Pharmaceutical Benefits Scheme) and state/territory data linkage units (hospital admitted patient data collections, Register of Births, Deaths and Marriages). The data were partitioned into training (60%, N=375) and validation (40%, N=245) datasets. The detailed medical record data in the training set were used to inform and refine algorithms to classify treatment type and date based only on the administrative data. The accuracy of these algorithms will be compared to OPAL study data using the validation set. We will assess validity using the sensitivity, specificity, positive and negative predictive values, and kappa statistics.

Results
Preliminary findings, based only on comparisons within the training dataset, suggest high sensitivity and specificity for receipt of chemotherapy (99%, 95%) and surgery (94%, 100%) in primary treatment. For those who had chemotherapy, receipt of specific chemotherapy agents commonly used in ovarian cancer treatment also had high sensitivity, 98% for platinum-based agents and 95% for taxane agents. There was high exact agreement for both the date of first chemotherapy (80%) and first surgery (81%). These results will be updated with comparisons using the validation set. Results from more complex measures including identifying neo-adjuvant vs adjuvant chemotherapy, intra-peritoneal chemotherapy and surgery type will also be presented.

Conclusion
Administrative health data can provide accurate data on core aspects of cancer treatment when there are barriers to more extensive data collection.

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Using linked data to report on health outcomes of Humanitarian entrants

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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Content:
Background:
Refugees and Humanitarian entrants have unique experiences which may impact their health outcomes. Information to identify refugee and humanitarian entrants in health data sets is limited. Consequently, there is a paucity of data on the health outcomes in this population with most existing research utilising survey data. Using linked data to identify refugee and humanitarian entrants in health datasets can provide a more complete picture of the health of this whole population.
Aim:
Use the Multi-Agency Data Integration Project (MADIP 2006-2020) to assess and report on the health outcomes of refugee and humanitarian entrants.
Methods:
The settlement data base, which contains visa information for all permanent migrants who arrived in Australia from 2000, was used to create a cohort of refugee and humanitarian entrants and a comparison cohort of all other permanent migrants. The MADIP spine was used to link these cohorts to Pharmaceutical Benefits Scheme (PBS), Medicare Benefits Schedule (MBS), deaths and Census 2021 data to investigate various health indicators including health service utilisation, medication dispensing, causes of mortality and prevalence of long-term health conditions.
Results:
The extensive data output produced from this analysis allowed for the identification and quantification of health disparities in the refugee and humanitarian entrant population.Data were also analysed to report on other health indicators.

Impact on field:
This project demonstrates the utility of data linkage to provide a complete picture of the health of refugee and humanitarian entrants in Australian. The results demonstrated in this abstract show how health disparities in this population can be identified to support targeted interventions. Altogether this information is vital to support informed health service planning and settlement policies.
Word count: 324

Multi-Agency Data Integration Project (MADIP), 2006 - 2020, MADIP Modular Product, ABS DataLab. Findings based on use of MADIP data.

Thinking beyond data standards: Principles for working with ethnicity data in epidemiology

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Ethnicity acts as a dynamic social determinant of health, influencing access to services, socioeconomic status, and cultural factors that shape health outcomes. The accurate collection and analysis of ethnicity data are crucial in epidemiology research, due to the pivotal role in understanding health disparities and informing equitable public health interventions. Working with ethnicity data presents numerous challenges and complexities that researchers must address to ensure the validity and reliability of their findings. This presentation presents a comprehensive framework of principles for effectively working with ethnicity data in epidemiological studies.

Firstly, it is imperative to define ethnicity with cultural and sociopolitical sensitivity, recognising that it is a social construct and not a biological determinant. Clear and inclusive definitions should be employed, allowing individuals to self-identify their ethnic background, while acknowledging the multidimensionality and fluidity of ethnicity.

Secondly, researchers must prioritise the ethical considerations surrounding ethnicity data collection, ensuring informed consent, confidentiality, and protection of participants' privacy. Sensitivity to cultural nuances and historical legacies of discrimination is essential, promoting trust and engagement among communities.

Thirdly, rigorous data collection methods should be employed to enhance the accuracy and comparability of ethnicity data. Researchers should adopt standardised and validated measures that capture the nuances of ethnicity while being mindful of potential biases and challenges related to self-reporting and the use of proxy measures.

In data analysis, researchers should apply appropriate statistical techniques that account for the complex interplay between ethnicity, social determinants, and health outcomes. Using techniques like structural equation modelling and multilevel modelling while exploring intersectionality can facilitate a comprehensive understanding of health disparities and ensure the validity of findings.

Ensuring transparency and appropriate reporting of ethnicity data are essential for the reproducibility and comparability of epidemiological studies. Researchers should explicitly describe their methods and limitations related to ethnicity data collection, handling missing data, and biases.

Lastly, collaboration with diverse stakeholders, including community members, is vital throughout the research process. Engaging communities in study design, data collection, and interpretation helps to foster a more inclusive and culturally appropriate approach, leading to interventions that address the specific needs and concerns of different ethnic groups.

Long-term risk of COVID-19 after extreme smoke exposure

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Aims and objectives
Ambient PM2.5 is associated with higher rates of COVID-19 infection and severe disease. Yet it is unclear whether medium-term extreme PM2.5 events such as coalmine fires also increase risk, or how long the vulnerability lasts. We evaluated COVID-19 outcomes in a cohort of people exposed to smoke from the 2014 Hazelwood coalmine fire.
Methods
In late 2022, we surveyed members of an Adult Cohort to determine long-term health effects of the coalmine fire. COVID-19 infections were identified with validated self-report tools and symptom-based algorithms. PM2.5 exposure was determined from time location diaries and modelled air pollution estimates. Hospitalisation for COVID-19 served as a proxy for severity. We conducted logistic regressions, and adjusted for demographics, smoking, socioeconomic status and asthma/COPD.
Results
Of 612 participants completing the survey, 44% (n=270) either reported or met the symptom threshold for a COVID-19 infection. A 1SD increase in PM2.5 exposure was associated with 17% higher odds of infection (OR=1.17, 95%CI: 0.97-1.41, p=0.092). Results were similar in crude models (OR=1.08; 95%CI: 0.92-1.27). There were too few hospitalisations (n=7, 1%) to conduct severity analyses.
Conclusions
PM2.5 from a coalmine fire was not significantly associated with COVID-19 infections 6-8 years later, though direction of association was consistent with evidence indicating that PM2.5 increases risk. As climate change will increase the frequency of fire events and the COVID-19 pandemic shows no signs of abating, it would be prudent to treat the association as real until additional evidence becomes available.

Suicide mortality of Australian migrants between 2006-2019 – An intersectionality approach

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

With over seven million people from Australia's culturally and linguistically diverse (CALD) backgrounds, a significant knowledge gap exists regarding suicide mortality in this group. Using an intersectionality lens, our study aims to explore factors contributing to suicide in CALD migrants and to identify specific groups that may require tailored support.

The National Coronial Information System data was used from 2006-2019, including 36086 cases. Police and coroners' reports were used to identify factors contributing to suicide deaths in the groups identified as high-risk. We did three sets of suicide mortality analyses (all populations included aged 15 & above, young people aged 15-24, and elderly population aged 65 & above) for six migrant groups from Oceania, Asia, Africa, Middle East, South and Central American, and English-speaking countries with reference to Australian-born. All analyses were stratified by sex.

At the entire population level, the suicide risk of CALD migrants in all sub-groups is lower than the Australian-born; however, it changed in younger and older migrant groups. Amongst young male CALD migrants, those from Oceania countries have a 40% higher suicide risk than the Australian-born. Elderly CALD migrants (both men and women) from European countries have a 17% higher risk of suicide than their Australian-born counterparts. At the entire population level, the suicide rate of Oceania migrants was noted as consistently high over the years in both men and women, whereas the suicide rate of female African migrants increased by 8% during 2006-2015.

We found that unemployment is the most cited contributing factor for the working-age population. For young Oceania migrants, a history of mental illness and suicidal thoughts known by family members were frequently reported. In contrast, elderly migrants from European backgrounds who died by suicide were found to be more likely to have experienced chronic health conditions, mental health issues, or chronic pain prior to their death, indicating a possible link between these factors and their suicide.

Our study highlights the importance of using intersectionality to understand the suicide mortality of Australian migrants. Collaborative research, including people with lived experience, is needed to understand these differences and develop tailored prevention strategies.

Distinct trajectories of adult transport-related physical activity (TRPA) independent of childhood TRPA

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background - Transport-related physical activity has been identified as a key means of increasing total physical activity participation and producing considerable health benefits. There are a number of public health campaigns focusing on promoting transport-related physical activity from a young age that aim to develop healthy habits for retention across the lifecourse. However, few studies examine how transport-related physical activity changes across the lifecourse and whether childhood transport-related physical activity levels influence those observed later in life.

Methods - Latent class growth mixture modelling with adjustment for time-varying covariates was performed across four timepoints (ranging from 7 to 49 years) of the Australian Childhood Determinants of Adult Health study (baseline, 1985). Behavioural patterns and the retention of transport-related physical activity were assessed across the lifecourse.
As child and adult adjusted transport-related physical activity measures could not be harmonised, trajectories of adult transport-related physical activity (n=702) were identified. Log-binomial regression analysis was then performed to determine whether childhood levels of transport-related physical activity predicted these identified adult trajectories.

Results: Two stable groups of adult transport-related physical activity trajectories were identified: persistently low (n=520; 74.2%), and increasingly high (n=181; 25.8%). There was no significant relationship between childhood transport-related physical activity levels and patterns in adulthood (relative risk of high childhood transport-related physical activity yielding high adult transport-related physical activity trajectory membership = 1.06; 95% confidence interval = 0.95 – 1.09).

Conclusion: This study found childhood transport-related physical activity levels were not associated with transport-related physical activity patterns in adulthood.
These findings suggest that childhood does not appear to impact adult transport-related physical activity directly. While transport-related physical activity in childhood may have health, social, and environmental benefits, further intervention is required beyond childhood to promote the implementation of transport-related physical activity into adulthood.

Cutting-edge methods to reduce biases from epidemiological research using routinely collected data

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Routinely collected observational (e.g. administrative and registry) data are increasingly being used to undertake real-world epidemiological and comparative effectiveness research. However, inherent limitations of these data make them prone to selection and misclassification bias. It is important to understand, and where possible, evaluate the extent to which these biases impact on the quality of evidence obtained. We provide guidance on using cutting edge statistical methods to minimise and quantify these biases in epidemiological studies based on routinely collected observational data, drawing on our experience from the PRECISE data linkage study.

Methods: In PRECISE, data from the Australian Stroke Clinical Registry were linked with various government-held administrative databases. The primary aim in PRECISE was to determine, within a target trial framework, the real-world effectiveness of Medicare-funded chronic disease management (CDM) policies for improving survival after a stroke or transient ischaemic attack (TIA). To minimise systematic differences in baseline characteristics between exposure groups due to lack of randomisation (i.e. selection bias), we used data-driven approaches to explore different propensity score-adjustment methods, including matching, stratification, weighting, and direct adjustment. To understand potential effects of misclassification of our exposure (i.e. receiving care specified in the CDM policy), we undertook probabilistic bias analyses based on Monte-Carlo simulations, and using hypothetical ranges for the distribution of the sensitivity and specificity for misclassification.

Results: The PRECISE primary outcome analysis comprised 12,368 eligible patients with stroke/TIA. Our data-driven approach enabled the choice of the most appropriate propensity score adjustment method, and ensured between-group balance of all 42 covariates analysed. The propensity score adjustment yielded a hazard ratio (HR) of 0.74 (95% CI 0.62-0.87) for the effect of the CDM policy on survival. When assessing plausible ranges of 0.75 to 1 for sensitivity and specificity of classification of receiving care specified in the CDM policy, the corrected HR was 0.67 (95% CI 0.57-0.72) for non-differential misclassification and 0.67 (95% CI 0.57-0.72) for differential misclassification.

Conclusions: We demonstrated examples from a flagship data linkage study in Australia to illustrate a range of cutting-edge statistical approaches for minimising major biases arising from using routinely collected observational data for epidemiological research.

High-dimensional Mediation Analysis Using Machine Learning

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Cohort studies frequently collect biological specimens like blood, urine, and faeces to obtain high-dimensional 'omics' data and other biomarker information. These data may be key to understanding the biological pathways mediating the effects of exposures on disease risk. The recent interventional effect approach for mediation analysis offers a promising avenue to address these problems. However, current implementations of this approach rely on parametric methods that may not be valid for these high-dimensional problems in which there can be many variables (multiple biomarkers) and complex relationships but a small sample size. We employed the efficient influence function within a nonparametric model to describe doubly robust estimators for interventional effects from which we developed targeted minimum loss-based and double machine learning estimators. The nuisance parameters of these estimators can be modelled using machine learning to tackle high-dimensional problems, with the use of sample splitting (i.e. discovery and validation sets) enabling valid inference. We examined the performance of these methods in simulation studies and applied them to investigate the longitudinal relationship between body mass index (BMI) and blood pressure (BP) in the Longitudinal Study of Australian Children, with potential mediation by the NMR metabolomic profile (228 metabolites). The proposed methods enable estimation of the indirect effect of an exposure on an outcome through a joint set of high-dimensional mediators in observational studies.

Housing Australian children: a snapshot of health inequalities in early life

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Background
The impact of housing as a social determinant of health on children's health outcomes has been widely documented. However, research attention is often focused on separate components of housing, while in reality, housing disadvantages are likely to co-occur. A better understanding of the typology of housing disadvantages would inform targeted interventions that could potentially benefit children's health across the life course. In this study, we aim to 1) identify the distinct typologies of housing disadvantages; 2) examine the health inequalities arising from these housing typologies.

Methods
A cross-sectional Latent Class Analysis (LCA) was conducted, using data of 4355 Australian children aged 4 to 5 years from the Longitudinal Study of Australian Children. Nine binary indicators of housing disadvantages measuring insecurity, unaffordability, tenure, and unsuitability were included in the LCA. Logistic regression adjusting for maternal age, child's gender, and sample weights were used to compare the health outcomes of each housing typology.

Findings
Four distinct typologies were identified: children in good conditioned, affordable, and secure housing (60%); children in uncrowded but insecure housing (11%); children in crowded homes (24%); children in unsuitable housing (5%). The prevalence of the most disadvantaged housing typology was higher in lone-parent, low-income, and low-education households. Compared to children in good housing, children in unsuitable housing already lagged behind key developmental and health outcomes at preschool age, and showed underutilization of primary healthcare services

Translational outcomes
Clinicians are uniquely positioned for screening and referral to tackle housing disadvantages. The development of screening tool for housing should focus on questions about unsuitability as it identified the most vulnerable group of children.

Conclusion
Children's housing experiences draw the picture of health inequalities rooted in early life. Interventions to improve children's outcomes need partnerships between housing authorities and health systems to achieve both social and health justice for children.

Ultra-Processed Food Consumption and Overall Respiratory Diseases, COPD and Lung Cancer Mortality.

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Background: Consumption of ultra-processed foods (UPFs) is strongly linked with adverse health outcomes but its association with respiratory diseases has not been investigated. This study aimed to evaluate the relationships between UPFs consumption and risk of mortality due respiratory diseases overall, chronic obstructive pulmonary disease (COPD), and lung cancer among older adults in the United States.
Methods: A total of 96,607 participants aged 55 years and over were obtained from Prostate, Lung, Colorectal and Ovarian (PLCO) cancer study, a randomized trial designed to investigate the effects of screening on cancer-related mortality. However, data collected also afforded the opportunity to examine the relationships between UPF intake and mortality caused by respiratory diseases. Dietary history of participants was collected at baseline using a validated food frequency questionnaire as was the presence of respiratory diseases. Cox regression was fitted to estimate the risk of all-cause mortality and cause-specific mortality due to increased consumption of UPFs over time. Competing risk regression was used to account for the competing risks events and effect of participant loss.
Results: During the follow-up period of 1,379,655.5 person-years (median 16.8 years), 28700 all-cause, 4,901 all respiratory, 2,015 lung cancer and 1,536 COPD mortalities occurred. A dose-response association was found between higher UPF intake and mortality from all respiratory diseases and COPD, but not lung cancer. After considering competing events, higher intake of UPF increased the risk of mortality from all respiratory diseases by 10% (HR: 1.10; 95% CI: 1.01, 1.21) and COPD by 20% (HR: 1.20; 95% CI: 1.02, 1.42). After imputation for missing data, the risk of lung cancer increased by 25% among participants in the highest quintile of UPF intake.
Conclusion: The PLCO trial data confirmed that consumption of UPF increased respiratory mortality, among those with COPD, however further mechanistic studies are recommended to further clarify the link between UPF and lung cancer.
This study also indicated that a high intake of UPF generally increases the risk of mortality of those with respiratory diseases and contributes to a large body of evidence indicating that higher UPF consumption increases the overall risk of mortality.

Medication Adherence Mayhem: Overcoming Measurement Issues with Pharmaceutical Dispensing Data

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Medication adherence is essential for maximising the effectiveness of medicines for managing or preventing chronic conditions, including stroke. In Australia, data on dispensed medications from the Pharmaceutical Benefits Scheme (PBS) can be accessed to measure medication adherence. However, there are several challenges to overcome when working with PBS data. The aim of this presentation is to illustrate differences in medication adherence estimates after stroke, based on various techniques in PBS data to account for pre-supply, early refills, switching, and hospitalisations.

Methods: Observational study using linked data from the PRECISE project (NHMRC #1141848). Briefly, person-level data from the Australian Stroke Clinical Registry were linked with government administrative datasets including the PBS, until 2018. Durations of medication exposure were determined using either : 1) 75th percentile of refill time; 2) World Health Organization Defined Daily Doses; and 3) prescribing information for the most relevant indication. Adherence to antihypertensive medications was measured within one year post-discharge using the proportion of days covered (PDC) method. The PDC numerator was the number of days with medication supply available, while the denominator was the number of days in the observation period (365 days or until death). PDC estimates were compared with adjustment for pre-supply, early refills, switching, and hospitalisations – as per recommendations in TEN-SPIDERS medication adherence reporting guideline.

Results: Among 24,816 survivors of stroke or transient ischaemic attack, 17,470 were dispensed an antihypertensive medication within one year of discharge (43% female; median age 74 years). Durations of exposure for each antihypertensive were similar using different dosage assumptions. In subsequent analyses, daily doses were derived from prescribing information. Within one year post-discharge, the median PDC for antihypertensive medications was 82% (interquartile range [IQR]: 63-91%). Adherence estimates increased following adjustment for pre-supply (+5%), early refills/switching (+8%), and hospitalisations (+6%). The combination of these adjustments yielded a median PDC of 93% (IQR: 82-98%).

Conclusions: There are several important adjustments to consider when measuring and reporting medication adherence using PBS data. To improve the external validity of medication adherence studies, authors should use the TEN-SPIDERS tool to clearly document how the PDC was derived, including all adjustments undertaken.

Spatiotemporal analysis of timeliness of lung cancer care and area-level determinants

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: The timing of lung cancer care has a prominent role in determining important patient outcomes. Previous studies on the timeliness of lung cancer care have shown substantial geographic disparity and temporal variations. However, there is no published study on the contribution of areal level determinants for the spatiotemporal variations of timeliness of lung cancer care. Therefore, this study examined the spatiotemporal analysis of the timeliness of lung cancer and area-level determinants in Victoria using a Bayesian framework.
Methods: Lung cancer cases reported to the Victorian Lung Cancer Registry (VLCR) between 2011 and 2022 were evaluated, and diagnostic delays were spatially mapped to the 79 Local Government Areas (LGAs) of Victoria. To quantify the spatial and temporal patterns, and area-level determinants, we employed the Bayesian spatiotemporal Poisson model using WinBUGS version 1.4.3 and Arc-GIS version 10.8 statistical softwares. For comparing the models, the Deviance Information Criteria (DIC) and Wantanable Akaike Information Criteria (WAIC) were applied. Model convergence was assessed using an Autocorrelation plot, density plot, and trace plot. In the final model, the Adjusted Relative Risk (ARR) with the 95% Credible Intervals (Crl) were reported to declare the statistical significance of the areal level determinants.
Results: A total of 11,602 lung cancer patients were included. The proportion of delay in diagnosis of lung cancer in 2011-2014, 2015-2018, and 2019-2022 were 34.95%, 29.44%, and 31.29%, respectively. Across LGAs, significant spatiotemporal patterns of diagnosis delay was observed. LGAs located in the state's outermost parts had a higher relative risk of lung cancer diagnostic delays. A higher proportion of patients born overseas were significantly associated with high risk of delay in diagnosis of lung cancer (RR=1.16).
Conclusions: These findings can be used to explore equity and inform lung cancer screening programs to emphasize LGAs with a relatively high risk of delayed lung cancer diagnosis. Additionally, investigating the spatiotemporal variation of lung cancer diagnosis delays could help with resource allocation and prioritization for efficient lung cancer screening and diagnosis at an early stage.
Keywords: Delay in diagnosis of lung cancer, spatiotemporal analysis, Conditional Autoregressive Model, Victoria

Joint effects of smoking and alcohol drinking on liver cancer risk

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: Smoking and alcohol drinking tended to aggregate. These two behaviors are well-known risk factors for liver cancer; however, the joint effects of smoking and drinking on the risk of liver cancer remain unclear. This study sought to investigate the joint effects of smoking and alcohol drinking on the risk of liver cancer in Korean men and women.
Methods: A nested case-control study was conducted, using a population-based cohort from a customized database (N = 7,393,825) provided by the Korean National Health Insurance Service from 2002-2020. The study included 52,524 cases (42,122 men, 10,402 women) and 209,960 controls (168,401 men, 41,559 women), matched by age, gender, income, and chronic viral hepatitis B and C status. Unconditional logistic regression was used to estimate the liver cancer risk according to the joint and independent effects of smoking and alcohol drinking regarding status and amount per day. The interactions between the two factors were assessed in multiplicative and additive scales. The group of dual non-users was the reference. All analyses were performed separately by gender. Covariates included body mass index, physical activity, and comorbidities.
Results: For men, the risk of liver cancer increased significantly among dual users, adjusted odd ratio, aOR = 1.17, 95% confidence interval (95% CI): 1.12-1.22. The interactions between current smoking and drinking were present in additive scale (relative excess risk due to interaction, RERI=0.23 (0.18, 0.29), attributable proportion, AP = 0.17 (0.13, 0.22), and synergy index, SI = 3.36 (2.74, 3.99), and multiplicative scale (the product term, aOR = 1.22 (1.16, 1.29)). By smoking and drinking levels, the increased risk was shown most strong in those who smoked moderately (1-20 cigarettes/day) and drank ≥20 g/day, aOR = 1.64 (1.58, 1.71). Additive and multiplicative interactions were also observed for smoking and drinking levels. For women, the liver cancer risk increased among current smokers, regardless of drinking status and no significant interaction was observed in both scales.
Conclusions: In men, dual users of tobacco cigarettes and alcohol beverages were at a significantly higher risks of liver cancer, compared to single users. No interaction was observed for women.

Establishing a geographic linked data cohort for epidemiological research

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Recent advancements in data infrastructure and the digitisation of Electronic Health Record (EHR) data offer unprecedented opportunities to merge diverse routinely collected data sources to generate longitudinal population data. We describe the development of a linked geographic cohort within the Australian National Centre for Healthy Ageing (NCHA) to support epidemiological research.

Methods: The cohort was established in the Frankston/Mornington Peninsula area, a geographically defined region in Victoria, Australia. To identify suitable elements for research, EHR data from the sole public health provider (2 acute hospitals, 2 rehabilitation hospitals and >10 community and outpatient centres) were interrogated. Based on published literature and consensus processes relevant items were selected and curated within a specialised research data warehouse. Curation involved: data validation, quality checking and internal linkages between episodes within and across services. Data quality were maximised through data harmonization, merging from multiple datasets and implementation of an artificial intelligence (AI) pipeline for extraction of text-based items. Approvals were obtained from government agencies to access commonwealth held claims data (primary care, medication, aged care, death) and state administrative hospital data, for all residents of the region aged ≥60 years. Publicly available datasets were scoped for relevance and collaborations built with local councils and primary healthcare networks.

Results: Data for a cohort of >900,000 patients collected over a 10-year period have been curated within the NCHA Data platform's research data warehouse. So far 117 items from 11 datasets held within the health service EHR systems, have been identified as suitable for inclusion. Items include: demographics, diagnoses, attendances, medications, surgical procedures, outpatient visits, vital signs etc. Data governance, extraction and release processes, guided by the Five Safes Framework, are being tested and refined through project use cases. Linked state and commonwealth data have been obtained for 179,089 residents from Jan 2010-May 2021. Environmental data such as greenery, and traffic pollution have been incorporated and linkages to local general practitioner and personal alarm data is in process.

Conclusion: We have created a geographic linked data ecosystem to support epidemiological research. Expansion through linkages to other established datasets and creation of targeted sub-cohorts is underway.

Trends in the Youth Justice population overtime in South Australia

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Youth Justice supervision can impact a young person's physical, emotional, and social wellbeing and increases the risk of adverse outcomes later in life such as adult criminal involvement. Changes in the youth justice population overtime must be monitored to ensure available services and programs are relevant and effective in the population they aim to serve. The population supervised by youth justice in a single year is routinely described; however, little is known of the trends in contact over these young people's entire eligibility period. We examined trends in youth justice contact (between ages 10-17) for young people born between 1991 to 2002. We utilised the Better Evidence, Better Outcomes Linked Data (BEBOLD) platform to examine Youth Justice and Child Protection administrative data from the SA Department of Human Services and SA Department for Child Protection, respectively. We found the absolute number and proportion of young people to ever be supervised by youth justice has decreased overtime, from 404 young people in the 1991 birth cohort (2.0%) to 239 in the 2002 born (1.2%). However, the total number of mandates has remained steady across birth cohorts at around 2,000 mandates per birth cohort. The proportion of young people under the age of 14 at the time of their first youth justice supervision has increased overtime, from 12.1% in the 1991 birth cohort to 27.2% in the 2002 birth cohort. The overlap of the youth justice population with the child protection system has also increased overtime, with the proportion who ever experienced out-of-home care increasing from 16% in the 1991 born to 28% in the 2002 birth cohort. These findings suggest that whilst the number of young people supervised by youth justice has decreased, an increasing proportion of those under supervision have complex needs. Services and programs provided to those under supervision should consider the changing characteristics of the youth justice population relative to population size to ensure that adequate assistance and support options are available, for those under supervision now and in the future.

Automated reporting to communicate regional effects of primaquine dose for vivax malaria.

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Recent publications have assessed the effect of primaquine dosing globally, to prevent recurrent episodes of Plasmodium vivax malaria, while limiting primaquine-associated haemolysis. However, National Malaria Programs are reluctant to change policy contingent on global data alone and have requested local efficacy and safety data. We aimed to develop open access automated local and regional reports using a single standardised data repository to assist regional and national policy makers.

Methods: Following a systematic review to identify P. vivax efficacy studies including treatment with daily primaquine regimens, we approached investigators to share individual patient data. Data were standardised and pooled into a single repository. The statistical software packages R and Stata and the notebook interface R Markdown were used to generate reports on the effects of primaquine mg/kg dosing on efficacy, haematological safety and gastrointestinal tolerability. An R Shiny app was developed to allow user-selected country or regional open-access automated reports to be generated.

Results: In total, 7,175 patients from 26 studies were collated in the standardised repository. The R Shiny app allows users to generate reports for any combination of 17 countries or 3 global regions. Users can choose to download a detailed or summary report and for this to be saved in html and/or pdf format. The reports provide an overview of the studies undertaken in the selected location, the participant characteristics and key efficacy, haematological safety and gastrointestinal tolerability results. For each report, simple model checks are undertaken, including ensuring reference case data are available, confidence intervals are reasonable and use of alternative models where mixed effect models do not converge.

Conclusion: The R Shiny app provides an accessible platform for national and regional policy makers and investigators to evaluate automated regional reports assessing the efficacy and safety of different primaquine regimens. This interactive, open access platform has the potential to directly inform policy decisions in vivax-endemic countries and regions.

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Mode of birth and childhood infections: a systematic review of observational studies

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background:
Caesarean section is a common surgical procedure and may be lifesaving for mother and/or child. The proportion of births by caesarean section has increased globally from 12% in 2000 to over 20% currently. Among caesarean births, an estimated 6.2 million annually (approximately one sixth) may not be medically justified. Many studies have examined associations between caesarean section birth and childhood immune-related outcomes, but studies vary in sample size and setting. To date, there has been no synthesis of the research regarding mode of birth and childhood infections, the commonest reason for hospitalisation and primary care consultation in children.

Methods:
We systematically searched for observational studies examining the relationship between caesarean section births (emergency and elective) and any infection outcome in children up to 18 years of age. Studies were excluded if the sample was not representative of a general population or if the focus was neonatal or vertically-acquired infections. Risk of bias was assessed using the ROBINS-E tool. Meta-analyses of infection clinical groups were performed where appropriate.

Results:
Following title/abstract screening and full text review by two independent reviewers, 25 of 3083 studies were included. Findings were largely from birth-cohort and registry-data-linkage studies in high-income countries. Cohort sizes ranged from a few hundred births to several million. Infection outcomes varied with some examining overall infections (either hospitalised or non-hospitalised), while others focused on clinical groups of infection (gastrointestinal or respiratory) or specific infections (e.g., RSV). Overall, 24 of the 25 studies reported a positive association between caesarean section birth and greater risk of infection outcomes, generally around 10-25%. We are currently performing meta-analyses for hospitalised respiratory and gastrointestinal infections; more detailed findings will be presented.

Conclusion:
Findings from high-income countries show a consistent association between caesarean section birth and heightened risk of both specific and general infections in children across a variety of settings. Limitations include the potential for both unmeasured confounding and confounding by indication and a lack of studies from low-and-middle-income countries. These findings may contribute to policies regarding non-medically indicated caesarean section and inform mechanistic studies, particularly regarding the early life microbiome, to identify therapeutic targets.

Identifying social health components associated with dementia risk: a machine learning approach

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background. Social health is a broad term encompassing an individual's interactions, community engagement, perceptions of, and satisfaction with, their relationships. Previous studies suggested an association between better social health and a lower risk of dementia. However, the knowledge of which specific social health activities are most beneficial for lowering the risk of dementia is inconclusive.
Aims. To establish optimal cut-off points and identify the social health components that influence the risk of dementia, using traditional and machine learning approaches.
Methods. Secondary data from a cohort of 12,896 relatively healthy community-dwelling Australians aged ≥70 years enrolled in the ASPREE Longitudinal Study of Older Persons (ALSOP) study were used. They were free from dementia, physical disability, cardiovascular diseases or any medical conditions limiting life expectancy to <5 years at baseline and were followed for a maximum of ten years. For our analysis, eligible participants completed all 25 social health questions spanning five aspects (family and social supports; activities and community engagement; loneliness; caring and volunteer work; and social interaction through workplace, education program and living arrangement). Dementia was adjudicated according to DSM-IV criteria. Optimal cut-off points were determined using the X-Tile program that allows outcome-based analysis of survival data through a minimum p-value approach. Variable selection was performed by backward elimination and LASSO. Cox proportional hazard regression was used to identify the association between social health components and dementia. All analyses were stratified by gender.
Results. Of 9,936 participants, 319 incident dementia cases (181 men, 138 women) were found over six years' median follow-up. We identified babysitting or child-minding during the past year (occasionally-most days) and attending social/sporting entertainment (rarely-sometimes) in men; and babysitting (occasionally-most days), caring for a person with illness or disability (occasionally-most days), attending an educational class (rarely-always) and pet ownership in women were associated with a 31%-39% reduction in the risk of dementia, after mutually adjusting for the remaining social health components.
Conclusions. This study provides early evidence on specific social health components related to dementia risk. Future community-based social interventions to prevent dementia could focus on social/sporting entertainment programmes for men and community educational activities for women.

Moderate alcohol consumption and late-life depression: A causal Inference

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Background: Alcohol intake is a potentially modifiable risk factor for depression. There are data suggesting that light to moderate consumption may be associated with a lower risk for depressive symptoms when compared with abstinence, with risk increasing again for heavier drinkers, resulting in a J-shaped relationship. However, the extent to which these protective effects are genuine causal relationships, as opposed to biased associations driven by methodological limitations, has not been established. We employed a marginal structural model (MSM) approach to investigate the J-shaped relationship between alcohol consumption and depression.
Methods: Community-dwelling, initially healthy individuals aged 70+ years (N = 19,114), were recruited from 2010 to 2014 through general practitioners (Australia) and clinic-based mailing lists (United States) and followed until June 2017 (median 4.7 years follow-up). The 10-item Center for Epidemiologic Studies Depression scale (CES-D10) was used to detect depressive symptoms. Alcohol drinking was stratified into abstinence, occasional consumption, moderate consumption, and above-guideline consumption according to current U.S. guidelines by incorporating frequency, volume, and heavy episodic drinking. Age, sex, race, ethnicity, education, smoking status, residential type, living arrangement, BMI, morbidities, or chronic conditions were considered potential confounders. Subgroup analyses for men and women were performed.
MSMs were used to fully adjust for measured confounders through a “marginal” approach and balance confounders and withdrawals across different levels of alcohol consumption.
Results: The model confirmed a J-shaped relationship between alcohol and depression symptoms. Moderate drinkers had the lowest depression rate followed by occasional drinkers (OR:1.11; 95% CI [1.03-1.20]), and above the guideline drinkers (1.15; [1.06-1.24]), and abstinence from alcohol group had the highest rate of depression (1.19; [1.10-1.29].
Conclusion: Our findings contribute preliminary evidence that associations between moderate alcohol consumption and reduced risk for depression may reflect a causal link. Further adjustment by considering the effect of healthier lifestyles known to be associated with light alcohol consumption including diet, physical activity, socioeconomic status, social networking, and social isolation on the Australian sample (n-17,320) will be discussed. The collinearity of these factors has long been a pitfall for epidemiologic studies of the possible benefits of alcohol drinking.

Applications and reporting of causal methods in infectious studies: A Systematic Review

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background: In infectious diseases epidemiology, causal inference is being increasingly employed to estimate causal effects. This systematic review aimed to describe the usage and reporting of causal methods in observational infectious disease (ID) studies.
Methods: We conducted systematic searches of PubMed, Medline, Web of Science and Scopus to identify the application of causal methods in the analysis of ID observational data between 2010 and 2023. We summarised the uptake and reporting of key characteristics of causal methodology.
Results: Of the 172 studies, the majority utilised propensity score-based methods (n=133, 77%). We identified only 39 studies that explicitly described the use of causal frameworks and employed more comprehensive causal analyses. The most common reason for using causal methods was to address time-varying variables that are prominent in ID research. Consequently, a common approach utilised was inverse probability treatment weighting with the marginal structural model; Targeted Maximum Likelihood Estimation became a popular approach in more recent years. We found considerable variations in the reporting of key methodological characteristics.
Conclusion: Included studies demonstrated the capacity of causal methods to answer more complex ID research questions. However, there is substantial variation in the practice and reporting of causal methodology. Development of reporting guidelines is needed for clear reporting alongside training for future causal methods users and readers on how to use and appraise applications of causal inference in observational ID research.
Keywords: Causal inference, infectious disease, observational, causal methods reporting

Lifestyle and all-cause and cancer-specific mortality among cancer survivors: A cohort study

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

The World Cancer Research Fund (WCRF) advise cancer survivors to follow the lifestyle recommendations for cancer prevention; however, associations between lifestyle and survival following a cancer diagnosis remain unclear. We investigated associations between lifestyle and all-cause and cancer-specific mortality among survivors of any malignant cancer, and three specific cancer types – breast, colorectal and prostate cancers, using data from the UK Biobank. At their first assessment in 2006-2010, UK Biobank participants aged 37-73 years completed a questionnaire and had anthropometric measurements taken. Only participants with a history of malignant cancer at baseline, as per cancer registry information, were included in our analyses. A lifestyle index was computed for each individual based on adherence to current recommendations for diet, physical activity, alcohol consumption, smoking, and body weight. Date and cause of death was obtained via linkage to national death registries, and participants were followed up until November 2022. Cox regression was used to examine associations with all-cause and cancer-specific mortality for any malignant cancer, and breast, prostate, and colorectal cancers, adjusting for relevant confounders including age, socioeconomic status, time-since diagnosis, and overall health rating, all of which were measured at baseline. Our study populations were 20,805 individuals with any prior cancer diagnosis, 5,537 with breast cancer, 1,943 with colorectal cancer, and 2,715 with prostate cancer. There were 4,328 deaths and 3,354 cancer-specific deaths during the 258,985 person-years of follow up (breast cancer population: 975 deaths, 520 breast cancer deaths; colorectal: 456 deaths, 170 colorectal cancer deaths; prostate: 674 deaths, 360 prostate cancer deaths). We found a higher lifestyle index, representing greater adherence to the recommendations, was associated with a lower risk of all-cause mortality for those with any malignant cancer (highest vs lowest lifestyle index tertile: HR[95%CI]=0.77[0.71,0.83]), and for each of the three cancer types investigated (breast: 0.73[0.62,0.86]; colorectal: 0.68[0.52,0.89]; prostate: 0.73[0.59,0.89]) . A higher lifestyle index was also associated with a lower risk of cancer-specific mortality among those with any malignant cancer (0.82[0.75,0.89]) and those with prostate cancer (0.70[0.53,0.93]). Our findings suggest following the WCRF lifestyle recommendations for cancer prevention after a cancer diagnosis may prolong life.

Triglycerides, risk of incident dementia, and cognition change among community-dwelling older adults

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Importance: Evidence concerning the relationship between triglycerides and dementia risk is limited and inconsistent.
Objective: To examine the association of triglycerides with risk of incident dementia and cognition change in community-dwelling older adults.
Design, Setting, Participants: This cohort study used data from adults (aged ≥65 years) recruited to the ASPREE trial in 2010-2014, who had no prior dementia or cardiovascular disease events at enrolment.
Exposure: Baseline fasting triglycerides.
Main outcomes: Incident dementia. Other outcomes included changes in composite cognition score and domain-specific cognition scores (global cognition, memory, language and executive function, and psychomotor speed). Dementia risk was estimated using Cox proportional-hazard models and cognitive change was examined using linear mixed-effects models, with adjustment made for cholesterol levels, lipid-lowering medication use, demographic and clinical conditions. The main analysis was repeated in a sub-cohort of participants with available APOE-ε4 genetic data with additional adjustment for APOE-ε4 carrier status, and an external cohort (UK biobank) with similar selection criteria applied.
Results: 18,294 ASPREE participants having complete data were included, with a median [IQR] fasting triglyceride of 106 [80-142] mg/dl). There were 823 incident dementia cases over a median follow-up of 6.4 years. When analyzing triglycerides on a continuous scale, higher triglyceride levels were significantly associated with lower risk of incident dementia in the entire ASPREE cohort (HR with doubling of TG: 0.82, 95%CI 0.72-0.94). Findings were similar in the sub-cohort of participants with genotypic data and after adjustment for APOE-ε4 data (n=13,976), as well as in the UK Biobank cohort (n=68,200) (HR was 0.82 and 0.83, respectively, all p ≤0.01). The graded relationship between lower triglycerides and higher dementia risk were also seen in cubic spline analyses and in analyses treating triglycerides as a categorical variable. Higher triglycerides were also associated with a significantly slower decline in composite cognition and memory over time (both p<0.05).
Conclusion and Relevance: Among the older participants studied in ASPREE, those with higher triglyceride levels, albeit most within the normal to high-normal range, had lower risk of dementia and slower cognitive decline over time. Lower triglyceride level is a potential predictor of high dementia risk in older populations.

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Low-density-lipoprotein cholesterol and mortality outcomes in a large community-based older cohort

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Importance: The prognostic implication of cholesterol levels in older adults remains uncertain.
Objective: To examine the relationship between low-density-lipoprotein-cholesterol (LDL-c) and mortality outcomes in older individuals.
Design, Setting, and Participants: This observational analysis used data from the ASPirin in Reducing Events in the Elderly trial (ASPREE; NCT01038583). ASPREE recruited 19,114 participants aged ≥70 years (≥65 if U.S. minorities), who had no diagnosed dementia, physical disability or cardiovascular disease (CVD) at baseline. This study only included those who were not taking lipid-lowering agents at baseline. The median (interquartile range) follow-up was 6.9 (5.7-8.0) years.
Exposure: Fasting LDL-c at baseline.
Main outcomes: Multivariable Cox proportional-hazards models were used to examine associations of LDL cholesterol with all-cause, CVD, cancer, and combined non-CVD/non-cancer mortality. Restricted cubic splines were used to depict non-linear relationships. Subgroup analysis was performed by age and sex.
Results: Among 12,334 participants included [mean (SD) age: 75.2 (4.6) years; 54% females], 1250 (10%) died (24% due to CVD, 43% cancer, and 33% non-CVD/non-cancer) during the follow-up. There was a U-shaped relation for LDL-c and all-cause mortality (nadir: 3.3mmol/L) and a curvilinear relation for other mortality outcomes. Each 1-mmol/L higher LDL-c was associated with a lower risk of all-cause mortality (HR=0.91, 95%CI 0.85-0.98), cancer mortality (0.83, 0.74-0.94) and non-CVD/non-cancer mortality (0.81, 0.71-0.93), but a higher risk of CVD mortality (1.19, 1.03-1.38). Reduced risks of all-cause and non-CVD/non-cancer mortality were only significant in males and but not females (P values for sex interaction <0.05). Age was found to modify the association between LDL-c and CVD mortality. When deaths in the five years after baseline were excluded, the HRs for all-cause, cancer, non-CVD/non-cancer and CVD mortality were 1.01, 1.04, 0. 90 and 1.18 respectively (all P>0.10). Replacing baseline LDL-c values with the mean LDL-c measurement at the baseline, first, and second annual visits did not change the results materially.
Conclusions and Relevance: Higher LDL-c is associated with greater risk of CVD mortality in older adults. Reduced risks for non-CVD mortality may be driven by reverse causality, evidenced by the absence of associations after excluding deaths that occurred within the initial five years of follow-up.

Snakebite envenoming: A systematic review and meta-analysis of global morbidity and mortality

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Background: Snakebite envenomation represents a significant and often disregarded public health hazard, particularly in rural communities across tropical and subtropical regions. An estimated 1.2-5.5 people are envenomed by snakebites annually. More than 125,000 of these bites are fatal and 3-4 times as many results in disability/disfigurement. Despite its prevalence, collecting accurate epidemiological data on snakebite is challenging. This systematic review and meta-analysis collates global epidemiology data on snakebite morbidity and mortality.
Method: Medline, Embase, Cochran and CINAHL Plus databases were searched for articles between 2001-2022. Pooled incidence and mortality were obtained using random effects modelling, heterogeneity (I2) was tested, and sensitivity analyses performed. Newcastle-Ottawa Scale assessed study quality.
Results: Out of the four databases, 5,312 articles were found, duplicates removed, and 3,953 articles were screened by title and abstract, 65 articles containing information on snakebite epidemiology 663,460 snakebite were selected for analysis. Men (59%), engaged in agricultural labour (27.5%), and residing in rural area (66.7%) were most at risk of snakebite. More than half (57%) of the bites were venomous, in summer season (38.5%), during daytime (56.7%) and in the lower limb (56.4%). Envenoming severity was mild (46.7%), treated in hospital (68.3%) and used anti-venom (64.7%). The pooled global incidence and mortality was 187.2/100,000 population (95% CI:78.6-295.8) and 1.31/100,000 population, respectively. Stratified by continents, Africa has the highest incidence of 466.2/100,000 population (95%CI: -141.7 to 1074.0) while Europe has the lowest with 43.3/100,000 population (95%CI: -20.5 to 107.1). Furthermore, the highest mortality was recorded in Asia 2.64/100,000 population (95%CI: 0.60 to 4.68), and Africa 2.48/100,000 population (95%CI: -1.39 to 6.35). Incidence was highest among habitants of upper-middle-income countries 537.0/100,000 population (95%CI: -388.2 to 1462.2) while mortality was highest in low-income countries 8.1/100,000 population (95%CI: 7.68 to 8.54).
Conclusion: Incidence and mortality rates noted here highlight the global impact of snakebites and underscore the critical need to address the burden of snakebite. It also reveals that while reported snakebite incidence was higher in upper-middle-income countries, the burden of mortality was greatest among inhabitants of low-income countries, again emphasising the need for greater efforts to tackle this neglected tropical disease.

Knowledge and awareness regarding snakebite envenoming and management: systematic review and meta-analysis

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background: Snakebite envenoming is a serious, life-threatening medical condition that predominantly affects people living in rural communities across Africa, Asia, and Latin America. As our climate changes, the concern is growing that negative human–snake interactions will increase. Our ability to prevent and manage snakebite requires effective antivenoms as well as knowledge regarding the prevention and management of snakebite among health- care workers and affected communities across the globe. This systematic review aims to assess existing levels of knowledge regarding snakebite prevention and management in both healthcare workers and affected communities.
Methods: This review was conducted on studies reporting quantitative measurements to evaluate knowledge and practice regarding snakebite prevention and management published in major databases between 1 January 2000 and 31 December 2021. Random effects model- ling was used to obtain the pooled proportion. Heterogeneity (I2) was tested, and sensitivity analyses performed.
Results: Out of 3,697 records, 16 studies from 12 countries assessing 7,640 participants were included. Four of the studies were ranked as good quality studies, 9 as fair, and 3 as poor. This study results demonstrated that 56% of the study population answered the knowledge question correctly (95% CI 48% to 63%, $p < 0.001$). High heterogeneity was observed ($I2 = 97.29\%$), with marginal publication bias (Egger's regression test, $p = 0.0814$). Participants had relatively higher knowledge concerning use of antivenom as preferred treatment, followed by snakebite prevention, knowledge of signs and symptoms of snakebite, knowledge of first-aid, and knowledge of treatment. Participants had lower knowledge relating to types of snakes and the identification of snakes.
Conclusion: Adequate knowledge about snakebites and its management among the general population and healthcare workers was 56%. Healthcare workers and communities across Asia showed higher relative knowledge compared to those in Africa and the Middle East. These data suggest that further education is needed in both the general population and among healthcare workers to ensure that appropriate preventative and patient management techniques are being utilised in snakebite endemic regions. Greater local awareness of the risks and appropriate management of snakebite is required to reduce the burden of snakebite mortality and morbidity.

The Problem of Prevalent User Designs in Observational Dementia Studies

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background:
Randomised controlled trials (RCTs) are considered the gold-standard for generating causal evidence, but conducting an RCT is not always feasible or ethical. Observational studies are thus commonly used, particularly in dementia research. These studies often make use of a 'prevalent user design', in which an outcome is compared between those with and without prevalent exposure at baseline. These study designs are at risk of selection biases which may compromise the estimation and interpretation of causal effects. The objectives of this study were to i) review how common the 'prevalent user design' was in dementia research; ii) through a simulation study, assess and quantify biases common to these designs; and iii) provide recommendations on alternative study designs which may help reduce these biases.
Methods:
A scoping review of cohort studies investigating non-pharmaceutical exposures for dementia in the last 3 years was conducted. Directed acyclic graphs were used to identify and describe sources of bias related to prevalent user designs, using a hypothetical study of physical activity and incident dementia as a case study. Finally, a simulation study was performed to assess and quantify bias related to i) pre-study exposure affecting sample selection, and ii) exposure-confounder feedback; and to assess how these biases are influenced by participant age at recruitment.
Results:
Our review demonstrated that the prevalent user design is highly popular in studies of non-pharmaceutical exposures in dementia research. We will show the results of our simulation study to provide an indication of the magnitude of bias which might be expected in studies of prevalent users, under a range of realistic scenarios, and present results addressing the question of whether these biases will be greatest in cohorts with an older age at recruitment.
Conclusions:
Given the flaws associated with the prevalent user design, the new-user design which emulates a randomized controlled trial (i.e., the target trial emulation) will be discussed as an alternative design strategy to improve the validity and consistency of causal inferences from observational dementia studies.

The Alberta Moving Beyond Breast Cancer Study: assessment completion at follow-up timepoints

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Objectives: The AMBER Study is an ongoing prospective cohort study examining the role of physical activity, sedentary behaviour, and health-related fitness in breast cancer survivorship. Here we describe participant retention and assessment across the year 1 and year 3 follow-up time points.
Methods: 1,528 newly diagnosed stage I (≥T1c) to IIIc breast cancer survivors from Edmonton and Calgary, Alberta, provided baseline measurements within 90 days of surgery. These measurements included a blood draw, cardiorespiratory and musculoskeletal fitness, body composition (DXA scan), lymphedema assessments, accelerometers, and questionnaires assessing demographics and patient-reported outcomes. Participants were reassessed on these outcomes at 1 and 3 years post-diagnosis.
Results: At baseline, the cohort was, on average, 55 years old (SD=11). More participants were diagnosed as stage II or III (56%) vs. Stage I (44%). Overall, 58% received chemotherapy and 74% had radiation. At year 1 follow-up, 1,517 participants were alive, and 1,353 completed at least one assessment (89%). Of those participants, 1,296 (95.7%) engaged in the cardiorespiratory fitness test where 943 (72.7%) achieved peak VO2. Participants also completed upper body strength (80.3%), lower body strength (79.7%), body composition (92.5%), lymphedema (93.2%), blood draw (90.2%), physical activity and sedentary behaviour (Actigraph: 86.1%; activPAL: 82%), and patient-reported outcomes (94.3%) assessments. A total of 822 (60.7%) participants completed all assessments. At year 3 follow-up, 1,488 participants were alive, and 1,174 completed at least one assessment (78.9%). Of those participants, 1,002 (85.3%) engaged in the cardiorespiratory fitness test where 742 (74.1%) achieved peak VO2. Participants also completed upper body strength (74.1%), lower body strength (73.3%), body composition (83.8%), lymphedema (84.8%), blood draw (85.1%), physical activity and sedentary behaviour (Actigraph: 79.2%; activPAL: 76.6%), and patient-reported outcomes (93.9%) assessments. A total of 643 (43.2%) participants completed all assessments.
Conclusions: Given the inherent challenges in retaining participants in longer-term prospective cohort studies, we report good retention at the year 1 (89%) and year 3 (78.9%) follow-up time points. Ongoing and future analyses will allow for a detailed examination of associations and mechanisms linking physical activity, sedentary behaviour, and health-related fitness with breast cancer outcomes across the breast cancer survivorship trajectory.

Estimating health gains of achieving optimal BMI in Australia: a simulation study

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: High BMI is a number one risk factor for non-fatal disease burden and second for fatal in Australia. Information on cross-stratified mean BMI by age, sex and socio-economic groups and linking that with both length and quality of life at a population level is needed in the Australian context to inform policies (aligning with the targets and ambitions of the National Preventive Health Strategy 2021-2030).

Methods: National Health Survey 2017-2018 was used to estimate the log-transformed BMI and SD, which was cross-stratified across age, sex, and SEIFA categories (defined as Socio-Economic Indexes for Areas). In Australia, SEIFA provides a measure of socio-economic status according to geographical area and ranks areas according to socioeconomic advantage and disadvantage. A proportional multistate life table was used to estimate the health gains from attaining optimal body mass index (<25 kg/m2). A total of 19 BMI-associated diseases were modelled in PMSLT. Participants were the 2021 Australian population modelled over their first ten years of lifespan (until 2030).

Results: The study estimated the mean body mass index and uncertainties by each cross-stratified age. Overall, the observed and predicted mean (±SD) BMI was 28.39 (±5.98) and 27.64 kg/m2 (±1.2), respectively. Notably, the difference in predicted mean BMI between SEIFA quintiles were higher in male (most vs least deprived: 28.50 (±1.21) vs 27.59 (±1.17)) compared to female (most vs least deprived: 28.28 (±1.25) vs 26.32 (±1.22)) counterparts. We found significant health gains in the first ten years of lifespan. Health gains were 2.6 times higher (95% CI: 2.5 to 2.7) in the most compared to least deprived quintile.

Conclusions: Results quantified the population-level distribution of body mass index and uncertainties using a nationally representative cross-sectional survey. Using these estimates, further quantification of health gains over the first ten years of lifespan for a total envelope of nineteen diseases demonstrated a substantial health gain. The study found health gains were higher in most compared to least deprived quintile.

Recurrence of congenital heart defects in siblings: a multinational comparison

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: The recurrence risk of congenital heart disease (CHD) increases with a known family history of this condition, but few studies have investigated the risk of CHD recurrence among siblings. This study aims to examine the recurrence risk of CHD in siblings within a population-based cohort and combine results in a systematic review and meta-analysis.
Method: All singleton liveborn infants born in 2001-2019 New South Wales (NSW), and 2008-2020 in Victoria, Australia, with a recorded diagnosis of CHD (ICD10-AM codes: Q20-Q26.9) up to one year of age were identified using linked birth and hospital admission records. Sibling pairs were identified using the unique project number of each mother. The recurrence risk ratio (RRR) was calculated using log-binomial models with CHD in the older sibling as exposure and CHD in the younger sibling as outcome, adjusting for year of birth, maternal age, and maternal diabetes. A systematic review was then conducted using MEDLINE and Web of Science databases with relevant data extracted and pooled with findings from this study using random-effects model.
Result: A total of 704,057 sibling pairs in NSW and 354,412 sibling pairs in Victoria were included. Among sibling pairs, the prevalence of CHD in the younger sibling was 220, and 248 per 10,000 for those with CHD in the older sibling for NSW and Victoria respectively. The adjusted RRR was 2.63 (95% CI 2.19-3.13) in NSW and 3.48 (95% CI 2.65-4.58) in Victoria. Recurrence RR of severe CHD was 4.19 (95%CI, 2.37-7.41) in NSW and 2.31 (95% CI 0.58-9.20) in Victoria. Four population-based studies were included in the meta-analysis, including the current study and studies from Denmark and Norway. The pooled recurrence RR in siblings of any CHD was 3.09 (95%CI, 2.73-3.49) and severe CHD was 5.04 (95%CI, 3.36-7.55) with I2= 30%.
Conclusion: The overall risk of having a sibling with CHD increased 3-fold, and 5-fold for severe CHD, when the older sibling was affected. Findings provide important information for pregnancy counseling and aids risk prediction.

Impact of interpersonal racism on health and healthcare utilisation: national prospective study

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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Introduction: Experience of racism is associated with poorer health and negative healthcare access and experiences. Most evidence for these associations comes from cross-sectional surveys, limiting causal interpretations. We describe results from a large-scale national study using prospective secondary sampling of past New Zealand Health Survey [NZHS] respondents to compare health and healthcare utilisation outcomes by past exposure to racism.

Methods: Sampling was conducted from the NZHS. Exposed individuals were those reporting past experience of racial/ethnic discrimination; matched unexposed individuals were selected from the NZHS, stratified by respondent ethnicity and using propensity-score based sampling methods to balance the invitation list on key potential confounders (nativity, age group, gender, area deprivation, qualification, employment). Responses were collected by multimodal survey (paper-based, online, telephone). Analysis used doubly-robust adjustment, accounting for inverse probability of treatment [IPTW] weights alongside adjustment for baseline covariates included in the propensity-score sampling. Health outcomes were further adjusted for baseline health status.

Results: A total of 2010 individuals responded from the 2016/17 NZHS (54% response rate) with exposed and unexposed groups well matched on the baseline covariates used in the sampling step. Covariate adjusted results by exposure to racism showed poorer mental health outcomes (e.g. mean difference in Kessler-10 = 0.95, 95% CI 0.42, 1.47) with weaker evidence for physical health outcomes (e.g. adjusted odds ratio [aOR] for worse self-rated health = 1.29, 95% CI 0.99, 1.68). Health utilisation results included that those with past exposure to racism had more unmet need in the last 12 months (aOR = 1.71, 95% CI 1.31, 2.23) and lower satisfaction with their usual medical centre (aOR = 1.41, 95% CI 1.10, 1.81).

Conclusion: As shown in this prospective study, interpersonal experience of racism has a material impact on physical and mental health for Māori and other non-European population groups including Pacific and Asian peoples. The findings suggest that the impact of racism on access to timely and appropriate healthcare may be one pathway by which exposure to racism influences health outcomes. Addressing racism needs to be prioritised in addressing health inequities in NZ and internationally.

Investigation of emerging endemic areas for Buruli ulcer in urban Geelong, Australia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Buruli ulcer (BU), a World Health Organization's neglected tropical disease caused by the environmental pathogen Mycobacterium ulcerans, is endemic to South East Australia. Outbreaks of BU in Victoria are worsening; state-wide, BU cases have increased from 77 in 2012 to 342 cases in 2022. Previously, centred in coastal areas of the Mornington and Bellarine Peninsulas, endemic areas have expanded to new urban, non-coastal areas, including suburbs of inner Melbourne.

Rapid detection of new endemic areas offers important public health opportunities for targeted prevention messaging and for community and clinician education to reduce exposures and improve early detection and treatment, to improve clinical outcomes. In this study, conducted by the Barwon South West Local Public Health Unit and CSIRO, we describe the changing incidence and spatial distribution of BU cases in Geelong. We compare the distribution of human BU cases to the distribution of M. ulcerans DNA-positive possum faeces (possums are recognised as key mammalian reservoirs amplifying the bacterium in the environment), and compare the demographics and clinical presentation of BU cases from 2020 onwards, the local transmission period, to those occurring prior.

A total of 80 BU cases have been notified for central Geelong areas from 2011-2022. Spatiotemporal analysis showed clear clustering of cases in areas of Belmont (2019-2022) and Highton (2022), with clustering also noted in Newtown (2020-2021). Clusters occurred in highly focal geographic areas. This indicated the emergence of new endemic areas in Geelong. Clustered cases were observed in close proximity to detections of M. ulcerans DNA-positive possum faecal samples collected in a 2020 systematic survey and partial follow-up surveys in 2020 and 2022. Possum faecal sample positivity was observed in emerging areas of transmission prior to the emergence of human cases.

Initial investigation findings on the emerging endemic areas have been communicated, in collaboration with the Department of Health, via local and state-wide media, social media and health communications directly to local clinicians and general practice forums to increase local awareness for BU prevention, early diagnosis and treatment.

Mental health of Chinese international students: A systematic review

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background: Young people's mental health is a global priority because they have heightened vulnerability to multiple stressors associated with mental disorders. The impacts of the COVID-19 pandemic on this group have been severe. Local and international university students are at higher risk of mental disorders than other young people of the same age. Chinese international students (CIS) form the biggest international student cohort. In 2019, more than 1.6 million CIS were studying abroad. The United States, Australia, the United Kingdom, Canada and Japan are the five most popular destinations. Despite the size of this population, the mental health of CIS, and risk and protective factors, have not been sufficiently studied. This systematic literature review aims to synthesize quantitative and qualitative evidence on mental health and associated factors in CIS.

Methods: This systematic literature review is exploring CIS's mental health, the associated factors and stressors during their education journey abroad. Peer-reviewed journal articles were considered. We examined both quantitative and qualitative evidence related to the topic.

Results: In total, 38 peer-reviewed journal articles are included, which consist of 37 in English and 1 in Chinese. Three are mixed-method studies, eight are qualitative studies, and 27 studies are quantitative. Regarding context, half of the studies were conducted only in the United States. Seven studies recruited CIS from multiple host countries. Three were from South Korea, three from the United Kingdom, and two from Japan. Australia, Germany, Ireland, and Canada have single studies. Nearly one-third are concerned with COVID-19. Questions such as 'What are the challenges faced by CIS?', 'What are the coping strategies used?' and 'What factors are associated with depression, anxiety or stress?' were frequently asked. Only two studies examined the prevalence of depression and anxiety of CIS, and both data sets were from universities in America.

Conclusions: Although there is some consensus on factors associated with CIS's mental health in the American literature, whether this can be generalized to CIS in other countries is uncertain. Additionally, no studies provide data on the prevalence of depression and anxiety of CIS in countries other than America.

The Target Trial Framework: Applying principles of causal inference to observational data.

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background: While randomised controlled trials are considered the benchmark for assessing treatment efficacy, they are not always feasible. Significant progress has been made in health data linkage, leading to notable developments in utilising observational data for making causal inference. The target trial framework provides a structured process to design real world studies by providing a detailed protocol description based on a hypothetical randomised trial. Our objective is to outline the application of the target trial framework for determining the population effect of a national policy to incentivise chronic disease management in general practice (GP) following a stroke/Transient Ischaemic Attack (TIA).

Methods:
1. Cohort establishment: Australian Stroke Clinical Registry (January 2012-June 2015, Victoria and Queensland) data were linked with state hospital data and national Medicare, pharmaceutical, aged care and death data.
2. Data partitioning by time: Wash out, exposure, and outcome periods were defined to reduce survivor bias and allow policy outcomes to take effect.
3. Eligibility: Criterion similar to a trial were applied to reduce bias from inappropriate participant selection.
4. Exposure and comparator: Identified using Medicare claim items.
5. Treatment assignment: Weighted using IPTW derived from 42 covariates to estimate the average population treatment effect
6. Outcome: Defined using national death data
7. Robustness analyses: Systematic bias analyses, 12 pre-specified subgroup analyses, assessment of causal contrasts.

Results: Data linkage allowed sufficient size and breadth of data for target trial specification. Registry data provided a clinical diagnosis of stroke/TIA for eligibility and Medicare and death data allowed accurate specification of exposures and outcome. Application of the framework resulted in the inclusion of 12,368 cohort members (45%) in the analysis with excellent balance between groups for all covariates (standardised differences <0.05) with IPTWs. Participants with a chronic disease management claim compared to standard GP care had a 26% lesser mortality rate during the follow-up period, (adjusted hazard ratio: 0.74; 95% confidence interval: 0.62, 0.87). Results remained constant for all robustness analyses.

Conclusion: We provide an exemplar of how the target trial framework can provide rigorous and reliable evidence for policy decisions by applying the principles of causal inference to observational data.

Academic achievement among children with chronic kidney disease in the KCAD study

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Children with CKD are at risk of reduced academic achievement, which may compromise their health and socioeconomic flourishing across the life-course. However, robust longitudinal assessments of numeracy and literacy are limited.
Aims: To describe literacy and numeracy achievement for children and adolescents with CKD across years 3-9 relative to general population statistics, and compare achievement over time across baseline CKD stage.
Methods: We obtained linked NAPLAN data (2008-2021) for NSW participants in the KCAD study (recruited 2012-2016, aged 6-18yrs, including all CKD stages [CKD 1-2, CKD 3-5, dialysis, transplant]). Z-scores were calculated comparing participants' literacy (reading, writing, spelling, grammar/punctuation) and numeracy NAPLAN scaled scores to the NSW population mean for that calendar year and school year (expected population z-score mean 0/SD 1). In sensitivity analyses, we adjusted for caregiver education through stratification. Effect sizes were defined per NAPLAN national reports: <0.2=close, 0.2-0.5=above/below, >0.5=substantially above/below. We built multivariable linear mixed models for reading and numeracy (excluding dialysis patients due to small numbers), testing interactions of CKD stage with time.
Results: Of 230 participants, 185 had some valid NAPLAN data. Mean age at KCAD baseline was 12.3yrs and 62% were male. Mean (95%CI) z-scores for reading were: -0.25 (-0.50 to 0.00), -0.28 (-0.52 to -0.04), -0.36 (-0.57 to -0.15), -0.45 (-0.66 to -0.24) for Years 3, 5, 7, and 9. Z-scores for spelling, grammar/punctuation, writing mostly showed similar patterns. For numeracy, mean (95%CI) z-scores were -0.23 (-0.48 to 0.01), -0.32 (-0.55 to -0.10), -0.27 (-0.48 to -0.07), -0.37 (-0.56 to -0.18), across Years 3, 5, 7, 9. Performance was similar or worse after adjusting for caregiver education. In mixed models, for reading there were no significant differences across CKD stage and no interaction with time, although achievement appeared to worsen with more advanced CKD. For numeracy, there was an interaction between CKD stage and time – achievement seemed to improve over time for children with CKD 1-2/3-5 but not for those with transplants.
Conclusions: Children with CKD may have reduced academic achievement compared to the general population, especially in later school years. Those with more advanced disease are particularly at risk.

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Factors for times to diagnosis and treatment in patients with lung tumours

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background: Lung cancer has been a leading cause of cancer death globally for over 20 years, characterised by late disease stage at diagnosis and delays in diagnosis and treatment. This is the first study in Australia investigating the factors for times to lung cancer diagnosis and treatment from the first presentation in primary care.

Methods: Primary care datasets (Patron and NPS MedicineWise) and hospital datasets (Peter MacCallum Cancer Centre and St Vincent's Hospital in AURORA registry) in Victoria were linked. The outcomes are: diagnostic interval (DI), from the date of the first presentation in primary care to the date of diagnosis at hospital; and the total diagnostic and treatment interval (TDTI), from the date of the first presentation in primary care to the date of cancer treatment initiation. Associations between patient characteristics and both time intervals were analysed using the Cox-regression model, adjusted for sex, age, histopathology, year of diagnosis, ethnicity and hospital.

Results: A total of 268 patients diagnosed with lung tumours between 2005-2021 were linked and analysed; among them, 19%, 10%. 28% and 43% were at stage I, II, III and IV. Identified risk factors for longer DI and TDTI were: at least one of any comorbidities (DI: hazard ratio (HR)=0.58 [95%CI 0.41-0.80]; TDTI: HR=0.59 [0.42-0.83]), comorbidities of respiratory diseases (DI: HR=0.76 [0.59-0.99]; TDTI: 0.75 [0.57-0.99]) and renal insufficiency (DI: HR=0.56 [0.33-0.96]; TDTI: HR=0.53 [0.31-0.92]), observed weight loss as the first encounter (DI: HR=0.61 [0.41-0.90]; TDTI: 0.63 [0.42-0.94]). Additional risk factors for longer TDTI were: age at diagnosis (>=75 vs. <65: HR=0.71 [0.51-0.98]) and alcoholism (HR=0.52 [0.30-0.93]). The factor for shorter DI and TDTI was CT or X-ray as the first encounter (DI: HR=1.67 [1.26-2.21]; TDTI: HR=1.66 [1.25-2.21]). Another factor for shorter TDTI was environmental exposure of asbestos (HR=1.45 [1.02-2.02]). Above factors can be found in analysis for the sub-cohort of 220 patients with non-small-cell lung cancer, except for the comorbidities of respiratory diseases for both intervals, and alcoholism for TDTI.

Conclusion: Identified social and clinical factors could be valuable for designing potential interventions to address diagnostic and treatment delays in patients with lung cancer.

Inequalities in premature mortality from comorbidity clusters: Analysis of Australian Census-linked data

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Research has demonstrated that Australia has experienced recent widening in area-level inequalities in premature mortality (Adair & Lopez, 2020a). This trend has occurred concurrently with a rapid slowdown in premature cardiovascular disease mortality decline that has contributed to slowing growth in life expectancy since 2003.(Lopez & Adair 2019) Understanding of these trends needs to recognise the increasingly important role of clusters of comorbidities in mortality. These clusters of comorbidities commonly share a risk factor, for example a group of conditions related to overweight and obesity that have contributed significantly to recent adverse premature cardiovascular disease mortality trends (Adair & Lopez 2020b). Such chronic disease risk factors demonstrate significant inequalities according to socio-economic status and geography.

In Australia, recent availability of death registration data linked to the 2011 and 2016 Censuses in the Australian Bureau of Statistics Multi-Agency Data Integration Project (MADIP) provides enormous potential to improve measurement of the extent of inequalities in mortality. This study uses ABS MADIP data to identify the extent of socio-economic inequalities in premature mortality (35-74 years) from clusters of comorbidities in Australia in 2011-21. Socio-economic data from the 2011 and 2016 Censuses include highest educational attainment, household income, marital status and living arrangements. Clusters of comorbidities analysed include overweight- and obesity-related cardiovascular disease mortality (comorbidities of diabetes, chronic kidney disease, hypertension, lipidemias and obesity) and alcohol-related causes. Inequalities are assessed using ratios of age-standardised death rates (bivariate) and Cox proportional hazards regression models (multivariate).

Preliminary findings show that there are significant inequalities in premature mortality from the overweight- and obesity-related cardiovascular disease cluster by household income, education, marital status (never married: higher mortality), and living arrangements (live alone, in rental or government housing: higher mortality). For each variable, these inequalities are wider than for other causes of premature death.

The results provide essential evidence for targeting of interventions to reduce these disparities in premature mortality. More generally, the study demonstrates the opportunities afforded by large linked datasets to strengthen evidence to inform public policy that will address the most urgent public health issues in Australia.

Quantitative and qualitative trends in Northern Territory Aboriginal Health Key Performance Indicators

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Introduction: Healthcare delivery in the Northern Territory (NT) is challenging with 233,000 people dispersed over 1.3million km2. In this context, there are significant health disparities among the Aboriginal population compared to non-Aboriginal population. Monitoring changes in the provision of services and outcomes is a key priority of the primary healthcare sector. Led by the Aboriginal Health Forum, NT Aboriginal Health Key Performance Indicators (AHKPIs) have been collected since 2010 and provide an important dataset for monitoring primary healthcare services among Aboriginal peoples. The indicators reported include: maternal/child and preventative health; chronic disease management; and sexually transmissible infections (STI). This study is the first to report long-term NT AHKPI long-term trends with analysis of quantitative and qualitative data.

Methods Aggregate AHKPI data for 22 indicators were examined for 2010–2021 for resident Aboriginal people. Descriptive statistics were used to summarise trends with significant changes tested using binomial regression. Findings were contextualised with qualitative data from frontline staff.

Results The AHKPI data represents 88.1– 92.8% of the NT Aboriginal population. There have been improvements in 9/22 AHKPIs including; antenatal attendance in first trimester (44.5%–54.0%,$p<0.001$); adult health checks (17.4%–52.5%,$p<0.001$); childhood anaemia testing (59.7%–65.7%,$p<0.001$); anaemia in children (15.6%–9.4%;$p<0.001$) and pregnant women (15.6%–9.4%;$p<0.001$); STI testing (25.6%–35.7%,$p<0.001$); and GP management plans (56.5%–61.9%,$p<0.05$), team–care arrangements (43.8%–59.7%,$p<0.05$) and testing glycaemic control (54.8%–57.6%,$p<0.05$) for diabetic clients. Declines occurred in child health checks (47.7%–39.3%, $p<0.05$), cervical screening (65.4%–57.3%,$p<0.001$) and blood pressure monitoring (81.4%–72.9%,$p<0.001$). For many AHKPIs, the gains were greatest in the period 2016–2019 and declines observed through the COVID-19 pandemic 2020–2021.

Health providers emphasised the importance of community/individual relationship and culturally appropriate care. Lack of health literacy was a significant barrier while advances in technology (e.g. Point–of–Care testing) were enablers of improvements.

Conclusion Monitoring AHKPIs assists primary healthcare services to identify improvements, target resources and work towards closing the gap in health disparities for Aboriginal Australians. Aboriginal Primary Healthcare Services have led the way in developing primary healthcare KPIs, providing lessons for others to follow (e.g. GPs).

Transitions of care for people living with dementia–insights using linked data

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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Dementia describes a collection of symptoms characterised by progressive and irreversible impairment to brain function. People living with dementia have increasing care needs as their condition progresses and tend to be high users of both the health and aged care systems. However, little is known about how people living with dementia transition between hospital and residential aged care. Understanding transitions of care for people living with dementia is critical to ensure quality care is being provided.

This study aims to examine the following using linked data:
- patterns of entry into residential aged care and use of health services by people living with dementia following a hospital admission
- hospital admission characteristics that were most associated with higher rate of entry into residential aged care among people living with dementia
- how care transition patterns and hospital admission characteristics for people living with dementia compared to people without dementia.

This study uses the National Integrated Health Services Information Analysis Asset, a multi-source enduring linked data asset containing de-identified administrative health, residential aged care, and deaths data from 2010–11 to 2018–19 for most Australian jurisdictions.
The study included people aged 65 or older who were hospitalised for one or more nights in 2017. People living with dementia were identified in the linked data from diagnoses recorded in admitted patient care, residential aged care and mortality data, as well as prescriptions for dementia-specific medications. The linked data was used to examine entry into residential aged care, health service usage (such as subsequent hospital admissions, emergency department visits, GP and specialist consultations) and mortality in the 7-days, 3-months and 12 months following hospital discharge.

The use of linked data has enabled dementia-specific reporting from data sets that on their own only identify a small proportion of people living with dementia. Access to linked data has also enabled assessment of transitions of care between health and aged care systems over time, highlighting the need for linked data to assess care pathways and service interactions.
This study is still underway, and key findings will be presented at the conference.

Current and future burden of Ross River virus infection attributable to temperature

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: There is a growing set of evidence indicating the impact of climate change on emerging and re-emerging infectious diseases. The transmission of Ross River virus infection (RRV), the most notifiable vector-borne disease in Australia, has been amplified by rising temperatures. Understanding the current and future burden of RRV in the context of climate change is essential for planning and implementation of adaptation strategies.

Methods: Given the rare deaths of RRV in Australia, only Years lived with disability (YLD) associated with RRV between 2003 and 2018 were sourced from the Australian Institute of Health and Welfare Burden of Disease (BoD) database. Using a meta-regression model, we estimated the location-specific relative risks (RR) per 1°C temperature increase and used this to calculate the high temperature-attributable burden of RRV during the baseline period (2003–2018). The future burden of RRV attributed to high temperatures for the periods of 2030s and 2060s under three greenhouse gas emission scenarios (Representative Concentration Pathways, RCP 2.6, RCP 4.5 and RCP 8.0) were estimated.

Results: The current study showed temperature attributed in the burden of RRV infection in Australia. During the baseline study period (2003-2018), high temperatures accounted for 28.5% of the observed burden of RRV in Australia, corresponding to an annual average of 46.3 YLDs or 0.02 per 10,000 population. The high temperature-attributable burden of RRV varied across climate zones with the highest burden observed in oceanic climate zones. By 2030 and 2060, temperature-attributable burden of RRV is projected to increase by 2.1% and 2.6% of baseline levels, respectively. As temperatures continue to increase, it is anticipated that high temperatures will contribute to higher RRV burden in Australia. The current findings can be relevant to develop adaptation strategies specific to each climate zone.
Keywords: Ross River virus; Infectious disease; Burden of disease; Temperature; Climate change

Protective and risk factors for Buruli ulcer in South-Eastern Australia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Transmission pathways for Buruli ulcer (BU) are not fully understood. Greater understanding of environmental and behavioral risks across geographic regions and climates is required to inform mitigation strategies globally. BU incidence in South-Eastern Australia is increasing, with spread to new geographic areas, including increasingly urban environments. This detailed case-control study explored host, environmental and behavioural risk and protective factors to inform mitigation strategies to control the disease spread.

We recruited 245 adult BU cases (notified June 2018 - June 2020) and 481 postcode-matched controls from across endemic areas of Victoria, Australia. Participants reported data on environment factors at their residence or holiday home, outdoor activities and prevention behaviors on self-administered questionnaires. Age- and sex- adjusted odds ratios (aOR) were obtained using conditional logistic regression, and clustering of potentially protective behaviors were examined.

We found the likelihood of BU was higher for individuals with diabetes mellitus, aOR 2.25 (95% CI 1.13, 4.48), but lower among those with a history of BCG vaccination (aOR 0.60 (0.40, 0.90)). Working outside with soil contact had higher odds of BU than working indoors in endemic areas (2.89 (1.01, 8.25)). A strong dose-response relationship was observed between the number of possums at residential properties and likelihood of BU; aOR 4.58 (1.50, 13.98) in residents with 1-2 possums, aOR 6.09 (1.86, 19.90) with ≥ 5 possums. BU was associated with tea trees (1.72 (1.10, 2.69)) ponds (1.69 (0.99, 2.42)) and bore water use (1.56 (0.98, 2.50)) at the residence. Insect repellent use, covering arms and legs during outdoor activity and immediately washing wounds were protective; undertaking multiple protective behaviors was associated with the lowest odds of BU (aOR 0.22, (0.10, 0.48) for ≥ 6 compared to 0-1 protective behaviors).

Our findings suggest that a combination skin hygiene and protection behaviors and previous BCG vaccination may provide protection against BU in endemic areas, especially for those at increased risk due to health, occupational, or environmental risks. These findings are helping to inform the implementation of evidence based public health measures to address the increased incidence of BU in this region.

Weight training and risk of all-cause, cardiovascular disease and cancer mortality

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Objectives: To investigate the overall and dose-response associations between weight training - a specific type of muscle-strengthening exercise - and the risks of all-cause, cardiovascular disease (CVD) and cancer mortality in older adults, and to describe the joint associations between weight training and aerobic exercise and mortality risk.
Methods: This cohort study used data from 216,339 participants from the NIH-AARP Diet and Health Study from the United States. Information about weight training was collected via self-report in 2004-2005, and participants were followed up to the end of 2019. Cox proportional-hazards regression was used to estimate the hazard ratios (HR) and associated 95% confidence intervals (CI) for the associations between weight training and all-cause, CVD and cancer mortality, after adjusting for confounders including aerobic exercise.
Results: Around 25% of participants (mean age 70 years, 58% male) reported engaging in any weight training over the past year, and 79,107 (37%) participants died during the 15-year follow-up period. Engaging in any amount of weight training (vs. none) was associated with lower risk of all-cause (HR=0.94; 95% CI=0.93, 0.96), CVD (HR=0.92; 95% CI=0.90, 0.95) and cancer mortality (HR=0.95; 95% CI= 0.92, 0.98). Larger risk reductions were observed among females than males. Older adults who performed both aerobic and weight training exercise had greater mortality benefits, particularly at intermediate levels of aerobic exercise.
Conclusion: In this large cohort of older adults, performing any amount of weight training was associated with lower risk for all-cause, CVD and cancer mortality, and those who engaged in both weight training and aerobic exercise were at lowest risk. These findings strongly support the recommendations of physical activity guidelines to perform muscle-strengthening exercises in addition to moderate-to-vigorous aerobic physical activity.

Timing of contraceptive use and pregnancy in relation to endometrial cancer risk

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background:
The oral contraceptive pill (OCP), full-term births and older age at last birth provide substantial protection against endometrial cancer (EC). However, the effects of timing of OCP use and the joint effects of OCP and full-term births remain unclear.
Aims:
To assess the individual and joint associations of OCP timing and full-term births with EC risk.
Methods:
We conducted a meta-analysis with individual-level data from 31 studies (10 cohort, 21 case-control) in the Epidemiology of Endometrial Cancer Consortium, comprising 19,219 EC cases and 46,993 controls. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using mixed-effects logistic regression, considering study as a random effect and adjusting for potential confounders.
Results:
Overall, 19,007 (42%) controls and 6,732 cases (36%) had ever used OCP, with median durations of 4 and 3 years respectively. Preliminary analyses show that EC risk decreased by 22% (OR=0.78, 95%CI=0.76-0.80) for every five years of OCP use, with progressive reductions in risk up to over 20 years of use (OR=0.25, 95%CI=0.18-0.35) compared to non-users. While the association between OCP use and EC risk was slightly weaker for women with more full-term births, the interaction was not significant (p=0.1), suggesting that the two factors are largely independent. There was no association between age at first/last OCP use and the risk of EC overall, among nulliparous women or those whose last OCP use was before their last birth. However, older age at last use was associated with a reduced risk among parous women (p-trend=0.04; ORs for last age ≥40 vs never use =0.82, 95%CI=0.70-0.97; last age ≥40 vs <25 among users =0.86, 95%CI=0.66-1.02) and there was a weak inverse association among those who used the OCP after their last birth, regardless of OCP duration.
Conclusion: Our findings confirm that the inverse associations between OCP use, full-term births and EC risk are largely independent. Age at first or last OCP use is not associated with EC risk among nulliparous women. However, among parous women, particularly those continuing OCP use after their last birth, a later age of last OCP use may provide a modest additional reduction in EC risk.

Excess deaths from pneumonia indicative of early underdiagnosed COVID-19 deaths in Australia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

BACKGROUND
Internationally, research on 'excess deaths' at the national-level during the early stages of the COVID-19 pandemic suggests deaths due to COVID-19 were not all classified as such, leading to an underestimation of the true level of COVID-19 mortality. For countries with low COVID-19 mortality and pandemic interventions in place that also reduced deaths from other causes, missed COVID-19 deaths are unlikely to be detectable within excess deaths examined at the 'all-cause' level. The likelihood of being counted as a COVID-19-related death later in the pandemic may also be associated with socio-demographic factors that influence healthcare services access.

OBJECTIVE
To investigate whether early COVID-19 deaths in Australia were misregistered to the cause 'pneumonia', and to examine overall pneumonia death trends through to the end of 2022 according to socio-demographic characteristics.

METHODS
We interrogate Australian death data to compute actual and expected weekly total deaths (5-year average), and 'pneumonia' deaths, by gender, from January 2020 to December 2022. We compared to pre-pandemic trends (2015–2019) across and within Australian states and territories. We used an aberration detection algorithm developed for disease surveillance, applying the Farrington Flexible method via the surveillance package in R software. The algorithm uses an over-dispersed Poisson generalised linear model to generate upper bound threshold values for time points based on historical data.

RESULTS
Weekly Australian 'pneumonia' deaths followed the average trend in 2020 until mid-March 2020 when, in weeks 13 to 15, the algorithm flagged an alarm when the weekly values exceeded upper bound threshold values, with an additional 88 deaths for the period. This period corresponds to the first peak in officially recorded, separately categorised, COVID-19 deaths in Australia. The remainder of 2020 and 2021 show repeated periods where pneumonia deaths fell well below historic records (weeks 16-47). Once borders opened in 2022, pneumonia deaths returned to near pre-pandemic levels.

CONCLUSIONS
Excess deaths from 'pneumonia' from late-March to mid-April 2020, if attributable to COVID-19, would more than double Australia's official COVID-19 toll to mid-April. This would suggest community transmission was greater in Australia's first wave than indicated by COVID-19 death counts.

Best of Both Worlds? Simultaneous algorithm development via machine-learning and expert-led approaches

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4D - Methods 2, Delacombe, October 20, 2023, 1:30 PM - 3:00 PM

Background: Demand for predictive algorithms in healthcare is growing, and machine learning (ML) technologies increasingly facilitate automated, 'hands-off' approaches to development. In general, epidemiologists and biostatisticians favour human-led approaches, which are time-consuming and may not be strictly reproducible. Conversely, data scientists tend to prefer automated approaches which are less resource-intensive but can introduce bias.
Utilising the National Centre for Healthy Aging Data Platform (derived from hospital electronic health record data from >900,000 patients over 10 years) we seek to harness the strengths of ML and Natural Language Processing (NLP) technologies, but also to limit known weaknesses by nesting these within a subject-matter-expert led framework for algorithm development.
Methods: Using a recent project predicting probability of dementia as an example, this talk presents the scientific rationale for our novel dual-stream approach, and outlines how Steyerberg's popular 7-step modelling framework can be adapted to include simultaneous subject matter expert and ML/NLP led development streams.
Results: In the Subject-Matter-Driven approach, candidate predictor variables are selected by an expert panel for inclusion in algorithms trained via traditional statistical methods (e.g. logistic regression). In line with best practice, "full", pre-specified models (including all variables) are examined prior to pursuing parsimonious models via penalisation. In the Machine Learning (ML) driven approach, candidate variables are selected via state-of-the-art, supervised ML techniques, including Support Vector, Decision Tree/Random Forest, Gradient Boosting, Naive Bayes, and K-neighbours classifiers.
The performance and structure of resulting algorithms is then compared, shedding important light on the 'blind-spots' of both approaches. A final, amalgamated model can then be explored which includes variables selected within both streams.
Our NLP infrastructure supports both approaches in two ways; i) by extracting variables identified by the expert panel which are initially unavailable within the medical record and, ii) by creating document-level risk scores which can then be passed to both models.
Conclusion: Our unique dual-stream approach to predictive algorithm development combines the computational power of ML and NLP with the nuance and natural scepticism of human expertise. The assembly of an expert panel to guide predictive model development, though time consuming, has scientific and implementation advantages.

Walking for transport and development of persistent physical disability in older adults

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Abstract
Purpose:
Walking for transport may help integrate adequate levels of physical activity into a daily routine of older adults, however, less is known about its effect on development of persistent physical disability in this population group. This study aims to investigate the association between transport-related walking and development of physical disability among community dwelling Australians.

Methods:
In a prospective cohort study, 11,454 adults (mean age=75.1 years, 53.1% female), from the ASPirin in Reducing Events in the Elderly [ASPREE] Longitudinal Study of Older Persons [ALSOP], self-reported transport walking (never, rarely/once a week, more than once a week, everyday) in their first year of the study. Persistent physical disability was defined as inability or severe difficulty with performance of one or more of the six basic activities of daily living (ADL) which include walking, bathing, dressing, transferring from a bed or chair, using the toilet, and eating, with the same ADL loss confirmed after a 6-month period. Cox proportional hazards regression adjusted for socio-demographic, health-related behaviours, and clinical health measures. Hazard ratios [HR] and 95% Confidence Intervals [CI] were reported.

Results:
Of the 11454 participants, 2.8% never engaged in transport walking, 21.7% walked for transport rarely/once a week, 31.4% walked more than once a week and 44.1% walked for transport every day. During a median follow-up period of 6.4 years, 421 participants (3.7%) developed persistent physical disability. Compared to participants who reported never walking for transport, the risk of developing persistent physical disability was lower in those who reported walking for transport rarely/once a week [0.50 (0.35-0.73)), more than once a week (0.40 (0.28-0.59)) or every day (0.36 (0.25-0.52)].

Conclusions:
The risk of developing persistent physical disability was lower in older adults engaging in any transport walking compared to those who reported never engaging in transport walking. Developing programs to encourage older adults' engagement in walking for transport could help boost their physical activity levels, lower their risk of developing disability, and promote healthy ageing.

Understanding how gender interacts with other social determinants of health inequities

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: Gender differences in health have been documented in Canada, Europe, and England but there has been limited Australian literature examining the interactions between gender and other social determinants of health (SDH). SDH, including gender, are key drivers of health inequities. Gender interacts with factors including migration status and socio-economic status so a fine-grained analysis exploring these relationships is important.

Methods: We analysed individual data (N=109,999) on self-assessed health and social determinants of health from the Australian Bureau of Statistics National Health Survey. Data from 5 releases of the National Health Survey (1995, 2001, 2007/08, 2014/15, and 2017/18) were pooled and analysed. For each individual, the main outcome of interest was self- assessed health which was dichotomised into good (excellent, very good, or good) and poor (fair or poor). To provide a detailed mapping of health inequalities in Australia, we examined self-assessed health by gender, income, education, employment status, and migration status using descriptive analysis and logistic regression.

Results: Across all 5 releases of the Australian Bureau of Statistics National Health Survey we found the majority of individuals self- assessed their health as good (83.3%, n=91,584) compared to poor (16.7%, n=18,415). The proportion that reported their health as poor did not vary by gender (male: 16.8%, n=51,947; female: 16.7%, n=58,052). However, when considering intersections between gender, socio-economic status and migration status descriptive analysis found higher levels of poor self-assessed health were reported for low-income males (36.8%), males not in the labour force (31.4%), female migrants (18.4%), low educated males (22.1%) and low educated males born in Australia (37.7%). Preliminary regression models indicate women experience poorer self-assessed health compared to men (OR=0.80, 95% CI 0.75-0.84) in a model that controls for selected social determinants

Conclusion: While overall differences in self-assessed health between men and women appear minimal, gender inequalities are evident in combination with other key SDHs.

Learning outcomes:

A SDH approach is needed when examining health differences by gender because it points to the underlying social circumstances that have contributed to health inequities.

Association Between Egg Intake and All-Cause Mortality in Community-Dwelling Older Adults

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

The relationship between egg consumption and mortality in older adults remains inconclusive, with conflicting findings reported in previous studies. This study aimed to examine the association between egg intake and all-cause mortality in adults aged 70 years and over.

A prospective cohort study was conducted among 10,202 community-dwelling adults (54.1% females, mean age 77.5 [SD 4.3]) participating in the ASPirin in Reducing Events in the Elderly (ASPREE) Longitudinal Study of Older Persons (ALSOP) and ASPREE XT. Mortality data were obtained from medical records and notifications from close contacts, verified using independent sources. Participants self-reported their egg intake frequency as rarely/never, 1-2 times/month, 1-2 times/week, or 3-6 times/week/several times/day. Cox proportional hazards regression analysis, adjusted for various factors, including sociodemographic characteristics, health-related information, clinical covariates, and overall dietary quality, was performed to assess the association between egg intake and all-cause mortality.

The majority of participants (54.9%) consumed eggs 1-2 times weekly. Over a median follow-up period of 3.9 years, 638 all-cause mortality events were recorded, with 55.9% (344 events) of events occurring in individuals consuming eggs 1-2 times weekly. After adjusting for potential confounders and when compared to rare/no consumption, no significant association was observed between monthly, weekly, or daily egg intake and all-cause mortality (HR 1.14 [0.76-1.72]; 1.09 [0.75-1.61]; 1.13 [0.74-1.70] respectively). Subgroup analysis suggests the presence of gender differences in the association between egg consumption and the risk of all-cause mortality.

In this prospective cohort study of community-dwelling adults aged 70 years or older, no significant association was found between egg intake and all-cause mortality. However, there is some evidence to suggest potential gender differences in the relationship between egg consumption and the risk of mortality. Further research is necessary to explore this gender-specific association.

Five-year vs ten-year predicted cardiovascular disease risk in Aotearoa New Zealand

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Background
Internationally most countries recommend using 10-year cardiovascular disease (CVD) risk prediction equations to inform cardiovascular preventive treatment decisions, whereas Australian and New Zealand guidelines recommend predicting 5-year CVD risk. We aimed to compare predicted 5-year and 10-year CVD risk distributions across Aotearoa New Zealand and to examine whether they identified different high-risk populations.

Methods
De-identified individual-level linkage of multiple administrative health datasets in Aotearoa New Zealand was undertaken to establish a cohort of almost all New Zealanders without CVD or heart failure aged 30-74 years on December 31, 2006, with follow-up linkage to hospitalisations and mortality until 31 December, 2018. We derived age- and sex-specific Cox regression models to predict individuals' 5-year and 10-year CVD risks using pre-defined routinely available CVD risk predictors. We described the distribution of 5-year and 10-year CVD risks and compared characteristics of high-risk participants selected by 5-year equations and 10-year equations.

Results
During 19,728,636 person-years of follow up (mean: 13.3 years), 155,924 CVD events occurred among 1,746,665 people. The proportion of participants with 5-year risk <5%, 5-10%, 10-15%, and ≥15% were 79%, 13%, 5% and 3%, respectively, and with 10-year risk <10%, 10-15%, 15-20%, and ≥20% were 76%, 9%, 5%, and 9%. Most participants in the highest 5-year risk decile were also in the highest 10-year risk decile (93.7% and 96.1% of women and men) and for most ethnic groups. Participants only identified in the highest 5-year risk decile were younger, more likely to be from population groups with high rates of CVD incidence and from deprived areas, and much more likely to be dispensed lipid-lowering and antiplatelet/anticoagulant medications.

Conclusions
Approximately 20% of New Zealanders aged 30-74 years had 5-year CVD risks >5%, and 25% had 10-year CVD risks >10%. Five-year and 10-year equations demonstrated substantial overlap in identifying the highest-risk groups, although 5-year equations tended to identify more people from population groups known to be at increased longer-term CVD risk, highlighting an advantage of 5-year over 10-year CVD risk assessment.

Cancers from low dose ionizing radiation: what risk from medical X-rays?

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Cancer incidence is increased in persons previously exposed to low dose ionizing radiation from computed tomography (CT) X-ray scans. We need to know if the excess cancers are actually caused by low-dose medical radiation rather than being attributable to reverse causation or confounding. Here we model data from our Australian cohort. We show that the diagnosis rate for solid cancers, adjusted for age, sex, time, and radiation dose is increased in the early months after a CT scan when compared with the diagnosis rate in a matched cohort without CT exposure. By two years after exposure, the excess cancer incidence is much decreased, presumably because reverse causation has waned. Nevertheless, the excess relative risk (ERR) for cancer is still increased at lag-times of more than two years after a CT. This indicates that low dose radiation can promote new cancers in susceptible individuals after lag periods as short as two years. Susceptibility is likely to be mediated by pre-existing mutations, probably acquired somatically more often than inherited.
CONCLUSIONS
(1) Reverse causation and confounding contribute to excess cancers at lags of less than two years, whereas excess cancers at lags of two years or more seem to be mostly attributable to CT radiation.
(2) Ionizing radiation, as from CT scans, is likely to “select out” individuals who are already susceptible to cancer because of pre-existing mutations, leading to an earlier diagnosis.
(3) The observed dose response for early cancers, based on those who are most susceptible, will tend to overestimate the whole population response.
(4) However, as individual susceptibility is pre-existing, it is legitimate to include the “susceptibility times dose” interaction in attributing risk for affected individuals.
(5) In future work it will be important to follow CT-exposed cohorts for longer times, and to introduce a new metric (years of healthy life lost from cancer) as an overall measure of the impact of low-dose ionizing radiation.
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A review on mammographic textures as strong breast cancer risk predictors

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background: Textural information from mammograms has emerged as a promising breast cancer risk predictor, distinct from conventional mammographic density. However, it remains unclear whether the textures from specific classification categories outperform other textures or mammographic density in breast cancer prediction when using the same datasets and the reliability of the evidence.
Methods: We searched the PubMed database for original research papers, published up to April 2023, which assessed the associations between the mammographic measures and breast cancer risk, measured by odds ratios (OR) per standard deviation, and the risk prediction performances, measured by the area under the receiver operating characteristics curve (AUC), for texture and density-based measures using the same datasets. Sixteen papers were included, examining texture-based measures either as composite scores of multiple textural features, or single textures, and percent mammographic density (PMD) measured by Cumulus or other density-based measures using similar intensity thresholding techniques.
Results: Of 10 papers reporting ORs, five showed greater ORs for statistical texture-based measures compared to PMD and other textural features ($P<0.05$), with increases of 40% to 500% on the log scale. Risk associations remained significant when textures and PMD were fitted together. Eight of 16 studies showed higher AUCs of textures (AUCs of 0.63–0.85) compared to PMD (AUCs of 0.56–0.66) ($P<0.05$). Combining textures from multiple categories yielded greater AUCs than single categories or single textures. However, the reliability of the evidence requires further evaluation due to the lack of necessary information and inappropriate study design considerations, including sample representativeness, matching and adjustments, overfitting, validation methods, mammogram view selection, image pre-processing methods, and regions of interest selection.
Conclusion: Textural features from different classification categories capture distinct breast cancer risk information, partially independent of mammographic density. Statistical features could outperform mammographic density as biomarkers for predicting breast cancer risk. Performance could be further improved by including multiple textures. However, obtaining reliable and precise prediction of texture-based mammographic measures for breast cancer risk necessitates addressing various issues not limited to those discussed. Effective collaboration of researchers from different fields could be beneficial for advancing this complex field of texture analysis-based risk prediction.

BMI trajectories during infancy are associated with psychosocial outcomes in late childhood.

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Common mental disorders often emerge during childhood and adolescence, and their prevalence is disproportionately elevated among those affected by obesity. Early life growth patterns may provide a useful target for primordial prevention, however, research assessing infant growth as an early indicator of later mental health is lacking. Therefore, this study aimed to identify distinct BMI trajectories during the first year of life and to assess their associations with psychosocial outcomes in preadolescent children.

Methods: A large representative sample of Greek school children, aged 9-13 years, participated in the cross-sectional Healthy Growth Study between 2007-2010. Infant anthropometric data, measured monthly from birth to 1 year, were recorded from paediatric health records. Children with at least two serial measures of height and weight were included in the analysis (n=1778) and BMI trajectories from 1 to 12 months of age were estimated using group-based trajectory modelling. Regarding psychosocial outcomes, children's emotional functioning, self-esteem, body image dissatisfaction and dieting behaviours were assessed via valid questionnaire. Associations between the infant BMI trajectories and childhood outcomes were modelled using binary and ordinal logistic regression.

Results: Four BMI trajectories were identified during the first year of life: low (28.8%), average (41.2%), high (24.5%) and very high (5.5%). We found that children belonging to the very high trajectory were more likely to experience greater body image dissatisfaction (OR: 1.56, 95%CI: 1.07, 2.29) and to engage in dieting (OR: 1.53, 95%CI: 1.04, 2.26) and restrained eating (OR: 1.73 95%CI: 1.17, 2.58) behaviours than participants belonging to the average trajectory. Body image dissatisfaction was also greater in children belonging to the high trajectory (OR: 1.34, 95%CI: 1.07, 1.68). Infant BMI trajectories were not associated with emotional functioning or self-esteem status in preadolescence.

Conclusion: Differences in risk of experiencing poorer psychosocial outcomes in late childhood may be discernible from growth patterns in early infancy. Whilst further research is needed to replicate these results, our findings support continued efforts to promote healthy growth during infancy.

Respiratory symptoms after the Hazelwood coalmine fire and pandemic: a longitudinal analysis

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Background and aims
Coalmine fire-related fine particles <2.5 μm (PM2.5) are associated with higher prevalence of respiratory symptoms. We investigated whether the effects abated, persisted, or worsened over time and whether there was an interaction with history of COVID-19.
Methods
The Hazelwood Adult Cohort was established after a 2014 coalmine fire in regional Australia. Members include residents of Morwell, which was covered in smoke for six weeks, and nearby Sale, which was largely unaffected. We analysed data from the 2016/2017 survey (n=4,056) and 2022 follow-up (n=612). Participants answered a validated respiratory symptom questionnaire. We used mixed-effects logistic regressions to determine the longitudinal effects of mine fire-related PM2.5 exposure and logistic regressions to determine moderating effects of COVID-19.
Results
In the 2016/2017 survey, coalmine-fire related PM2.5 was associated with higher prevalence of chronic cough (OR: 1.20, 95%CI: 1.11-1.31 per 1 SD increase in PM2.5), current wheeze (OR: 1.20, 95%CI: 1.11-1.31), chest tightness (OR: 1.11, 95%CI: 1.01-1.23), and chronic phlegm (OR: 1.21, 95%CI: 1.07-1.37). At the 2022 follow-up, there were additional increases in chronic cough (interaction OR: 1.28, 95%CI: 1.04-1.58) and possibly current wheeze (interaction OR: 1.22, 95%CI: 0.98-1.52) due to coalmine-fire related PM2.5. There were no detectable effects of COVID-19.
Conclusions
The prevalence of chronic cough increased over time due to PM2.5/coalmine fire smoke. A plausible mechanism is increased cough hypersensitivity, which has detrimental effects on physical, mental, and social health. The lack of detectable interactions between PM2.5 and COVID-19 infection may be attributable to high vaccination coverage in Australia.

The impact of COVID-19 on private pathology testing uptake in Australia

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
The COVID-19 pandemic impacted non-COVID pathology testing in Australia, with sustained reductions for some tests already apparent by the end of 2022. Reductions were likely a result of both direct and indirect COVID-19 impacts on health care access.

Aim
To examine fluctuations in non-COVID pathology testing in four Australian states/regions coincident with COVID-19 infection peaks and related control measures, and subsequent recovery, from January 2019 to June 2023 inclusive.

Methods
Pathology data from January 2019 to June 2023 were accessed from a large national commercial pathology laboratory service. Tests included in the analysis were histology, prostate-specific antigen, gynaecological cytology, full blood count, HbA1c, and HIV Antibody. Testing volumes were compared to 2019 within states/territories, and disruptions were compared across states/territories during lockdown periods.

Results/discussion
The greatest reductions in testing were during the initial lockdowns from March 2020, and diminished with subsequent lockdowns. For example, FBC testing in Victoria varied by -22%, -5% and 4% during sequential substantial lockdowns.

Impacts on testing varied by region and test type, however, total testing volumes were lower for all tests in 2020 compared to 2019, excluding HbA1c. The direction and degree of fluctuations varied by test. For example, in Victoria, 2021 test volume was lower than 2019 for histology (-11.7%) and HIV (-10.3%), but higher for FBC (2.3%) and PSA (3.7%).

Where testing is part of ongoing screening or chronic disease management, testing may resume without a catch-up period. For diagnostic tests, for example histology, where there has not been a subsequent surge to compensate for pandemic reductions, recovery can be limited by ongoing health workforce shortages and some backlog persists. If diagnostic testing is delayed, then even when normal rates of testing resume, there will be a later diagnosis on average.

Conclusions/implications
Whilst changes in population size, testing methods and market share of the pathology provider can all impact test volume over time, there is evidence of ongoing negative impacts of the pandemic on pathology. Given potential delays in diagnosis and disruptions to disease management, further studies are required to investigate the causes and consequences of reduced testing.

Causal relationships between breast cancer risk factors based on mammographic features

Ms Zhoufeng Ye[1], Dr Shuai Li[1,2,3], Dr Tuong Nguyen[1], Dr Gillian Dite[1,4], A/Prof Robert MacInnis[1,5], Prof John Hopper[1]
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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Introduction
Conventional mammographic density defined as white or brighter regions on the mammogram is an established biomarker of breast cancer (called Cumulus). Two additional density measures (Altocumulus and Cirrocumulus), defined by higher brightness thresholds, and a measure based on textural features (named Cirrus) were reported to improve breast cancer risk prediction jointly. Different risk information for breast cancer could be captured by density- and texture-based measures. Whether there are causal relationships between them is unknown.
Methods
We digitized mammograms for 371 monozygotic twin pairs, with age at mammogram ranging from 40 to 70 years old, from the Australian Mammographic Density Twins and Sisters Study, none were diagnosed with breast cancer at the time of mammography. We generated normalized, age-adjusted, and standardised risk scores for Cirrus, and for three spatially independent density measures, the light areas (Cumulus minus Altocumulus), brighter areas (Altocumulus minus Cirrocumulus) and brightest areas (Cirrocumulus). The causal inference was made using the Inference about Causation from Examination of FAmilial CONfounding (ICE FALCON) methodology.
Results
The risk scores were correlated within twin pairs and with each other ($r=0.22$ to 0.81; all $P<0.05$). We estimated that 8-72% of the latter associations could be attributed to familial confounding between the risk scores with the remainder attributed to causal relationships. There was consistent evidence for positive causal relationships: of Cirrus, the light areas, and the bright areas on the brightest areas (accounting for 34%, 55% and 85% of the associations); and of the light areas and bright areas on Cirrus (accounting for 37% and 28% of the associations).
Conclusions
The lighter (less dense) areas could have causal effects on the brightest (highly dense) areas, including a causal pathway through the mammogram risk score based on textural features. The causal relationships between density measures are stronger than that between density measures and textural features. Textural feature-based measures, such as Cirrus, could be integrated into the breast cancer risk prediction model and improve performance. This may benefit young women who are not within the recommended age range for screening programs. These findings also demonstrate how ICE FALCON decomposes associations between familial biomarkers into pathways.

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Fathers' pre-pubertal passive smoke exposure impairs lifetime lung function in their offspring

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Background

Epigenetic changes caused by passive smoke exposure before completing puberty may increase the risk of asthma in future offspring, but the impact on lung function was unknown. We investigated whether such exposure in parents was associated with poorer lifetime lung function trajectories in offspring.

Methods

Data from 816 father-offspring and 1,149 mother-offspring pairs in the Tasmanian Longitudinal Health Study (TAHS) were analysed. Parents self-reported their passive smoke exposure before the age of 15 years. Offspring underwent spirometry at six-time points from ages 7 to 53 years, and lung function (FEV1, FEV1/FVC and FVC) trajectories were derived using group-based trajectory modelling. Multinomial regression models were used to investigate associations between fathers' and mothers' pre-pubertal passive smoke exposure with offspring's lifetime lung function trajectories. Mediation analysis was performed to assess potential mediator by offspring's gestational age, birth weight, passive smoke exposure in childhood and smoking history over the life-course to middle age. Offspring gender at birth, passive smoke exposure in childhood and smoking history were also assessed as effect modifiers.

Results

Fathers' pre-puberal passive smoke exposure was associated with offspring's lifetime "below average" FEV1 trajectory (adjusted multinomial odds ratio [aMOR]= 1.62 [95%CI: 1.09-2.41]) and "early low - rapid decline" FEV1/FVC trajectory (aMOR= 2.30 [95%CI: 1.07-4.93]). There was a significant interaction between offspring's own childhood passive smoke exposure and their fathers' pre-puberal passive smoke exposure (p-interaction= 0.038); thus, the association between fathers' pre-pubertal passive smoke exposure and their offspring's risk of having a "below average" FEV1 trajectory is stronger in offspring who experienced additional passive smoke exposure during childhood (aMOR= 2.70 [95%CI: 1.52-4.80]) compared to those who did not (aMOR= 0.88 [95%CI: 0.50-1.56]). No interaction was observed with offspring gender or smoking history. The proportions of the indirect effects through each mediator assessed were limited (< 13%). No significant adverse associations were found for FVC trajectories nor maternal exposures.

Conclusions

Fathers' pre-pubertal passive smoke exposure may have a deleterious direct effect on future offspring's lifetime lung function trajectories. This further highlights the importance of limiting pre-pubertal exposure to passive smoke, and the possible impacts across generations.

Pain and its interference in daily living in relation to cancer

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background
Pain is a common, debilitating, and feared symptom, including among cancer survivors. However, large-scale population-based evidence on pain and its impact in cancer survivors is limited. We quantified the prevalence of pain in community-dwelling people with and without cancer, and its relation to physical functioning, psychological distress, and quality of life (QoL).
Methods
Questionnaire data from participants in the 45 and Up Study (Wave 2, n=122,398, 2012-2015, mean age=60.8 years), an Australian population-based cohort study, were linked to cancer registration data to ascertain prior cancer diagnoses. Modified Poisson regression estimated age- and sex-adjusted prevalence ratios (PRs) for bodily pain and pain sufficient to interfere with daily activities (high-impact pain) in people with versus without cancer, for 13 cancer types, overall and according to clinical, personal, and health characteristics. The relation of high-impact pain to physical and mental health outcomes was quantified in people with and without cancer.
Results
Overall, 34.9% (5,436/15,570) of cancer survivors and 31.3% (32,471/103,604) of participants without cancer reported bodily pain (PR=1.07 (95% CI=1.05-1.10)), and 15.9% (2,468/15,550) versus 13.1% (13,573/103,623), respectively, reported high-impact pain (PR=1.13 (1.09-1.18)). Pain was greater with more recent cancer diagnosis, more advanced disease, and recent cancer treatment. High-impact pain varied by cancer type; compared to cancer-free participants, PRs were: 2.23 (1.71-2.90) for multiple myeloma; 1.87 (1.53-2.29) for lung cancer; 1.06 (0.98-1.16) for breast cancer; 1.05 (0.94-1.17) for colorectal cancer; 1.04 (0.96-1.13) for prostate cancer; and 1.02 (0.92-1.12) for melanoma. Regardless of cancer diagnosis, high-impact pain was strongly related to impaired physical functioning, psychological distress, and reduced QoL.
Conclusions
Pain is common, interfering with daily life in around one-in-eight older community-dwelling participants. Pain was elevated overall in cancer survivors, particularly for certain cancer types, around diagnosis and treatment, and with advanced disease. However, pain was comparable to population levels for many common cancers, including breast, prostate and colorectal cancer, and melanoma.

Probiotics vs. pharmacological maintenance therapies for functional constipation in children: Network meta-analysis

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Background
Functional constipation is a common pediatric healthcare issue There has been a rise in randomised controlled trials (RCTs) comparing probiotics to various maintenance therapies such as polyethylene glycol, lactulose and mineral oil.
Objectives
To compare probiotics to all other oral maintenance therapies for functional constipation in children and rank all treatments in terms of effectiveness in a network meta-analysis.
Methods
RCTs were identified through systematically searching the MEDLINE, Scopus, EMBASE and Cochrane Library databases and trial registries, and forward and backward citation searching (PROSPERO registration: CRD42022360977). Within-study risk of bias was assessed using the Cochrane Risk of Bias 2 tool and confidence in the estimates were assessed using the CINeMA framework. We conducted random-effects network meta-analysis to calculate mean difference in defecation frequency and relative risk of treatment success. All comparisons were reported as compared to a placebo.
Results
There were 51 RCTs identified, of which 40 and 29 provided data required to perform network meta-analysis of defecation frequency and treatment success respectively. Mineral oil was the most effective treatment for increasing risk of treatment success (RR: 2.39, 95% CI: 1.49, 3.83). A combined treatment of polyethylene glycol and lactulose was also highly efficacious at increasing risk of treatment success (RR=2.39, 95% CI: 1.15, 4.98). A combination of mineral oil and probiotics was the most effective treatment at increasing defecation frequency (MD: 3.13, 95% CI: 0.63, 5.63). As a standalone treatment, probiotics were not effective at increasing defecation frequency compared to placebo (MD: 0.57, 95% CI: -0.13, 1.27), while mineral oil alone maintained efficacy (MD: 2.65, 95%CI: 1.30, 3.99). Only 4 RCTs were rated as having a low risk of overall within-study bias and confidence in the estimates ranged from low to very low.
Conclusions
There is currently no evidence to support the use of probiotics over other well-established pharmacological treatments for functional constipation in children. Mineral oil, polyethylene glycol, and lactulose were the most effective treatments to increase defecation frequency and treatment success rates.

Mountains to coast, 20 years of notifiable diseases trends in Gippsland, Victoria

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background:
The Gippsland region public health unit (GRPHU), established in 2020, is responsible for public health activities across six large geographically and socioeconomically diverse local government areas (LGAs) in eastern Victoria. Most literature available for notifiable infectious diseases in Australia has been reported and interpreted at a statewide level, despite notable differences at regional levels, such as Gippsland.

Aim:
To understand the temporal trends, geographic variations, demographic differences, sociodemographic inequalities and more recently the impact of the COVID-19 pandemic on infectious disease notifications for the Gippsland region. This information will be used to identify priority diseases for the region, inform health protection strategies and drive targeted and tailored public health responses.

Methods:
Cases notified to the Victorian Public Health Event Surveillance System (PHESS) from 2001 to 2022 were analyzed by disease group (blood borne viruses, gastrointestinal, sexually transmitted infections [STIs], vaccine preventable diseases [VPDs] and other), LGA, Indigenous status, age group, and social disadvantage using the Australian Bureau of Statistic's Index of Relative Socioeconomic Disadvantage quintiles. Gini coefficients, adjusted relative risks, population attributable fractions were calculated.

Results:
Over the 22-year period, the ten most notified diseases in the Gippsland region were Chlamydia trachomatis, Influenza, Campylobacter, Pertussis, Varicella Zoster, Hepatitis C, Salmonellosis, Respiratory syncytial virus, Shingles, and Cryptosporidiosis. Notification incidence increased by two-fold between the earlier and later time periods, largely driven by STI and VPD notifications. Notification incidence was higher in more advantaged socioeconomic quintiles compared with less disadvantaged quintiles.

Conclusion:
The identification of diseases with increasing notification rates such as STIs, and sociodemographic factors associated with the higher disease burden highlight priority areas for public health intervention for Gippsland. Subsequent steps will be to leverage these findings to identify evidence-based disease, population, and location specific interventions.

Breathe Melbourne Citizen Science Project: Understanding air pollution on children's school commute.

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Background:
Melbourne's inner west has some of the highest levels of air pollution across Australia, largely due to its industrial history and proximity to the ports. Air pollution data are typically collected via static monitors, this fails to characterise what people are exposed to in their daily lives and may underestimate exposure. Children are particularly vulnerable to air pollution, yet the levels of air pollution they are exposed to on their school commute remains unknown. With decades of government inaction to solve this issue, Breathe Melbourne set out to understand the levels of air pollution on children's school commute in Melbourne's inner west.

Objective:
1) To empower children as our air quality scientists and bring about behavioural changes to reduce their air pollution exposure.
2) To provide valuable data for the community and government to act upon.

Methods:
In 2022/2023, we taught over 200 primary school students across six school in Melbourne's inner west to be citizen scientists for a week. They learnt about air quality, scientific enquiry, and collected air pollution data on their way to and from school using the latest technology: air quality sensors built into backpacks. The sensors measured two key pollutants of interest: Particulate Matter smaller than 2.5 microns (PM2.5) and Nitrogen Dioxide (NO2). With the help of researchers, children used their data to find behavioural ways to improve the quality of air they breathe on their school commute. In addition, researchers are using the data to create a policy-brief for government, to push for much-needed action.

Results:
Results will be available by the conference date. We will report on four key areas: Children's air pollution exposure on their school commute; 2) children's enjoyment and engagement as our air quality citizen scientists; 3) our policy-brief findings; and, 4) the effectiveness of a novel citizen science project to influence policy-makers and government.

Conclusion:
As the first study of its kind in Australia, our Breathe Melbourne results offer insights into the role citizen science can play in policy areas where the evidence of health impacts is abundant, but policy making fails to follow suit.

Automated Generation of Disease Parameters for Intervention Modelling

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Background

Models of disease incidence and progression are frequently used to estimate the health impacts of interventions. Sourcing suitable data is challenging as these models must have sufficient detail to capture how the intervention impacts each disease. Coherence between, or even within, data sets is rare, and some of the required parameters are often missing.

We developed a method to convert global burden of disease (GBD) estimates of disease prevalence, incidence, and mortality into coherent forecasts of disease rates. The GBD itself uses DISMOD MR II to ensure epidemiological coherence but has a different set of assumptions and requirements. Our method is motivated by our use of proportional multistate lifetables (PMSLT) to estimate health impact across multiple projects.

Method

Each disease is processed independently. We start by deriving the case fatality rate from mortality and prevalence. Next, we use incidence, case fatality, and prevalence rates to estimate the missing remission rates. We then use linear regression to project all five parameters into the future. This yields a base model with initial prevalence, incidence, case fatality, and remission rates, as well as annual percentage changes (APCs).

The base model could be used to produce prevalence and mortality estimates; however, these rarely align with the projections from GBD data. This is solved by iteratively tweaking the incidence, case fatality, and remission rates, as well as their APCs, until the model output agrees with the projected prevalence and mortality. The tweaking process is tuned to prevent overfitting and to avoid replicating artefacts of the source data, such as discontinuous rates as cohort age.

Results

Our method rapidly produces model-ready estimates of disease parameters by sex and single year of age for any GBD disease in any country. A single disease is processed within five minutes on a basic laptop, and we processed 3,000 diseases within three hours using a high-performance computing cluster. The process also produces plots and summary files to allow for efficient manual output validation. Our method may be useful to other researchers and analysts needing disease rates for prospective simulation modelling of population health.

Estimated changes in OECD health expenditure from meeting NCD mortality reduction targets

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Background
The Sustainable Development Goal (SDG) target 3.4 aims to reduce by 33% the probability of death in the working-aged populations (aged 30-70) from four non-communicable disease groups (referred to as “NCD4”): cardiovascular diseases (CVDs), chronic respiratory diseases, cancers, and diabetes. This study investigates the health expenditure impacts of achieving SDG 3.4 by accelerating changes in NCD4 incidence rates (“prevention”) or case fatality and remission rates (“treatment”) to achieve SDG 3.4 by 2030, across 38 Organization for Economic Co-operation and Development (OECD) member countries.

Methods
First, Proportional Multistate Lifetable (PMSLT) models for each country, including the 44 level 3 NCDs from the Global Burden of Diseases (GBD) categories falling under the overall NCD4 definition, were specified under business-as-usual (BAU) using our forecast disease rates. Next, the acceleration in incidence rates, or case fatality and remission rates, to achieve SDG 3.4 (i.e., a 33% reduction from 2015 to 2030 in the period NCD4 mortality risk between ages 30 to 70; 30q70) was determined for each country.

Second, the PMSLT was populated with our estimates of excess health expenditure for each disease in each OECD country.

Third, the difference in health system expenditure between BAU and the accelerated-to-achieve-SDG3.4 prevention and treatment scenarios were calculated, among 30- to 70-year-olds between 2020 and 2030 inclusive.

Results
The 30q70 mortality risks decreased between 2015-2030 under the BAU, but failed to achieve SDG 3.4 in any OECD country.

To achieve SDG 3.4 incidence rates for all NCDs had to decrease by an average of 4.4% more than BAU (11.2% - 1.5% range across OECD countries) under the prevention scenario, and case fatality (remission) rates had to decrease (increase) more than BAU by an average of 2.7% (range 5.3% - 1.1%) under the treatment scenario.

The prevention scenario resulted in the greatest health system savings, ranging from US$9.2 (Colombia) to US$237.8 (US) per person-year from 2020 to 2030. The treatment scenario had lesser savings, ranging from US$3.2 (Colombia) to US$55.7 (US) per person-year.

Implication
Significant savings in expenditure arise for the prevention scenario, although the required acceleration in incidence rates seems challenging.

Cardiovascular diseases risk factors among rural-to-urban migrants compared with their non-migrant siblings

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Background and aims: The increasing prevalence of cardiovascular diseases (CVDs) in developing countries like Bangladesh has been linked to progressive urbanisation. Comparisons of rural and urban populations often find a higher prevalence of CVD risk factors in the urban population, but rural-to-urban migrants might have different CVD risk profiles than either rural or urban residents. This study aimed to describe differences in CVD risk factors between migrants and non-migrants siblings and to determine whether acculturation factors were associated with CVD risk factors among migrants.
Methods: Using a sibling-pair comparative study, 164 male migrant who migrated from Pirganj rural areas to Dhaka City of Bangladesh and their rural siblings (total n=328) were assessed by interview, anthropometric measurement, blood pressure and blood samples. Comparisons were made using linear or logistic mixed effects models.
Findings: Physical inactivity, inadequate intake of fruit and vegetables and possible existence of a mental health disorder had 3.3 (1.73; 6.16), 4.3 (2.32; 7.92) and 2.9 (1.37; 6.27) times higher odds among migrants than their rural siblings, respectively. Migrants watched television on average 20 minutes (95% CI 6.17–35.08 min/day) more per day than the rural sibling group whereas PUFA intake, fruit and vegetable and fish intake of the migrants were -5.31 gm/day (-6.91; -3.70), -21.64 serving/week (-28.20; -15.09), -14.10 serving/week (-18.32; -9.87) lower than that of the rural siblings. For acculturation, only one-third migrants use local dialect to communicate with their spouse, children and friends. When migrants were asked if their dietary habits changed since migrating the city, most of them reported increasing consumption of different unhealthy foods (60% to 76%) and more than one-third believed they were less active than before migration. After adjusting, the risk of physical inactivity (p for trend, 0.001), inadequate fruit and vegetable intake (p for trend, <0.001), a mental health disorder (p for trend, 0.009) and low HDL (p for trend, <0.001) were tended to be higher for each increasing tertile of urban life exposure in migrants.
Conclusion: The findings suggest that migration from rural-to-urban environment increases CVD risk which exacerbate with time spent in urban area due to acculturation.

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Inequalities in survival in children with neuroblastoma and central nervous system cancers

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: There is substantial and consistent evidence that sex, socio-economic disadvantage, and remoteness of residence are factors that influence adult cancer survival. However, similar studies in children have reported inconsistent or inconclusive findings. This study aimed to investigate whether the observed inequalities in adults also apply to cancer survival in children, looking specifically at neuroblastoma and central nervous system (CNS) cancers.

Methods: We conducted a population-based study using Victorian Cancer Registry data from 1982-2021. The cohort included 1,324 children aged 0-14 years with a primary diagnosis of either a neuroblastoma or CNS cancers, who were followed until the end of 2021 based on linkage to death registries. Differences in survival were assessed using Cox regression, estimating hazard ratios for all-cause mortality separately for each of sex, socio-economic disadvantage, and remoteness of residence. All models were adjusted for age at diagnosis, and year of diagnosis, and the association between remoteness of residence and cancer survival was also adjusted for socio-economic disadvantage.

Results: There was an estimated HR of 1.18 (95% CI 1.00-1.40; p=0.05) for males compared with females in neuroblastoma and CNS cancers. Children with these cancers living in outside major cities had higher risk of death compared to their city-dwelling counterparts (HR of 1.19 (95% CI 1.00-1.43; p=0.06)). However, when adjusted for socio-economic disadvantage the HR reduced to 1.12 (95% 0.93-1.35; p=0.25). Finally, there was an estimated 1.51 (95% CI 1.11-2.05; p=0.008) fold increase in the mortality hazard for children with neuroblastoma and CNS cancers living in the most disadvantaged versus the least disadvantaged areas of Victoria.

Conclusion: We found strong evidence that neuroblastoma and CNS cancers survival was lower in children living in more socio-economically disadvantaged areas. There was weaker evidence of a difference by sex and remoteness of residence. Further research to identify the causes of these inequalities is required to inform interventions to address them.

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An exploration of geographic distribution of alcohol outlets

Dr Vanessa Prescott[1], Ms Jennifer Kerrigan[1], Ms Nellie Thomson[1], Mr Parker Blakey[1], Ms Joo Shan Ong[1]
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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Where we live and the built environment that surrounds us impacts our health behaviours and wellbeing in many ways. Both the number of (availability) and distance to (accessibility) alcohol outlets in the places we live could affect how much alcohol we consume and alcohol related harm. This project presents the lessons learnt in developing a method to estimate the variation in number of and distance to licenced alcohol outlets in individual small geographic areas in 6 Australian jurisdictions.

Method: ESRI Arc Pro 3.0 network analyst was used to calculate travel distance between population centroids and alcohol outlets. Population data for were sourced from the 2016 Census, SA1 boundary and mesh block boundary in 2016 were sourced from the ABS website. GNAF (Geocoded National Address File) was from Geoscape Australia and road network data was sourced from ESRI Street map premium. Data on alcohol harms are from the AIHW National Drug Strategy Household Survey 2019.

Results: There are many analytical choices that affect the meaningfulness of the results. Level of geography used for outputs (SA1/SA2, Greater capital cities/Rest of state), measures of density (number per geographic area, number within a radius) and measures of distance (drive time, walk time, m/km). The preliminary analysis of alcohol outlet data combined with data on alcohol harms by small areas demonstrate the importance of the measures used.

Alcohol consumption is known to cause a range of negative health outcomes. Further developing this method will be important for future work on investigating the relationship between alcohol outlets and harms at the AIHW and by other research bodies.

Somatic symptoms, psychological distress and trauma after disasters

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Aims and objectives
Wildfires cause significant physical and mental ill-health. How physical and mental symptoms interact following wildfire smoke exposure is unclear, particularly in the context of repeated exposures. In this cross-sectional study, we investigated how post-traumatic stress and general psychological distress were associated with somatic symptoms in a community exposed to multiple smoke events.
Methods
A random weighted sample of 709 adults exposed to smoke during the 2014 Hazelwood coal mine fire in south-eastern Australia completed a survey in 2020. The survey coincided with the Black Summer wildfires that caused a similar period of smoke haze in the region. Participants self-reported somatic symptoms (PHQ-15, measuring 15 types of physical symptoms such as pain, dizziness, shortness of breath, indigestion, fatigue etc), mine fire-related posttraumatic stress (IES-R), general psychological distress (K10), health diagnoses and demographic information. Associations between posttraumatic stress, general psychological distress, and each somatic symptom were analysed using ordinal logistic regression models.
Results
Overall, 36.2% of participants reported moderate- or high-level somatic symptoms. The most frequent somatic symptoms were fatigue, limb pain, trouble sleeping, back pain, headaches, and shortness of breath. After controlling for confounding factors, general psychological distress and posttraumatic stress were independently associated with all somatic symptoms (except menstrual problems in females with posttraumatic stress). Fatigue and trouble sleeping were the somatic symptoms most strongly associated with general psychological distress, with a one SD increase in K10 score increasing odds of being bothered by these symptoms by five fold (OR 4.90; 95%CI: 3.68-6.52) and four fold (OR:3.65; 95%CI: 2.81-4.74) respectively.
Conclusions
There was a high prevalence of somatic symptoms strongly associated with general psychological distress and posttraumatic stress within a community in the midst of a second large-scale smoke event. Healthcare providers and public health authorities should consider the interconnections of these conditions when supporting communities affected by climate-related disasters.

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Excess mortality in childhood-onset Type 1 diabetes: population-based study

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: People with childhood-onset type 1 diabetes (T1D) have higher mortality rates than the general population, but impact of age at diagnosis has not been examined. This study aims to assess the risk of mortality for T1D and examine the impact of sex and age of diagnosis.

Methods: The study population was identified from the NSW/Australasian Paediatric Endocrinology Group diabetes register, diagnosed with T1D <16 years in New South Wales (NSW), Australia from 1990-2009. The register was linked to NSW Death registrations to ascertain timing and cause of death up to December 31, 2019. Risk factors for mortality were assessed using multivariable Cox regression models and observed mortality rate compared to 'expected' rates in the Australian general population using indirect-standardised mortality ratios (SMR), overall and by sex & age at diagnosis (<8, 8-15 years).

Results: Of 5,412 children diagnosed with T1D, 113 died with all-cause mortality of 1.15/1,000 person-years. Most common causes of death were acute complication (DKA) (29%), diabetes without complication (17%), accident/misadventure (12%), cancer (11%) and chronic complications of T1D (10%). Older age at diagnosis (adjusted Hazards Ratio (aHR) 1.75, 95%CI 1.16, 2.70) & living in most disadvantaged areas (aHR 2.24 95% CI 1.20, 4.23) were associated with increased risk of mortality but not living in a rural area. Overall SMR was 2.5 (95% CI 2.06, 3.03) with females having higher SMR than males (3.80 vs 1.86) and females 30-39 years having highest SMR of 6.53 (4.0, 10.66).

Discussion: Compared to the general population, people with childhood-onset T1D had higher risk of mortality, particularly for females, those diagnosed at older ages and SMR increased with age. Targeted strategies to improve glycaemic control and prevention of chronic diseases are required.

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Visualising Landscapes of Deprivation 2.0

Dr Daniel J Exeter[1,2], Dr Katarzyna Sila-Nowicka[1], Ms Jessie Colbert[1]
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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Area deprivation indices have been used extensively in research, policy and advocacy in New Zealand and internationally. Commonly, composite deprivation measures are grouped into deciles or quintiles for analyses, including thematic maps used to highlight spatial differences in social circumstances within and between regions. Conventional choropleth maps are overwhelmingly used by policy analysts and researchers to describe the spatial distribution of deprivation, to emphasize associations with a range of socio-demographic outcomes, or to allocate funding to areas in need. While thematic maps are intuitive and easy to interpret for the general public, they also have a number of limitations, in particular potentially misleading audiences through the overemphasis of larger area units which typically have smaller populations.

Many geovisualisation approaches now exist that provide effective and accurate alternatives to thematic maps. These visualisations can be as easy and quick to create as traditional choropleth maps, with the assistance of modern technology and software. The advancement of online platforms and mobile phones has allowed the rapid development of dynamic and interactive visualisations that are both easy to access and make, allowing the user to have greater control and engagement with the visualisation.

We use the two main deprivation measures in New Zealand, the NZ Index of Deprivation (NZDep) and the Index of Multiple Deprivation (IMD), to provide a cartographic critique of area deprivation in New Zealand. First, we re-examine research from the late 1990s that outlined the opportunities and risks associated with using conventional cartographic techniques for visualising social circumstances. Next, we compare and contrast the NZDep and IMD indicators, followed by an exploration of a range of contemporary geovisualisation developments that extend beyond the typical cartographic toolkit and describe and interrogate spatial patterns of area deprivation and its relationship with health and social outcomes more effectively. Both static and dynamic geovisualisation examples will be used to explore the ‘landscapes of deprivation’, including, but not limited to: rose bar plot; violin plot; ridgeline plot; cartograms; tile grid small multiples; and Chernoff faces. We will discuss an interactive atlas currently in development that allows users to choose visualisation techniques to better understand patterns.

Methods for evaluating and comparing breast cancer risk assessment tools

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Breast cancer risk assessment tools (also known as risk prediction models) use numerical algorithms combining information on various risk factors to estimate the risk of being diagnosed with breast cancer within a certain time period. Many tools are available, with most developed for individual clinical applications or management of higher-risk population groups due to e.g. family history. Additionally, these tools could potentially be used in the general population to support more risk-based approaches to population breast screening, where higher-risk groups would be offered alternative or additional imaging and/or tailored screening intervals, potentially offset by less intensive screening of lower-risk groups. As part of a systematic review evaluating and comparing breast cancer risk assessment tools for this purpose (within the Australian government-funded ROSA-Breast project) we found that the performance of breast cancer risk assessment tools was most commonly assessed by (i) its calibration, using the ratio of expected over observed breast cancer events (E/O) and (ii) its discriminatory accuracy, using the area under the receiver operating curve (AUC) and/or the concordance statistic (C-statistic). For our analyses, we assessed and reported several additional methods of tool accuracy, which provided important additional information.
For example, for each tool and study setting, we plotted observed cancer rates by the mid-point percentile of each risk group, enabling a more standardised comparison of observed outcomes between various tools and settings. Moreover, we statistically tested how well each tool stratified different risk groups, by comparing the observed breast cancer rates in the mid-range risk groups (e.g. quintiles 2-4 or deciles 3-8) with the highest risk group(s) (quintile 5 or deciles 9-10). An analogous test was also applied to assess differences between mid-range and lowest risk group(s) (quintile 1 or deciles 1-2).
We concluded that, compared to the common practice of focusing on E/O and AUC/C-statistic values, assessing a wider range of metrics when evaluating different breast cancer risk assessment tools across various settings, produced a more comprehensive, standardised and balanced assessment for the purpose of population-level risk-based screening.

Association between congenital heart disease and attention deficit hyperactivity disorder: data-linkage study

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background: Children with congenital heart disease (CHD) are 2-3 times more likely to show symptoms of attention-deficit-hyperactivity disorder (ADHD) compared to those without CHD, however most studies have utilised parent-reported measures of ADHD, which are subject to bias.
Aim: To examine the association between CHD and prescription of ADHD medication in childhood compared to matched population controls and siblings.
Method: Children born from 2001-2016 in New South Wales, Australia with a recorded diagnosis of CHD (ICD10-AM codes: Q20-Q26.9) up to one year of age were identified using linked birth and hospital admission records. Those who died before age 4 years or were diagnosed with a syndrome were excluded. Siblings of those with CHD, and population controls matched by sex, gestational age and year of birth were identified using birth records. Prescriptions for stimulant treatment for ADHD were identified from data linkage to the NSW Controlled Drugs Data Collection until 31 December 2020. Multivariable logistic regression was used to examine association between CHD and ADHD medication adjusted for perinatal and sociodemographic variables, and conditional regression for sibling analysis.
Results: 7,709 infants with a CHD diagnosis, 11,065 siblings and 49,836 controls were included in the analysis. Of those with a CHD diagnosis, 187 (2.4%) were prescribed ADHD medication compared to 892 (1.8%) controls and 312 (2.8%) siblings. After adjustment for covariates, children with a diagnosis of CHD had higher odds of having ADHD medication prescribed compared to matched controls (aOR 1.25 95% CI 1.05-1.47), however not when compared to their siblings (aOR 0.91, 95% CI 0.75-1.12).
Conclusion: Children with CHD have increased odds of being prescribed medication for ADHD in childhood compared to the general population, but not when compared to siblings. Family characteristics, such as health seeking behaviour, or genetic susceptibility may explain risk of ADHD within families.

Linking individuals to areas: protecting confidentiality while preserving research utility

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

A tension exists between making data available which protects the confidentiality of individuals while containing sufficiently detailed geographic information to underpin the utility of research. We aim to inform data collectors and suppliers about geographic choices for confidentiality protection and to balance this with reassurance to the research community that data will still be fit-for-purpose. We test this by investigating the relationship between two geographical entities (points for the observations and polygons for area attributes) at a variety of scales, using a synthetic population of 22,000 people in the UK. We do this for individuals in England and Wales located by postcodes and by postal sector and postal district centroids and link these to a variety of census geographies (Output Areas, Lower Super Output Areas, Medium Super Output Areas, and Local Authority Districts). A binary logistic regression is used to investigate the odds of homeownership (controlled for age-group, sex and qualifications) by the level of deprivation according to the Carstairs index.

We also test the effect of moving people away from their original location by 'jittering' the postcode coordinates. We adjust the coordinates incrementally a specified distance away from the original location, and repeat the jittering process 100 times at each distance.

We find a smoothing of relationships up the geographical hierarchy. However, if postal sector centroids are used to locate individuals, linkages to Lower/Medium Super Output Area scales and subsequent results are very similar to the more detailed unit postcodes. Postcode locations jittered by 500 – 750 metres in any direction are likely to allow the same conclusions to be drawn as for the original locations. At further distances, patterns are likely to be very similar, although variations between simulations make findings less reliable if a single linkage was carried out with a jittered point. The applications of this research are wide-ranging. While this research may focus on England and Wales, this methods used in this research can be applied to any country and postal/census geography.

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Developing an index to capture overall price reductions across supermarkets

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

In healthy food retail intervention studies that use supermarket point-of-sale data to create outcome measures, information about product price discounting, which can strongly influence shoppers' behaviour, is not always available in the sales data.

We developed a methodological approach to estimate the level of price reductions store wide for healthy (core) and unhealthy (discretionary) packaged food sold: the price promotion index (PPI). Application of the indexes and their association with nutritional sales outcomes (energy in products sold per gram and percentage sugar sold) is demonstrated using one-year of weekly sales data in 10 supermarkets in Victoria, Australia.

PPI estimates the overall mean weekly percentage discount for all packaged food products in its category, weighting each item discount by product popularity. Regular price of each item was identified as the mode price at or above the median price and was used to calculate the weekly percentage discount for each item in each supermarket. Only products that were sold for ≥8 weeks during the study period were included in the index, to ensure that there was sufficient information to identify a regular price. Product popularity was estimated using mean number of items sold in weeks when the item was not heavily discounted (i.e., by less than 10% of its regular price).

Association between PPIs and nutritional outcomes was estimated using linear regression mixed models, accommodating serial autocorrelation (lag 3) and adjusting for potential confounders.

Weekly price reductions for discretionary food (mean PPI=8.2, 95%CI 8.1-8.3, range=5.1 11.2) were higher than for core food (mean PPI=5.0, 95%CI 4.9-5.1, range=2.4 8.0) with mean weekly difference of 3.2 (95%CI 3.3-3.4,p<0.001). We found that PPI discretionary was strongly positively associated with energy in products sold per gram (0.04, 95%CI 0.02 0.06;p<0.001) and sugar (0.08, 95%CI 0.03-0.12;p=0.001). The smaller price reductions seen in PPI core were found to not be associated with the nutritional outcomes.

The associations that we found between the index of price promotions we developed and healthiness of food purchases, showed that when price reductions are unknown, it has potential to capture the level of price promotions through the use of point-of-sale purchase data.

Preeclampsia and offspring blood pressure: a multilevel multivariate meta-analysis

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Preeclampsia is a condition of pregnancy characterised by hypertension and maternal organ dysfunction. Previous systematic reviews and meta-analyses have reported that offspring born to preeclamptic pregnancies had higher systolic (SBP) and diastolic blood pressure (DBP) throughout childhood and adolescence. However, these meta-analyses did not consider the impact of confounding, making it difficult to determine whether a true effect exists independent from factors such as maternal age, SES, BMI, parity, ethnicity and substance use during pregnancy.

Methods: To identify articles, we searched the Medline, CINAHL and Embase databases from their inception to January 31, 2022. Meta-analysis was conducted using the metafor package in R. Dependence between effect sizes from multiple follow-ups and multiple outcomes was accounted for by specifying in the statistical model how effect sizes were nested in each cohort using multilevel meta-analysis and robust variance estimation.

Results: There were 41 effect sizes from 7 cohorts which were adjusted for all important confounders. Offspring born to a preeclamptic pregnancy had higher SBP than those born to a normotensive pregnancy (MD: 1.74 mmHg; 95%CI: 1.41, 2.06). DBP was also higher for offspring of preeclamptic pregnancy, however this was smaller and not statistically significant (MD: 0.71 mmHg; 95%CI: -0.11, 1.54).

Conclusions: Differences between blood pressure of offspring born to normotensive and preeclamptic pregnancies were smaller than previously reported after only analysing effects which were adjusted for confounding. The current evidence does not suggest that preeclampsia is a key risk factor for hypertension in offspring, especially when considering the small differences identified and that the presence of residual confounding is a possibility.

This review was registered with Prospero (CRD42019132327).

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Inflammation and cardiovascular health in children and adults: analysis of three cohorts

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Inflammation is key to the development of cardiovascular disease, with evidence this begins early in life. Our aim was to investigate the association between inflammation markers (glycoprotein acetyls [GlycA] and high-sensitivity C-Reaction Protein [hsCRP]) and preclinical cardiovascular measures (carotid intima-media thickness [cIMT], pulse wave velocity [PWV], and blood pressure [BP]) in children and adults.

Methods: We used data from the Avon Longitudinal Study of Parents and Children [ALSPAC] (n=4564 mothers [mean age 48y], n=5511 offspring at up to 3 time points [8y, 18y and 24y]), the Cardiovascular Risk in Young Finns Study [YFS] (n=2015 adults [38y]), and the Longitudinal Study of Australian Children's Child Health CheckPoint [CheckPoint] (n=1325 parents [45y], n=1180 offspring [12y]). Cross sectional associations were determined using age, sex, socioeconomic position, smoking and body mass index adjusted linear regression.

Results: Higher GlycA, but not hsCRP, was associated with higher PWV across all ages, with stronger evidence in older adults (CheckPoint adults: difference in mean = 0.15 [95% CI 0.07, 0.24] m/s per 150 µmol/L increase in GlycA; YFS adults: 0.11 [0.06, 0.17]; ALSPAC young adults: 0.05 [0.00, 0.10]; ALSPAC teenagers 0.06 [0.02, 0.09]; CheckPoint children 0.04 [–0.01 to 0.09]; ALSPAC children 0.05 [0.01, 0.09]). Positive associations with BP increased with age for both GlycA (eg., CheckPoint adults: 1.1 [0.5, 1.7] mmHg higher diastolic blood pressure per 150 µmol/L increase in GlycA; ALSPAC mothers: 1.3 [1.1, 1.6]; CheckPoint children: 0.3 [-0.2, 0.8]; ASLPAC children 0.7 [0.5, 0.9]) and hsCRP (eg., CheckPoint adults: 1.1 [0.5, 1.6] mmHg higher diastolic blood pressure per 1 standard deviation increase in log-hsCRP; ALSPAC mothers: 0.6 [0.4, 0.9]; CheckPoint children: 0.1 [-0.3, 0.6]; ASLPAC children: 0.3 [0.1, 0.6]). There was little evidence of hsCRP associating with PWV or either inflammation marker with cIMT at any age.

Conclusions: The association between inflammation and PWV and BP increases with age, however GlycA is associated with arterial stiffness, measured by PWV, in childhood and may be superior to hsCRP as a biomarker for inflammation-associated cardiovascular risk across the life course.

Methodological considerations in early diagnosis of colorectal cancer research and dose-response meta-analysis

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background: Researching timely diagnosis and treatment in colorectal cancer is pivotal for producing evidence on how to improve outcomes. However, attempts at consolidating the literature often report varied methodological quality and approaches. The field is also characterised by unique features and biases, including the 'waiting-time paradox' where poorer outcomes are seen at both very short and long intervals. These issues need to be considered when both designing and synthesising research.
Aims: a) To systematically assess methodological considerations in the time to diagnosis literature, with a focus on epidemiological biases and statistical issues, and b) to perform a dose-response meta-analysis technique to overcome methodological shortcomings with other meta-analytic techniques.
Methods: Four databases (Ovid Medline, EMBASE, EMCARE and PsycInfo) were systematically searched for articles that assessed the association of a discrete interval of time before initial treatment in colorectal cancer on any outcome. Two reviewers independently screened papers for inclusion. Data was extracted on key methodological features and study findings. A dose response meta-analysis was performed using a one-step process, with restricted cubic splines to allow for a non-linear relationship.
Findings: 130 papers were included in the systematic review and eight in the meta-analysis. Several methodological issues were identified across the evidence base. Common issues included artificial categorisation of intervals, unadjusted analyses in observational research, the introduction of epidemiological biases such as immortal time bias and infrequent consideration of confounding by indication associated with the waiting-time paradox.
The dose-response meta-analysis of the time between diagnosis and treatment on overall survival showed a U-shaped association with a nadir at 45 days, suggesting beyond this point outcomes become increasingly poorer. While this method required more reported data than other meta-analysis methods, overall, the method provided a solution for commonly reported issues with meta-analysis, including heterogenous categorisation of intervals and consideration of non-linear associations.
Implications: Recommendations are provided for future researchers to combat the high prevalence of methodological issues found in the literature. The dose-response meta-analysis was found to be a suitable method for synthesising evidence in this research.

The effect of host immunity on parasite clearance for Plasmodium knowlesi.

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background

Malaysia has seen a drastic decrease in the number of Plasmodium falciparum and P. vivax malaria cases. Zoonotic P. knowlesi infections are now more prevalent, with 3575 cases reported in 2021 by the World Health Organisation. Individuals living in malaria endemic regions tend to develop immunity following multiple malaria infections. Immunity biomarkers against P. falciparum and P. vivax indicate the occurrence of previous malaria infections and have been shown to provide protection against clinical disease and high levels of parasitaemia, and for P. falciparum increase the rate of parasite clearance. There is a close genetic relationship between P. vivax and P. knowlesi, suggesting that immunity against P. vivax may lead to faster P. knowlesi parasite clearance. This study aims to investigate the effect of baseline P. vivax antibody levels on parasite clearance rates using data from 134 patients infected with P. knowlesi enrolled in three clinical trials.

Methods

Antibody levels specific to 21 P. vivax antigens were determined from baseline plasma samples. Parasite clearance rate, the outcome of interest, was estimated for each individual from longitudinal parasite data using the Worldwide Antimalarial Resistance Network Parasite Clearance Estimator. This involves fitting a log-linear, log-quadratic, or log-cubic regression model depending on the parasitaemia profile. Machine learning methods, specifically elastic net regularized regression, random forests, and partial least squares regression were performed to identify a subset of antibodies associated with parasite clearance for P. knowlesi infections.

Results

The study included the baseline plasma measurements from 134 patients infected with P. knowlesi malaria infections, consisting of ages between 3 and 78 years, with a median of 37 years. The median parasite clearance half-life is 2.6 hours (interquartile range of 2.1 - 3.2 hours). One antibody to P. vivax was identified by all three machine learning methods to be associated with faster parasite clearance.

Conclusions

Naturally acquired immunity to one P. vivax antigen increased the rate of parasite clearance in patients infected with P. knowlesi. This study could contribute to future vaccine development research.

Changes in tuberculosis risk profiles among foreign-born people in Quebec, Canada

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background : In many low tuberculosis (TB) incidence countries, the foreign-born population is disproportionately affected by TB. In 2020, TB incidence in Canada was estimated at 4.7 cases per 100,000 population, while incidence among foreign-born people was 14.3 per 100,000 people. We describe changes in the epidemiology of TB among the foreign-born population over a 29-year period, which can inform TB prevention and care.

Methods: We included all foreign-born people notified with TB disease in Quebec, Canada during 1990-2018. Demographic and immigration data were obtained from provincial reportable infectious diseases and immigration databases. Differences in demographic and immigration characteristics were investigated. Average annual incidence and incidence rate ratios were calculated by region and period, and Poisson models were used to investigate changes in incidence over time.

Results: There were 4,515 notifications of TB among foreign-born people during the study period. Of these, 46% (n=2,073) were female, and the median age was 37 years [IQR 28-56]. Annual incidence was highest among people from South-East Asia (41.7 [95% CI 38.0-45.9] per 100, 000), and lowest among people from Europe (5.1 [4.7-5.6] per 100,000). During 2000-2009 the average annual incidence of TB declined for all regions, but then plateaued for all regions except Europe during 2010-2018. People from Europe were oldest at the time of diagnosis (median 61.5 years [IQR 39-75.5]), and had the longest median time from arrival to diagnosis (21 years [3.7-41.0]); while those from Africa were youngest (median 30 years [23-37]), and had the shortest time from arrival to diagnosis (2 years [0.4-5.0]). The number of people diagnosed by region over time reflected broader patterns of immigration to Quebec, which saw earlier waves of migrants from Europe and more recent arrivals from Africa.

Discussion: The epidemiology of TB among foreign-born people in Quebec has changed, reflecting changes in immigration patterns. Although TB incidence is higher among people from regions with more recently arrived migrants, TB remains important among aging foreign-born people. By providing information about groups at higher risk of TB, this study can support efforts to reduce health disparities and achieve TB elimination in a low TB incidence setting.

Psychosocial impacts of COVID-19 on Australia-based West Africans who survived Ebola epidemic

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Introduction
The global COVID-19 pandemic resulted in widespread psychosocial impacts requiring public health management. Extensive research has investigated these impacts. For communities who survived the West African Ebola Virus Disease (EVD) epidemic, COVID-19 had potential to heighten the psychosocial impacts experienced. This study investigated COVID-19 psychosocial impacts and coping strategies of West African migrant survivors of the 2014-2016 EVD epidemic now living in Victoria.
Methods
A sequential mixed method approach incorporated an online questionnaire with the option to then participate in a semi-structured interview. Quantitative data was subjected to descriptive frequency analysis. Thematic analysis was utilised to identify key themes in participants' descriptions of their experiences, coping strategies, and social support during both EVD and COVID-19.
Results
Of 36 survey respondents, nine participated in semi-structured interviews. 52% of survey respondents were female with ages ranges 18-40years old constituting vast majority.
Of the 36 respondents, 22% had survived EVD infection and 15% had been infected with COVID-19. 69% had a family member/s who had survived EVD, 71% had family who had survived COVID-19. 51.5% had relatives who died of EVD, in contrast to 26.5% who had a family member die of COVID. Participants reported fear, lack of support and stress during and after the EVD. While the COVID-19 pandemic resulted in similar experiences, having survived EVD, the participants reported using positive coping strategies, in combination with government support measures. Overall, they reported improvement in life satisfaction living here in Australia.
Conclusion
This study of West African migrant survivors of the EVD epidemic now living in Australia provides epidemiological information on coping strategies to ensure healthy lives utilised by members of the Australian-African population. Although, living in Australia is no immunity to COVID-19 infection and the associated psychosocial impacts, the support offered by the Australian government provided an appreciated coping strategy. Lessons from previous experiences and improved quality of life enabled the use of positive coping strategies.

Estimating optimal time to treatment to improve colorectal cancer outcomes: linked-data study

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background: Colorectal cancer (CRC) is a leading cause of cancer related morbidity and mortality. Existing quality metrics focus on minimising the time taken to diagnose and treat CRC. To assess the association between discrete time intervals and cancer-related outcomes, data from multiple health services must be linked in order to follow people with CRC across episodes of care. This study reports on findings from a novel linked dataset that unites general practice, and clinical and administrative hospital data to interrogate the association between the time before diagnosis and treatment of CRC in Victoria with clinical outcomes.
Aim: To use a linked dataset to investigate the association between discrete intervals of time before diagnosis and treatment in colorectal cancer with stage of disease and overall survival.
Methods: Data from two general practice electronic medical record databases (MedicineWise and PATRON) were linked to ACCORD, a colorectal cancer clinical registry and VINAH, the Victorian Integrated Non-Admitted Health Dataset, to identify key events on the pathway to first treatment. Intervals were defined per standard frameworks. Cox proportional hazards and logistic regression models were used to examine the association between intervals and outcomes. Intervals were modelled as restricted cubic splines to allow for non-linear associations.
Findings: Multiple intervals were able to be measured using the linked data. The sample sizes for each interval ranged from n=99 for the time between first presentation in primary care to first investigation (doctor interval), to n=9362 for the time between diagnosis and initial treatment (treatment interval). Not all the measured intervals showed an association between their length and survival or disease stage. Those that did, specifically the diagnostic (between first presentation in general practice and diagnosis, n=265) and treatment intervals, showed U-shaped associations, known as the ‘waiting-time paradox’ where both very short and long times were associated with poorer outcomes.
Implications: The lowest point of the U-shaped associations found for specific intervals of time could provide recommendations for maximum time for each of these diagnostic and treatment events, which can strengthen evidence-based clinical guidelines.

Efficacy, safety and tolerability of primaquine in paediatric patients: an IPD meta-analysis

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Background: Plasmodium vivax causes significant malaria-related morbidity, particularly in children. It requires drugs to treat the acute symptomatic blood stage and relapsing liver stage (primaquine) of the parasite concurrently. Despite 60 years of use, the relative efficacy, tolerability and safety of primaquine in children compared to adults remains unclear. We aimed to investigate the effect of primaquine dose on these outcomes.

Methods: Efficacy studies of uncomplicated P. vivax published between January 2000 and February 2021, were identified and individual patient data from eligible studies pooled using standardised methodology. The effect of primaquine dose on the rate of recurrence between days 7 and 180 were derived using Cox regression analyses. Haematological safety was defined as a fall in haemoglobin ≥25% to less than 7g/dl. Gastrointestinal intolerance was defined as the presence of vomiting, diarrhoea, or anorexia between on days 5-7 and was assessed by logistic regression.

Results: The efficacy analysis was undertaken on 2,892 children and 3,790 adults from 19 studies. In children treated with ≥5 mg/kg total dose the rate of recurrence between day 7 and 180 was almost half of that compared with children treated with 2-<5 mg/kg; Hazard Ratio (HR) 0.56 (95% CI 0.38,0.83). This effect was not observed in adults; HR 0.80 (0.53, 1.22). A decrease in haemoglobin of ≥25% to <7g/dL was observed in 9/1,925 (0.5%) children and 3/2,717 (0.1%) adults. After controlling for confounders, the dose of primaquine had no significant impact on the change in haemoglobin between day 0 and days 2-3 or days 5-7 in children or adults. Gastrointestinal intolerance in children was greater with primaquine treatment than without at any daily dose, but in adults was only increased at a high daily dose relative to treatment without primaquine.
Conclusions: A higher primaquine dose may substantially decrease recurrence risk in children without major safety concerns. This large individual patient data meta-analysis forms the basis of a report submitted for World Health Organization pre-qualification of paediatric primaquine formulations.

Bayesian spatial analysis enhances planning of targeted interventions in out-of-hospital cardiac arrest.

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1D - Cardiovascular disease, Delacombe, October 19, 2023, 10:30 AM - 12:00 PM

Introduction. There are approximately 26,000 OHCA across Australia annually. Survival is typically poor with only 6% of patients surviving to hospital discharge/30 days. Regional variation in OHCA incidence and bystander CPR has been reported in Australia. Understanding spatial variations in OHCA incidence and bystander CPR rates is important in identifying localities to target with public health interventions.
Method. A Bayesian spatial model was fit to data of all emergency medical service (EMS) attended, adult (>= 20 years) OHCA of medical aetiology in Australia between 2017 and 2019. OHCA incidence and bystander CPR rates were estimated using integrated nested Laplace approximation, with Local Government Area (LGA) as the spatial unit. High-risk areas were defined as having an incidence rate greater than the national 75th percentile and a bystander CPR rate less than the national 25th percentile. In addition to a national spatial analysis, separate analyses were conducted for each state and territory. High-risk LGAs were define by an incidence greater than the state/territory 75th percentile combined with a bystander CPR rate less than the state/territory 25th percentile.
Results. 62,579 OHCA were recorded across 543 LGA nationwide. The estimated national incidence rate was 132.0 per 100,000 persons (LGA range: 58.5-198.3), while the estimated national bystander CPR was 67% (LGA range: 45%-75%). 60 LGA were identified as high-risk with the majority located in regional and remote areas of the nation. State-specific incidence rates were: Queensland (QLD) 134 (LGA range: 87-179), New South Wales (NSW) 132 (LGA range: 59-198), Victoria (VIC) 122 (LGA range: 78-173), South Australia (SA) 140 (LGA range119-169), Western Australia (WA) 110 (LGA range: 76-141), Northern Territory (NT) 78 (LGA range: 67-169), and Tasmania (TAS) 157 (LGA range: 136-172). The estimated bystander CPR rate for each state is: QLD 63% (LGA range 58-67%), NSW 64% (59-72%), VIC 69% (61-76%), SA 65% (45-70%), WA 71% (66-74%), NT 63% (58-64%), and TAS 67% (59-72%). High-risk areas were identified in each state/territory.
Conclusions: Bayesian spatial analysis provides a robust methodology for identifying regions with high OHCA incidence and low bystander CPR rates, providing valuable information to guide delivery of targeted interventions in OHCA.

Housing insecurity and health: causally focussed analyses of UK household panel data

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Housing insecurity is a growing problem in many high-income countries, fuelled by rising unaffordability, lack of supply, cuts to welfare, and insufficient tenant protections. An important form of housing insecurity is the threat of eviction, which often follows a period of falling behind in rent or mortgage payments. Using nationally representative panel data from the UK, we examined the effect of insecure housing on mental and cardiovascular health, and on sleep disturbance, during a period of government austerity. We also explored heterogeneous impacts across the population to understand where risk is concentrated, and potential modifying effects of unevenly applied austerity measures in the UK.

Methods: We used longitudinal data (2009-2018) on 25-64 year-olds from the UK Household Longitudinal Study. Health outcomes included mental health (GHQ, likely common mental disorder); sleep disturbance due to worry; and incident hypertension. The primary housing insecurity exposure was housing payment problems in the past 12 months. Using doubly robust marginal structural models (MSM) with inverse probability of treatment weights (IPTWs), we estimated absolute and relative health effects of housing payment problems. We then performed stratified analyses to assess potential effect heterogeneity across other indicators of housing and financial insecurity and local area indicators of austerity intensity (using linked data). In sensitivity analyses we compared MSM results to alternative model specifications.

Results: 20% of the sample experienced housing payment problems. Good balance of confounders was achieved with IPTWs. Using causally informed methods, we found that the average absolute effect of housing payment problems was to increase the likelihood of experiencing a common mental disorder by 2.1 percentage points (95% CI 0.7, 3.5), with an odds ratio of 1.2 (95% CI: 1.1, 1.3). Results were very similar for sleep disturbance. Evidence for an effect on hypertension was mixed. Effects were larger among private renters, low-income households and younger people aged 25-34, i.e. those with less secure tenure and less financial security.

Conclusion: Housing payment problems were associated with worse mental health and sleep disturbance in a large UK sample, during a period of austerity with reduced public spending on housing, welfare and other services.

Measuring indigenous outcomes and inequity– is a different approach to age-standardisation needed?

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

How do different approaches to age standardisation affect both population health measures for the Māori population and Māori /non-Māori inequity metrics?

Age-standardisation is a common method for quantifying population-level outcomes when those outcomes are age-dependent. This enables outcome measures to be compared between populations with different age structures. Direct age-standardisation uses the age structure of an external reference population to calculate age-weighted outcome rates for different populations.

This work updates and extends work by Robson et al (2007) by investigating the impacts of using different reference populations in direct standardisation calculations to quantify three age-dependent outcomes for the Māori population.

Ministry of Health and Stats NZ records were used for Māori non-fatal injuries, cancer registrations and mortality for a twenty-year period 2000 to 2019. Age-standardised rates per 100,000 population were calculated with 95% CI using the WHO, Segi and Māori 2001 reference populations as well as the 2018 Māori Estimated Resident Population (ERP). Māori/non-Māori rate ratios were also calculated.

Previous work highlighted the impact of the difference between the 2001 Māori population age structure and the two global standards (Segi and WHO). Our work reinforced that evidence with more time points and different age-dependent outcomes. More importantly, it demonstrated the impact of the Māori demographic since 2001 on age standardisation calculations. The different reference populations produced different rates for the three age-related outcomes. Māori had higher rates than non-Maori for all three outcomes in comparison using all external reference populations. However, the 2018 Māori population standard produced Māori /non-Māori rate ratios most similar to the Segi rate ratios.

Our results show the importance of reference population selection for quantifying indigenous outcomes. The changing Māori demographic structure would support using the most recent available Māori population as an external reference population, but this creates inconsistencies in time trends. These results reinforce the need for an indigenous standard population to be used in calculating Māori population health outcomes and Māori / non-Māori inequities. The changing Māori demographics mean this approach may not be suitable for time series analyses, where indirect standardisation and standardised outcome ratios would be more suitable solutions.

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Is the association between ethnicity and asthma modified by migration and diet?

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Introduction: Certain ethnic populations have disproportionately high prevalence of asthma. This could be related to environmental exposures owing to migration and diet. We sought to determine the association between ethnicity and asthma, and if this was modified by migration and diet.

Methods: We investigated UK Biobank participants who self-identified as White, South-Asian, Black or East-Asian. Asthma was defined as current (past 12 months) asthma symptoms, medication use or doctor diagnosis. Cross-sectional associations were determined using logistic regression, and effect modification using interaction analysis. Dietary patterns were identified using latent class analysis of food frequency questionnaires.

Results: We analysed 472,612 White (W), 9,879 South-Asian (SA), 8,058 Black (B) and 1,573 East-Asian (EA) adults. The association between ethnicity and asthma was modified by birth in UK compared to abroad (Non-UK born: OR=1.12 (SA), 1.08 (B), 0.67 (EA); UK born: OR=1.11 (SA), 1.24 (B), 1.39 (EA); p-int<0.001). Seven dietary patterns were identified (labelled by predominant food type): Vegetarian (7.1%), Prudent (23.1%), Self-neglecting (12.6%), Processed (15.7%), Meat-and-Veg (13.6%), Carnivore (13.9%) Pescetarian (14.0%). Compared to Prudent diet, Processed and Carnivore diets were associated with asthma (OR=1.42, p<0.001; and, OR=1.32, p<0.001; respectively), this differed minimally across ethnicities and did not reach clinical relevance (p-int<0.001). Frequency of diet patterns changed notably following migration, especially in EA subjects (eg. processed diet in non-UK born EA: 9.0% vs UK-born EA: 20.9%; p<0.001)

Conclusion: The association between ethnicity and asthma is amplified by migration, especially in East Asian individuals. ‘Processed’ and ‘Carnivore’ dietary patterns similarly increased asthma risk across all ethnicities, but the frequency of such diets varied considerably following migration depending on ethnicity. Our findings provide insight into likely gene-environment interactions that lead to asthma in migrant ethnic populations.

Prevalence of sleep duration and sleep medication use in Australian adults

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Introduction
Poor sleep is increasingly recognised as a behavioural risk factor for chronic diseases and mortality, highlighting the importance of effectively monitoring individual sleep characteristics to enhance the overall health and well-being of a population. This cross-sectional study aimed to identify and examine indicators of healthy sleep in an Australian-based adult population and analyse their relationship with sociodemographic characteristics and health conditions.
Methods
We analysed data from a nationally representative sample of adults aged over 18 (n = 21,562), who participated in the Australian Health Survey 2011-2013 (AHS). Participants in the AHS were assigned to either the National Health Survey (NHS) (n = 15,475) or the National Nutrition and Physical Activity Survey (NNPAS) (n = 6,114). The NHS collected data on sleeping tablets taken for a mental health condition. Bedtime and waketime on the previous night were self-reported in the NNPAS. From this we calculated sleep duration and categorised this into three groups: short sleep (< 7 h), optimal sleep (≥7 to < 9 h) and long sleep (> 9 h).
Results
Prevalence of sleeping tablets use among Australian adults who had a mental health condition was 10.5%. The majority used it for a duration of six months or more (73.9%). Prevalence of sleep duration among Australians adults revealed that on a typical night, a majority self-reported having the recommended amount of sleep (67.2%) with a mean sleep duration of 8.0 ± 1.4 hours. Short and long sleepers accounted for 16.4% and 16.5% of the sample, respectively.
Discussion
The results showed that only three sleep-related indicators were identified in the AHS. To promote awareness for the effective surveillance of healthy sleep, further work needs to be done to assess the specific sleep indicators most relevant for population surveillance and the need to routinely include sleep items in Australian-wide health surveys.

Active transport planning concept for diabetes self-management and weight reduction: Case report

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Context:
Sedentary lifestyle predisposes to diabetes and obesity, though these increases with age and is impacted by other ill-health conditions. Active travel such as bicycling and walking has positive impact in diabetes management. This autobiographical case report presents empirical data to advance considerations of active travel/mobility as epidemiological determinant of diabetes care outcome.
Process 'case report':
A 54-year-old Australian man lives with diabetes and works as a university academic. He weighed 110 Kg and desired to lose weight by riding bicycle and walking. However, the urban transport plan constituted a limiting factor, confounded by a 70 Km round-trip to work. Concerted effort was limited to 30 minutes a day and during this time, weight remained unchanged while fasting blood glucose at 7-8 mmol/L was managed with insulin injections.
A breakthrough came upon switching job to another University town, with better road networks that provided for extensive bicycle lanes and walkways. Thus, the man rode bicycle 1hour round-trip to work and in 1year, his weight reduced to 107 Kg while glucose improved to <6.5 mmol/L.
He went a step further and reduced bicycle riding to one day a working week and walked 90 minutes to work, totalling [3hours/day x 4days/week]. His weight further reduced to 104 Kg in 3 months while glucose control improved to <5.5 mmol/L he was taken off insulin, which was replaced with metformin once a day.
Analysis:
This case report presents measured changes in weight. Two points of thematic analysis are active transport and distance-to-work. Sustainable 'active transport plan' has enabled integration bicycle riding and walking into daily routines of DSM, But not at previous work environment. Also, new home address being 90 minutes walking distance-to-work relative to previous 70 Km round-trip is vital.
Outcome:
The affordances of active transport, and factor of distance-to-work need to be considered in educating the general population. This autobiographical case report shows empirical narrative of a man who struggles to lose weight. It advances active travel as an epidemiological factor to ensure healthy lives for individuals living with diabetes and/or obesity.

Self-controlled case studies find influenza and varicella associated with increased iGAS incidence

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3B - Infection/Injury 1, Ballroom 2, October 20, 2023, 11:00 AM - 12:30 PM

Invasive group A streptococcal disease (iGAS) is a rare and potentially life-threatening disease. Incidence of iGAS amongst First Nations people in the Northern Territory and Queensland is more than seven times higher than for non-First Nations people. The incidence of iGAS is higher in the period following influenza or varicella infection, and following exposure to an iGAS case (secondary iGAS). Although the associations between influenza or varicella and subsequent iGAS have not been well quantified, UK guidelines now recommend antibiotic chemoprophylaxis for children with chicken pox who are household contacts of an iGAS case. Similar recommendations are not made for influenza due to insufficient evidence. iGAS recently became notifiable in Australia, and national public health guidelines are under development. Improving our understanding of the association between influenza or varicella and iGAS could inform recommendations for managing the risk of secondary iGAS in Australia.

We used a self-controlled case study design to explore these associations using linked data for individuals diagnosed with iGAS from 2007–2017 in Victoria, Australia. As iGAS was not then notifiable in Victoria, cases were identified using the Victorian Hospital Pathogen Surveillance Scheme (VHPSS) and the Victorian Admitted Episodes Dataset (VAED). These data were linked to disease notification data and deidentified which included limiting date information to month and year. The exposure risk period for iGAS following infection with either virus was defined as the month of influenza /varicella diagnosis and the following month.

Of the 1949 individuals diagnosed with iGAS during the observation period, 82 (4.2%) had at least one diagnosis for influenza and 30 (1.5%) had a diagnosis for varicella. The incidence rate ratio of iGAS during the exposure risk period was 15 (95%CI 8–27) for influenza and 22 (95%CI 10–48) for varicella.

Using routinely collected population-level data, we demonstrated that both influenza and varicella infection were temporally associated with a marked increase in iGAS incidence. These results support further prospective studies into the association between influenza or varicella and iGAS, and into the benefit of antibiotic chemoprophylaxis for household contacts who have been exposed to either virus.

Essential Components for Tobacco Control Legislation in Alignment with the Global Guidelines

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background: Effective tobacco control is crucial in improving healthy lives by reducing smoking prevalence and exposure to secondhand smoke. Leading countries like New Zealand and Australia have enacted laws regulating tobacco products and smoking. However, South Korea's tobacco regulation laws are divided into two separate laws that are not dedicated for tobacco control, and critics argue that they do not fully reflect the guidelines set forth by the FCTC (Framework Convention on Tobacco Control). Therefore, there is a need to establish a Tobacco Control Legislation that can fully comply with the requirements of the FCTC.
Purpose: We aimed to derive the essential components of tobacco control laws from the leading countries for tobacco control law-making in Korea.
Methods: Using smoking prevalence and MPOWER implementation status, we selected four countries (Canada, United Kingdom, New Zealand, and Ireland). Based on the Tobacco Control Act page on the Campaign for Tobacco-free Kids website, we assessed whether legislation in each country included FCTC provisions. We assessed compliance with the FCTC provisions using the number of implementation actions from the 2021 Global Progress Report on WHO FCTC Implementation. Implementing MPOWER measures corresponding to each FCTC article was categorised as weak, moderate, and complete. Additionally, compliance with Article 8 and Article 13 were evaluated .
Results: Our analyses identified that the essential components of tobacco control legislations are definitions, smoke-free environments, ban on tobacco advertising, promotion, and sponsorship, tobacco product packaging and labeling, sales restrictions, protection of tobacco control policies from the commercial and other vested interests of the tobacco industry. The components of tobacco control legislations are similar among the selected countries. However, Korea had lower compliance scores than the leading countries for articles 8 (smoke-free status of private offices, prisons/detention facilities - public areas, commercial watercraft, common areas of private dwellings) and 13 (regulated forms for advertising by domestic newspapers and magazine, other domestic print media, internet communications, and promotion for toys or candy that resemble tobacco products).
Conclusion: Tobacco control legislation must reflect the guidelines of the FCTC and establish specific measures to ensure compliance with articles 8 and 13.

The effect of becoming unemployed on affordability of oral health care

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: Oral diseases present a global public health challenge despite being mostly preventable. Most working age Australian adults fully fund their treatments as oral health care is not covered under Medicare. Employment status is an important indicator of individual socio-economic status and its effect on affordability of oral health warrants more research.
Aim: This study investigates the instantaneous effect of becoming unemployed on affordability of oral health care.
Methods: Data from the Household, Income and Labour Dynamics in Australia (HILDA) study was used for the analysis. Inverse probability treatment weighting (IPTW) was used to examine the effect of change in employment status from employed to unemployed (N = 5445) on affordability of oral health care.
Results: The IPTW analysis showed that individuals who became unemployed are 2.1 (95% CI 1.3 - 3.5) times more likely to not afford treatment compared to employed individuals. On an absolute scale, those who became unemployed had 5% (95% CI 0.1% - 10%) higher probability of not being able to afford oral health care than those who were employed.
Conclusion: This study found that becoming unemployed instantaneously increased the probability of not being able to afford oral health care. It emphasizes the need for policies to address the impact of immediate financial hardship caused by unemployment.

Early natural menopause and risk of incident type 2 diabetes mellitus

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Early natural menopause (<45 years) is associated with an increased risk of cardiovascular disease, but it is unclear for type 2 diabetes mellitus (T2DM). Women with premature ovarian insufficiency (POI; amenorrhea due to loss of ovarian function before age 40) might be at the greatest risk, but very few studies had sufficient sample size to separate POI from early menopause.

Methods: We pooled individual-level data from 11 cohorts across four countries (Australia, UK, Sweden, and Netherlands) in the International Collaboration on the Life Course Approach to Reproductive Health and Chronic Disease Events (InterLACE) consortium. A total of 183,523 naturally postmenopausal women without T2DM before menopause were included. Age at natural menopause was self-reported and categorised as <40, 40-44, 45-49, 50-51, 52-54, and ≥55 years, while T2DM cases were defined from survey and registry data. Cox regression models were used to estimate hazard ratios (HRs) and 95% CIs of incident T2DM associated with age at menopause, with study as a random effect and models being adjusted for age, birth years, ethnicity, education level, smoking status, and body mass index at baseline.

Results: Over 13 years of follow-up, 11,702 (6.4%) women developed T2DM after menopause, of whom 76% of cases were identified through linked administrative data. The mean age at natural menopause was 50.3 (SD: 4.3) years, with 1.8% of women experiencing POI (<40 years) and 7.3% early menopause (40-44 years). Compared with menopause at age 50-51 years, POI and early menopause were associated with a 1.6-fold (HR:1.56, 95% CI:1.39-1.75) and 1.3-fold (HR:1.26, 95% CI:1.17-1.35) increased risk of T2DM, respectively. Random-effect meta-analysis of individual studies also showed similar results (two-step method), with no significant heterogeneity in the study-level estimates for T2DM risk associated with POI (pooled HR:1.58, 1.39-1.77, p=0.972) and early menopause (pooled HR:1.26, 1.16-1.35, p=0.674).

Conclusion: Women with POI and early menopause were at a higher risk of developing T2DM after menopause.

Learning Outcomes: Early natural menopause, especially POI, may be an important risk factor for T2DM in women. This evidence may inform interventions targeting those at-risk women with modifiable risk factors before menopause.

Using genomic variant signatures for low-cost detection of coeliac Disease

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background

Celiac disease (CD) has a worldwide prevalence of K≈1%, with its incidence consistently rising. As the condition is highly underdiagnosed, it has been proposed that novel, more refined screening for cases is required to complement existing diagnostic triggers, such as suggestive clinical symptoms or relatedness to CD patients given that prevalence K≈10% for first-degree (FD) relatives.

Methods

We have derived a novel methodology for analysing genome-wide association studies that explicitly accounts for non-linear signals conferred by combinations of variants that we denote as Variant Signatures. We use this method to analyse five published CD GWAS and data from the UK Biobank.

Results

We find that Variant Signatures within the HLA significantly enhances prior GWAS-models of CD-susceptibility across GWAS from five studies and spanning four European ancestries. In an external validation in the UK-Biobank (n >400,000), we demonstrate a signature present in only 2.6% of the data but including 30% of validated CD-cases. This signature confers a CD-risk 12.5 times the UK-average, exceeds a 10% CD-risk for FD-relatives, and translates to a high odds ratio of ≈17.8.

By focusing expensive confirmatory testing on the 2.6% of carriers of such a signature, we could potentially increase the number of CD-diagnoses from the current diagnosis rate of DR=30% to DR>50% in the UK, or from DR=20% to DR>40% in Australia (incidentally, for the UK, Australia, or UKB, the sub-population with a current CD-diagnosis is consistently ≈0.3%).

Furthermore, the absence of these deleterious variants significantly improves the accuracy of all the above tests in rejecting coeliac disease in >50% of the UK-Biobank cohort with the lowest risk.

Using a commercially available targeted genotyping assay, the cost of such a test for <100 SNP-genotypes could be <AU$5 (excluding labor) in high-volume service, such as an elective test in routine blood (or saliva) testing in pathology labs, or as a part of dedicated scanning for a set of selected diseases.

Discussion/Conclusion

Our approach to finding novel, concise SNP signatures of genetic variants that confer high risk could offer a powerful alternative approach for the widespread screening of immune-mediated conditions.

Access and service utilisation inequalities in the National Disability Insurance Scheme

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

Background
The National Disability Insurance Scheme (NDIS) is one of the largest social-policy reforms in Australia. The NDIS replaced the old 'block-funded' system of disability supports provided by Federal and State governments. There is growing concern that pre-existing social inequalities people with disability face could lead to inequitable assess to and use of self-directed disability services funded by the NDIS. However, quantitative research on access to and use of the NDIS is lacking.
This study presents the first attempt to use unit-record NDIS data to assess if pre-existing social inequalities translate to large scale inequalities in gaining access to and using services funded by the NDIS.
Methods
We used data obtained from the National Disability Insurance Agency containing individual level demographic and disability information of all NDIS applicants, and the budget and spending details for all participants. Using a target trial emulation approach, we estimated (1) the inequalities in gaining access to the NDIS and (2) the inequalities in allocation and spending of budgets for participants in each disability group. The inequality groups of interests were women and girls, Indigenous people, and people in socioeconomically disadvantaged areas.
Findings
Our findings show that women and girls had substantively lower success rates than other applicants. It was particularly challenging for women and girls with psychosocial or physical disability to be accepted in the scheme. For women and girls who got gained access, some continued to experience inequalities in funding allocation and spending.
In most disability groups, Indigenous applicants had marginally higher success rates than their non-Indigenous counterparts. They were also allocated larger plans; however, the spending was not equivalently higher given the larger plans.
People in socioeconomically disadvantaged areas were less likely to be successful when they made access requests. The inequalities in allocation and use of budgets for people who gained access were less prominent and varied by disability groups.

Stillbirth in the remote of NT: A retrospective cohort of births (1986-2017)

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background
Stillbirth rates have been stable in Australia (7.1 in 2003 versus 7.7 in 2020, per 1000 births), with consistently higher rates among women living remotely. In the NT, over half of the Aboriginal population reside in remote areas. Existing studies have demonstrated that fetal growth restriction (FGR) has a direct relationship with stillbirth and Aboriginal women in the remote areas have a higher incidence of small for gestational age infants (a proxy for FGR). However, the relationship between stillbirth and FGR by remoteness and Aboriginal status is not known.

Aim
1. To assess probability of stillbirth for discrete gestational age categories, by Indigenous status and remote residence. 2. Investigate the relationship between stillbirth and the combined effects of FGR, Aboriginality and remoteness.

Materials and Methods
Conditional probability estimates for preterm and term gestational age categories— extremely preterm (<28wk), very preterm (28-31wk), moderate-late preterm (32-36wk), early term (37-38wk), full term (39-40wk), and late/post term (41-44wk) were estimated on the sample of singleton pregnancies recorded from 1986-2017 (n= 88,559). We used logistic regression to investigate the relationship between stillbirth and combined effects of Indigeneity, remoteness, and FGR.

Results
Probability of stillbirth was higher for Aboriginal compared to non-Aboriginal women, across all the preterm and term gestational age categories. The significant three-way interaction, between Indigeneity, remoteness, and FGR, was partitioned into two simple interactions between Indigenous status and FGR—first, at non-remote level (x2=0.46, P=0.499) and second, at remote level (x2=9.92, P=0.002). For remote mothers, the effect of FGR (versus no FGR) was estimated per Aboriginality. Unexpectedly, FGR was protective (non-significant) for Aboriginal women (aOR=0.52; 95%CI: 0.27, 1.00; P=0.051) and a stillbirth risk for non-Aboriginal women (aOR=2.81; 95%CI: 1.24, 6.37; P=0.014).

Conclusion
The probability of stillbirth for preterm and term gestation age categories was higher among Aboriginal women residing in remote areas compared their non-Aboriginal counterparts. Unexpectedly, there was a contrasting effect of FGR on stillbirth for women in remote areas by Aboriginal status. Possible explanations include misclassification bias for FGR due to unknown conception dates or unreliable access to antenatal ultrasound. Further research is required to clarify this result.

Keywords-Stillbirth, FGR, Aboriginal

Variance of Age-specific Log Incidence Decomposition (VALID): application to female breast cancer

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background: The extent to which known and unknown factors explain how much people of the same age differ in their risk of a disease is fundamental to epidemiology. Risk factors can be correlated in relatives, so familial aspects (genetic and non-genetic) must be considered. Historically, this has been addressed by estimating 'heritability' as a percentage based on a deterministic 'liability'.

Methods: We developed a unifying model (VALID) by assuming that risk, defined as log(incidence) or logit(cumulative incidence), increases exponentially across risk scores which have standard normal distributions. The variance in risk is Δ^2, where Δ=log(OPERA) is the difference in mean risk score between cases and controls and OPERA is the odds ratio per standard deviation. A risk score correlated r between a pair of relatives generates a familial odds ratio of $\exp(r\Delta^2)$ from which classic familial risk variance decomposition can be applied. There is an upper limit to variance in risk caused by genetic factors, determined by the familial odds ratio for monozygous twin pairs, but no limit to variation caused by non-genetic factors. We applied VALID to published data on breast cancer risk factors.

Results: Variance in breast cancer risk is explained by different factors to different extents at different ages. The familial risk ratio, and therefore the familial variance, is greater at younger ages. A substantial proportion of familial variance prior to, but not after, menopause is explained by high-risk mutations in the major genes BRCA1 and BRCA2, a small proportion by the latest polygenic risk score, and a substantial proportion by non-genetic factors shared by sisters or undiscovered recessively inherited genetic factors. Questionnaire-based risk factors such as reproductive factors and body composition explain little variance in risk. New mammogram risk scores explain as much variation in familial risk as the polygenic risk score and a similar amount of variation in non-familial risk.

Conclusions: Much is unknown about the finite genetic and familial aspects of breast cancer risk, especially for young women, and very little is known about individual-specific variance in risk which is unlimited. These findings are contrary to those from applying the liability model.

The total burden of physical inactivity: including mediated effects on chronic disease

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: Regular physical activity reduces blood pressure, cholesterol, plasma glucose, and improves bone mineral density, along with improving mental health and reducing risk of falls. Current estimates of health burden due to insufficient physical activity have not attributed burden through these pathways, underestimating the importance of PA for population health relative to other risk factors.
Methods: We used a comparative risk assessment framework to estimate burden of physical inactivity through metabolic risk factors (blood pressure, fasting plasma glucose, cholesterol, bone mineral density) to their associated chronic diseases, and directly to depression, anxiety and falls, for Australian adults. Activity levels were grouped into sedentary, low, moderate and high based on METs/week undertaken, with RRs for each association drawn from published systematic reviews and meta-analyses.
Results: This analysis is currently ongoing. Preliminary estimates indicate that physical inactivity burden is substantially underestimated, and burden from over 20 additional conditions can be attributed to inactivity, instead of only the downstream risk factor. Results will be presented by age, sex, and by condition.
Conclusion: Expanding the epidemiological model of inactivity to include a wider range of direct effects, and effects that are mediated through other biomedical risk factors, is critical to better understanding the causes of chronic disease in Australia, and where to direct efforts to reduce disease burden.

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Australian Cancer Atlas 2: New horizons for a world-leading health communication tool

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2F - Virtual Online Only (mixed), October 19, 2023, 1:00 PM - 2:30 PM

Context
The Australian Cancer Atlas is an award-winning online interactive resource that displays small-area spatial variation in cancer epidemiology across Australia. Designed to engage a broad range of expert and non-expert audiences, the interface allows users to explore Australia by small area, providing clear visualisation of area-based social and geographical inequity in cancer outcomes. Thoughtful selection of methods and a focus on clarity of communication has enabled decision-makers, patient groups, educators and service providers to use the Atlas to improve outcomes and advocate for change. Underpinned by cutting-edge methods from biostatistics and epidemiology, the Atlas has inspired cancer atlas projects in other countries.

This year, the Atlas has been expanded to include a wide range of new features. This presentation will describe the process of developing the Atlas and activities carried out in conjunction with the research to maximise knowledge translation.

Process
Additional data have been obtained and new epidemiological and statistical methods have been developed to expand the Atlas to include spatiotemporal modelling, absolute measures and new types of cancer. A range of new indicators capture variation in outcomes across the cancer journey from risk factor prevalence and screening participation to treatment and loss of life expectancy.

Outcomes
The wealth of new information posed the challenge of presenting the data clearly and in an appealing way. Impact and ease of communication were considered when selecting which results to include. Focus groups involving diverse stakeholders were critical to the success of the final design.

Implementation of diabetes screening and associated factors in community pharmacy

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background: This study aimed to measure the nature and extent of undiagnosed type 2 diabetes (T2DM) screening in Australia, and to identify factors associated with implementation.
Methods: A cross-sectional survey was undertaken among a nationally representative sample of 415 community pharmacies recruited to the 2017 Pharmacy Diabetes Screening Trial across Australia. Self-reported data from pharmacies explored screening availability, volume, and processes, and also practice characteristics that may influence effective service implementation. Descriptive analyses were performed to outline the current state of diabetes screening, and binary logistic regression was performed to identify factors associated with pharmacies that (a) provided diabetes screening (yes and no), and (b) were high-performing (top quintile) in terms of screening activity levels.
Results: Overall, 39% of pharmacies conducted diabetes screening, with the top quintile constituting those who performed more than two screenings/week on average. The most commonly offered form of screening was blood glucose testing (35% of all pharmacies) followed by the paper-based AUSDRISK assessment (19%); HbA1c testing was not commonly offered (4%). A majority reported having software to guide delivery of professional pharmacy services (72%), pharmacy-based training for pharmacists/staff to implement services (63%), formal training requirements for some services (56%), patient files in pharmacy (61%), and meetings to review and improve professional services (55%), along with other less frequently used implementation strategies. In the adjusted regression models, pharmacies in Queensland and New South Wales were more likely to conduct diabetes screening compared with those in Victoria. Having software-guided service delivery, and written documentation of patient management/results, both doubled the likelihood of conducting screening. Pharmacies located alongside medical centres were significantly less likely to conduct diabetes screening, while those in large shopping centres were five times more likely to be high-performing CPs compared to those located in small shopping centres. Pharmacy-based training for pharmacists/staff to implement services was associated with significantly increased odds of a being a high-performing CP.
Conclusion: Our findings suggest that diabetes screening services in CPs can be improved and that policy and funding for standardized diabetes screening are required to complement and expand diabetes screening services.

Within-pair comparisons are better, not "biased", especially for studying sex and gender

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Papers claiming that within-pair comparison studies are “biased” unfortunately do not appear to define "bias", but this criticism is being used to discredit within-pair studies that do not find evidence for associations. Of course, not finding evidence for an association using a within-pair design does not imply there is no association, let alone no causation, as there could be insufficient power. Nevertheless, the “kiss of death” is being administered. The use of sibling controls whose participation is generated by their sibling’s diagnosis and less likely to be differential is important now that participation by controls is typically low and hardly unselected.

The authors of the “bias” papers appear to think there is one true strength of association between an exposure and an outcome; they recognise that the within-pair analysis estimate is a different and valid parameter that pertains to the conditional association after adjusting for familial confounders. If there is such familial confounding, the within-pair conditional parameter will naturally be closer to the null than an association found from studying unrelated individuals alone. The two different designs are facilitating estimates of two different entities. The difference between the parameter estimates is an estimate of the role of the specific familial confounding that contributes to the association in the first place.

The within-pair study design using dizygotic opposite-sex (DZO) twin pairs is an optimal way to study sex differences by controlling for age and shared unmeasured familial factors, including on average one-half of autosomal genetic factors and the shared womb at the same time. Comparison of within-pair differences between DZO and same-sex pairs is also giving insights into the potential causes of gender dysphoria.

Understanding that there is a difference between conditional and unconditional associations can allow for inference about causation using the Inference about Causation from Examining FAmiliaL CONfounding (ICE FALCON) approach which studies differences in pairs of conditional and unconditional associations. ICE FALCON explicitly makes use of the potential for familial confounding, works irrespective of whether there is individual specific confounding, and is strengthened by combination with within-pair analyses.

These issues will be illustrated by some simple examples.

Northern Territory Population Health Survey 2022: Disparities in outcomes critical to address

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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Introduction
An important research focus in the Northern Territory (NT) is the health and wellbeing of Aboriginal people, of whom a large proportion live in remote Aboriginal communities. For the remote communities, NT Health has great ability to capture data through clinic client records and monitored in the Aboriginal Health Key Performance Indicators. However, less data is available on those outside this system, inclusive of both Aboriginal and non-Aboriginal residents. In 2022, NT Health conducted an adult population health survey targeting people outside remote communities to better understand chronic health conditions, risk factors and social determinants of health. This presentation addresses the differences between population sub-groups.
Method
Survey samples were a random selection of the NT's mobile phone number list, excluding those belonging to residents of remote communities. After initial contact, eligible participants completed a 10-minute phone interview. Base weights were made for the final sample (n=2001) adjusted for the geographic stratum-level response rate and to match external benchmarks for key demographic characteristics. The final weighted sample was used to calculate prevalence estimates and rate ratios (rr).
Results
The final sample (n=2001) comprised 88% non-Aboriginal and 12% Aboriginal participants. Aboriginal participants had lower socioeconomic findings, including: education level, employment, household income, home ownership and household overcrowding compared to non-Aboriginal participants.
The prevalence of chronic conditions and mental health problems were higher among Aboriginal participants compared with non-Aboriginal participants. Aboriginal participants had a higher prevalence of diabetes (rr=2.5), heart conditions (rr=3.6), long-term respiratory conditions (rr=2.7) and stress-related mental health problem (rr=1.6), but lower prevalence of cancer and asthma. Aboriginal participants were also more likely to have multiple chronic conditions (rr=1.9).
Obesity, smoking, high cholesterol and high blood pressure were more prevalent among Aboriginal participants. Aboriginal participants were also less likely to meet recommended physical activity levels and consume more sugary drinks and fast food.
Conclusion
Addressing health disparities in the NT is a critical challenge. The socioeconomic disadvantages and excess burden of disease in the Aboriginal population persists regardless of residential location. Addressing this inequality will require coordinated approaches across the social determinants of health and primary health care.

Prevalence of complementary medicine use in young adults with mental health conditions

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background:
Mental health conditions (MHC) are increasingly being reported among young adults. Complementary and alternative medicines (CAMs) are non-pharmaceutical therapies that may aid in mental health management. Understanding the prevalence of CAMs use and the characteristics of CAM users may inform strategies for personalised mental health care.

Aims: To assess prevalence of CAM use, and characteristics of users, in young adults.

Methods:
Self-reported survey data from young adults aged 18-30 years completing the 2012 National Health Interview Survey (NHIS; n=6420) was analysed. Use of 21 CAMs in the last 12 months was queried, and consolidated to 5 categories. Eight MHCs were queried, and 3 were analysed: anxiety, depression, and sleep disorders. Prevalence of CAM categories and three MHCs were assessed by design-based F-tests and logistic regression. Multivariable logistic regression, adjusted for potential confounders, was used to assess demographics and lifestyle characteristics of CAM use among participants with either of three MHC. All analyses were weighted based on the 2012 U.S. population.

Results:
Twenty-two per cent of young adults reported having at least one of three MHCs. Of this population, CAM use was more frequently reported than in participants without MHCs (58.2% vs 43.1%, $p<0.001$). The top 5 CAMs used were herbal supplements (18%), yoga (16%), meditation (6%), special diets(3%), and massage (3%). Significant characteristic differences between CAMs users vs. non-users included higher proportions of males, partnered, university educated, of normal BMI, and engaging in regular physical activity.

Conclusion:
Frequency of CAM use appears to be higher in young adults self-reporting anxiety, depression, and sleep disorders. Observed demographic differences between CAM users and non-users, may serve as potential predictors of CAMs use in young adults with MHC.

Novel multi-sectoral data linkages to monitor health inequities among justice-involved young Australians

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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Background

Young people who encounter the criminal justice system (i.e., charged with a criminal offense and/or sentenced to a community-based order or detention) are amongst the most marginalised in our society. They commonly have multiple physical and mental health comorbidities; disproportionate rates of mental illness, suicide, self-harm, disability, substance use disorder, infectious disease, and chronic disease; and a markedly elevated risk of premature death. Despite this, we know very little about their healthcare needs and trajectories. Multi-sectoral data linkage is an effective tool to support routine monitoring and reporting on these outcomes.

Methods

We established two prospective cohorts of justice-involved young people using cross-sectoral data linkage: (1) in Queensland we linked youth justice records from 1993-2014 for 48,670 young people (age 10-18 years) to adult correctional records, death records, and coronial records; (2) in a national cohort we linked all youth justice records from 2000-2019 for 88,110 young people (age 10-17) with national ED, hospital, Medicare, PBS, and death data. We calculated crude mortality rates among people exposed to the youth justice system and compared them with rates among age- and sex-matched peers in the general Australian population.

Results

Young people in contact with the youth justice system in Queensland were 4.1 times more likely to die compared to their age- and sex-matched peers in the community, with one-third (32%) of deaths due to suicide. There was a 70% increased risk of death in the Queensland cohort due to non-communicable diseases compared to the general population. The national cohort will generate novel information on healthcare trajectories after contact with the youth justice system, including patterns of morbidity, mortality, and healthcare use.

Conclusion

These cohorts provide the first glimpse into the health of justice-involved young people in Australia. They form the foundation for routine monitoring and reporting on health needs, which is currently absent despite known health inequities. Population health monitoring during and after exposure to the youth justice system, on an ongoing rather than ad-hoc basis, is essential for timely and evidence-informed policy and practice decision making to improve health, reduce preventable morbidity and mortality, and reduce avoidable healthcare costs.

Intersectionality inequity in combination HIV prevention services in Ethiopia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Background: There have been recent international calls to address international inequities. We examined the effect of intersectionality inequity in HIV prevention services among those aged 15 to 49 years in Ethiopia.
Methods: The outcome variables of combination HIV prevention services are comprehensive knowledge about HIV/AIDS, an accepting attitude towards people living with HIV, and recent HIV testing. The sample size was 27,261 for knowledge and 25,542 for attitude and HIV testing. Intersectionality variables were wealth, education status, and residence. We conducted a multilevel logistic regression analysis. Adjusted odds ratio (aOR) and confidence interval (CI) with a data P-value ≤0.05 were statistically significant.
Results: Knowledge about HIV/AIDS was 47.0% and 13.9% among adults with triple advantages and disadvantages, respectively. Accepting attitudes towards people living with HIV were 75.7% and 16.0% among adults with triple advantages and disadvantages, respectively. Adults who undertook recent HIV testing results were 36.1% among triple advantages and 8.7% among non-advantages. Relative to adults with triple disadvantages, the odds of knowledge about HIV/AIDS were about four times (aOR = 3.94; 95% CI: 3.14 to 4.96) higher among adults with triple advantages. Adults with triple advantages were nine times (aOR = 9.17; 95% CI = 6.57 to 12.79) more likely to have an accepting attitude towards people living with HIV compared to adults with triple disadvantages. The odds of undertaking recent HIV testing were about six times (aOR = 5.95; 95% CI: 4.01 to 7.13) higher among adults with triple advantages than non-advantages.
Conclusions: HIV prevention services were lower among multiple intersecting disadvantages. The findings of this study imply that the country will not end its epidemic unless it prioritises those with multiple disadvantages. Access to primary care and public health services, community engagement, and multi-sectoral action are vital to narrowing the gap.

Socioeconomic inequality in combination HIV prevention services in Ethiopia: a population-based study

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: HIV/AIDS programmers have put efforts towards the provision of equitable combination prevention services. This study assessed the socioeconomic inequality and its contributors in combination HIV prevention services in Ethiopia.
Methods and materials: We used Ethiopian Demographic Health Survey data between 2005 and 2016 for HIV prevention knowledge and attitude variables, and 2011 to 2016 for recent HIV tests. The sample size was 27,261 for comprehensive knowledge of HIV/AIDS and 25,542 for an accepting attitude towards people living with HIV and recent HIV tests. The concentration curve (CC) and Erreygers concentration index (ECI) were employed to see socioeconomic inequity in comprehensive knowledge of HIV/AIDS, an accepting attitude towards people living with HIV, and recent HIV tests. Decomposition analysis was used to estimate the contributors to the observed socioeconomic inequity using generalised linear regression with a logit link function.
Results: The ECI value for inequities was positive, and the CC was below the line of equality in all services. Inequity was decreasing over time in comprehensive knowledge of HIV/AIDS (ECI =0.251 in 2005 to 0.201 in 2016) but increasing in accepting attitude towards people living with HIV (ECI = 0.388 in 2005 to 0.341 in 2016), and HIV testing (ECI = 0.200 in 2011 to 0.213 in 2016). Using the most recent population-based data (2016), 24.2% of socioeconomic inequity in comprehensive knowledge of HIV/AIDS was contributed by access to television, and 21.4% and 14.3% of inequity were contributed by household wealth status and education status, respectively. The major contributors to inequity in accepting attitudes towards people living with HIV were household wealth rank (22.9%), residence (13.2%), education status (10.0%), and watching television (4.1%). Inequity in undertaking an HIV test was explained by household wealth rank (61.1%), listening to radio (12.1%), education status (6.8%), and residency (6.3%).
Conclusions: The study revealed that combination HIV prevention services were concentrated among the higher socioeconomic groups. The findings of the study suggest that measures to improve HIV/AIDS prevention services and policies should give emphasis to socioeconomically disadvantaged groups. The country will not end its epidemic unless it gives priority to those left behind.

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Longitudinal trends in multiple sclerosis epidemiology in eastern Australia, 1951 to 2022

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background:
Of the various epidemiological features of multiple sclerosis (MS), the latitudinal gradient has been among the most consistent, where both prevalence and incidence increase with increasing latitude. In Australia, this latitudinal gradient has been well demonstrated, with frequencies of MS in Hobart (43°S) roughly 7-times that of tropical Queensland (19°S) and twice that of Newcastle (23°S). We here describe the longitudinal variation in MS prevalence and incidence across these three sites from the historical surveys in 1961 to our current surveys.

Methods:
Prevalence and incidence estimates were extracted from these previous publications or from our own data for the recent timepoints. Where age/sex-specific data were available from publications or current data, all prevalence estimates were age-standardised to the 1961 Greater Hobart population and the 2022 Australian population. Differences in prevalence and incidence were assessed by Poisson regression.

Results:
Prevalence ratios decreased since 1961: Hobart: Newcastle decreased from 2.0 to 1.0 in 2019/2021 and Hobart: Townsville from 4.9 to 1.9 in 2019/2022, while that between Newcastle: Townsville was more stable (2.5 in 1961 to 1.9 in 2021/2022). Incidence rate ratios since 1971-81 between Hobart: Newcastle were stable (1.9 in 1971-81 and 1.7 in 2011-2021), while that between Hobart: Townsville decreased from 5.8 to 1.3 in 2012-2022 and Newcastle: Townsville from 3.1 to 1.1 in 2012-2022.

Discussion:
The prevalence latitudinal gradient in eastern Australia has markedly attenuated, a consequence of significantly increasing incidence in Townsville, alongside proportional increases in incidence in Hobart and Newcastle, and changed population structures over time. Potential factors underlying these dynamics may include changes in environmental/behavioural.

Factors associated with hysterectomies in low and middle-income countries: a systematic review

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background: Although hysterectomy rates have declined in most high-income countries (HICs), it remains the second most frequently performed procedure among women worldwide. Although an expanding body of research has examined the factors affecting hysterectomies in high-income settings, studies remain limited in low and middle-income countries (LMICs). Differences in socioeconomic characteristics, cultural factors, and health system factors between HICs and LMICs suggest that the results of the studies conducted in HICs cannot be generalized to women in LMICs.

Objective: To systematically review and synthesize the evidence on factors associated with hysterectomies in LMICs.

Search strategy: PubMed, Embase, CINAHL, Scopus, and Web of Science were searched for relevant studies until June 30th, 2022. Besides, the reference lists of articles were searched to identify additional articles.

Selection criteria: Population-based studies in English using a quantitative research design conducted in LMICs.

Data collection and analysis: Relevant information was extracted using a data extraction sheet. The Newcastle- Ottawa quality assessment scale was used to evaluate the study quality. Due to variations in characteristics between studies, we used a random effects model to combine the effect size estimates.

Results: Twelve studies were included in the systematic review. Due to the smaller number of studies and variation in exposure measurement, we could perform a meta-analysis for only two exposure variables- level of education and sterilization. Educated women have lower odds (42%) of undergoing a hysterectomy (OR: 0.58, 95% CI: 0.23-0.92). The results of the meta-analysis for sterilization remained inconclusive. Advancing age and higher parity were the other factors associated with the increased risk of hysterectomies in LMICs. There was mixed evidence on the influence of household income on the risk of undergoing the surgery.

Conclusion: This systematic review and meta-analysis identified advancing age, lower education, and a higher number of children as factors associated with increased risk of hysterectomies in LMICs. The association of sterilization and hysterectomy remains inconclusive, warranting further research examining the socio-biological pathways and health system factors underlying the potential association.

Modelling the health impact of an equity-focused 2030 Tobacco Endgame in Australia

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3A - Lifestyle, Ballroom 1, October 20, 2023, 11:00 AM - 12:30 PM

Background:
The recently released National Tobacco Strategy 2023-2030 (NTS) includes a target to reach <5% smoking prevalence by 2030 in Australia, i.e., a 'tobacco endgame'. The proposed strategies to reach this radical target reflect a continuation of incremental policies employed over the last 10 years. Large inequities in tobacco use and harms by risk factors such as socioeconomic status (SES) are also not considered. Daily smoking prevalence among the most disadvantaged socioeconomic group remains almost twice the national average, and three times that of the highest socioeconomic group, with no change to these trends seen in recent years. Quantifying the potential health impact of an equity-focused endgame, by SES, will provide necessary direction for policymaking.

Aim:
To estimate the health impact, by health-adjusted life years (HALYs) and deaths averted, if a 5% smoking target were reached by 2030 in Australia.

Methods:
'Business as usual' (BAU), defined by a continuation of historic smoking trends, is compared to two hypothetical endgame scenarios: 1. an equitable 5% target reached by all SES strata, or 2. a more feasible 5% target with remaining inequalities by SES. Future BAU smoking prevalence is estimated by all combinations of age, sex and SES strata, with a simulated annealing approach. A combined Markov model and proportional multi-state life-table are used to estimate transitions between smoking (and vaping) states by strata, and quantify the difference in HALYs and deaths under the endgame scenarios compared to BAU.

Expected results:
This model is currently being calibrated. Preliminary results suggest that under BAU, smoking prevalence will not reach the 2030 target. It is expected that large health gains would result from a hypothetical endgame scenario, with greater gains under an equitable endgame.

Expected conclusions:
A tobacco endgame is unlikely to be achieved in Australia by 2030, particularly given ongoing inequity, including by SES. Radical, supply-sided actions, for example those recently legislated in Aotearoa/New Zealand's (A/NZ) equity-focused 'Smokefree Action Plan', are likely needed to rapidly reduce smoking prevalence and related inequities. Modelling of the effectiveness of potential endgame interventions will provide further guidance on enacting a much-needed equitable tobacco endgame plan in Australia.

Adherence to cancer prevention recommendations and risk of cancer: a prospective study

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: We examined associations between adherence to adaptations of 2018 World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) cancer prevention recommendations on diet, alcohol intake, body size, physical activity and smoking and total, exposure-related and site-specific cancer risk. Methods: 20,001 participants enrolled into the Melbourne Collaborative Cohort Study in 1990-94 aged 40–69 years who had their diet, body size and lifestyle re-assessed in 2003-07 were followed-up through June 2021. We constructed diet and standardized lifestyle scores based on core WCRF/AICR recommendations, including for alcohol intake, body size and physical activity, an additional score that incorporated weight change and sedentary behavior, and another including smoking. Associations with cancer risk were estimated using Cox regression, adjusting for confounders. Results: During follow-up (mean=16 years), 4,710 incident cancers were diagnosed. For highest quintile ('most adherent') of the standardized lifestyle score, compared with lowest ('least adherent'), a hazard ratio (HR) of 0.82 [95% confidence interval (CI)=0.74 to 0.92] was observed for total cancer. This association was stronger with smoking included (HR=0.74, 95% CI=0.67 to 0.81), but weaker when weight change and sedentary behavior were added, and when dietary factors alone were assessed. A higher score was associated with lower breast and prostate cancer risk, and lung, stomach, rectal and pancreatic cancer risk when smoking was included. Conclusions: Adherence to WCRF/AICR cancer prevention recommendations is associated with lower cancer risk. A component on abstinence from smoking is recommended for future revisions of the scoring system. Future studies should evaluate weights ascribed to individual components.

The COVID-19 pandemic and paediatric mental health hospitalisations in Australia

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

OBJECTIVES
To analyse data routinely collected by six large paediatric hospitals across five Australian states to examine the impact of the COVID-19 pandemic on mental health-related hospital presentations among children and adolescents during the pandemic period with restrictions and the period after the restrictions eased.

METHODS
We analysed the monthly mental health-related inpatient admissions and emergency department (ED) attendances data, using the Bayesian structural time series models. The COVID-19 restriction period was from March 2020 to December 2021 and the COVID-19 restriction-eased period from January to June 2022.

RESULTS
A total of 130 801 mental health-related hospital admissions (54 907) and ED attendances (75 894) were analysed. During the COVID-19 restriction period, there was a significant increase in inpatient admissions related to deliberate self-harm behaviours (82%, 95% credible interval [CrI], 7%–160%), as well as ED attendances related to overall mental health disorders (15%, 95% CrI, 1.1%–30%) and eating disorders (76%, 95% CrI, 36%–115%). The increase was higher among females and those living in the least socioeconomically disadvantaged areas. For example, there was a significant increase in deliberate self-harm behaviours related inpatient admissions among females (117%, 95% CrI, 27% to 210%) versus males (0.81%, 95% CrI, -73% to 74%) during the COVID-19 restriction period. There was also a widening gap between mental health-related presentations by sex and socioeconomic status during the COVID-19 restriction period. After the restrictions eased, there were slight declines in mental health-related hospital presentations; however, the numbers remained higher than the pre–COVID-19 levels.

CONCLUSIONS
The increase in mental health-related hospital presentations during the COVID-19 period calls for additional support for paediatric mental health care, particularly for children and adolescents with eating disorders and deliberate self-harm. These intervention support may help prevent unnecessary hospitalisations by children and young people vulnerable to specific mental health conditions during the time of crisis like the COVID-19 pandemic. The findings also call for additional mental health support targeted at children and adolescents of different socio-demographic characteristics to reduce the potential disparities in mental health-related hospital service use. It is important to monitor paediatric mental health service use as we enter "COVID-19 normal" period.

Contributions of causation and familial factors to longitudinal associations of wellbeing

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4C - Mental Health, Ballroom 3, October 20, 2023, 1:30 PM - 3:00 PM

Introduction
Considering wellbeing as a measure of health distinct from mental illness can allow for different insights into the familial and non-familial causes of mental health. The longitudinal correlation between wellbeing measures has been interpreted as being largely due to genetic factors. Causation between measures of wellbeing, as distinct from confounding from genetic or shared environmental factors, has not been considered.
Materials and Methods
Our sample consisted of 1,496 twins from The Twin study in Wellbeing using Integrative Neuroscience of Emotion (TWIN-E and TWIN-10 studies), who completed the COMPAS-W Wellbeing Scale at Baseline, 1 year after Baseline and 10 years after Baseline. Correlations within-individuals and within-pairs were assessed, including the within-pair correlation for the longitudinal change in wellbeing. The Inference about Causation by Examination of FAmiliaL CONfounding (ICE FALCON) model was applied between measures of wellbeing to assess evidence for causation, familial confounding, or a mixture of both causation and familial confounding.
Results
The change in wellbeing across time was uncorrelated within-pairs, suggesting familial factors do not influence how wellbeing changes longitudinally. ICE FALCON analyses between all timepoints for monozygotic & dizygotic pairs together and monozygotic pairs alone produced the same pattern of results; wellbeing at time 2 in an individual was associated with both wellbeing at time 1 in that individual and in that individual's co-twin when regressed individually. Wellbeing at time 2 in an individual was then regressed against wellbeing at time 1 in the individual and their co-twin together, where the coefficient for the co-twin attenuated to a greater degree than that of the individual. This suggests that wellbeing at time 1 causes wellbeing at time 2. In addition, familial factors were found to confound this relationship, with stronger confounding found for monozygotic pairs than dizygotic pairs.
Conclusions
There is evidence to support wellbeing at earlier timepoints causing wellbeing at later timepoints. Familial factors appear to influence wellbeing consistently across time. Our study suggests that successful interventions to improve wellbeing can cause changes up to 10 years in the future.

Rurality, deprivation and ethnicity: their intersection and impact on mortality

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2B - Health Equity 2, Ballroom 2, October 19, 2023, 1:00 PM - 2:30 PM

In New Zealand, there are inconsistent findings around inequities in health outcomes for people that live in rural and urban areas. One reason for this is likely to be the definition of 'rural' that is used, another is that there are stark and persistent socioeconomic and ethnic inequities in health outcomes. As a result, any rural-urban differences in health outcomes are often combined with Māori/non-Māori inequities or differences due to socioeconomic position. Determining whether or not this is a misrepresentation of the underlying reality is crucial for developing rural health interventions.

This study applied a recently completed, novel, and validated Geographic Classification for Health (5 categories: U1, U2, R1, R2, R3) to de-identified national routinely collected data available from Stats NZ (Census) and the Ministry of Health (Mortality Collection).

In 2018, just over 60% of the population lived in the most urban areas (U1); this group was relatively evenly distributed across the five quintiles of deprivation. In contrast, of the 50% of Māori that lived in U1, two times as many lived in the most deprived areas compared to the least deprived areas. For non-Māori, two-thirds lived in U1; of these, the number that lived in the least deprived area (Q1) was 1.5 times higher than the number that lived in Q5. Clear evidence of regional variation was apparent. Within GCH categories for Māori and non-Maori, there was a pattern of increasing age-sex standardised amenable mortality rates as socioeconomic deprivation increased. Compared to metropolitan (U1) non-Māori living in the least deprived quintile (Q1), standardised amenable mortality rates were 5 times higher for Māori in U1 living in the most deprived quintile (Q5), and around 4 times higher for non-metropolitan Māori living in Q4-Q5 and for Māori in R2/R3 and Q3. Our findings highlight that although there are different experiences of rurality and deprivation in different regions and for different population groups, it is evident that actions and policies need to focus particularly on supporting rural and remote Māori in areas of high socioeconomic deprivation where amenable mortality rates are the highest.

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Maternal prenatal and perinatal psychiatric hospitalizations and academic performance in adolescent offspring

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Introduction
To the best of our knowledge, this is the first register-based cohort study to examine the association between maternal psychiatric hospitalizations before, during, and after pregnancy and the risk of lower academic performance in their adolescent children.
Objective
To investigate the risk of lower academic attainment in adolescent offspring of mothers with psychiatric hospitalizations before, during, and after pregnancy
Methods
This administrative health data-based cohort study used linked data obtained from health and educational registries in New South Wales, Australia (n=168, 528). Maternal psychiatric diagnosis before, during, and after pregnancy was measured by using ICD-10. The educational performance of the offspring was assessed by National Assessment Program for Literacy and Numeracy (NAPLAN). A multiple Logistic regression model was employed to investigate the association.
Results
After controlling for relevant covariates, we found that adolescent children of mothers with psychiatric hospitalizations before, during, and after pregnancy were at increased risk of substandard academic performance in all domains, with the highest odds for numeracy [OR, 2.88 (95%CI 2.50-3.31)] followed by reading [OR, 2.08 (95%CI 1.81-2.38)], spelling [OR, 1.74 (95%CI 1.51-2.01), and writing [OR, 1.56 (95%CI 1.34-1.80). In our sex-stratified analysis, maternal psychiatric hospitalizations demonstrated a stronger impact on the academic performance of females in all academic domains. Severe psychiatric disorders showed greater effects when compared to other psychiatric disorders.
Conclusion
Early intervention strategies that aim to enhance academic performance in the children of mothers with psychiatric diagnoses before, during, and after pregnancy are needed.
Keywords: Psychiatric hospitalization, academic performance, maternal, offspring, adolescent

Associations of maternal smoking during Pregnancy with academic performance in adolescent offspring

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Introduction
Emerging epidemiological data have indicated associations between maternal smoking during pregnancy and a range of negative outcomes in children. Nevertheless, there is scant evidence reporting adverse effects on lower academic performance during adolescence.
Objective
To examine the association between maternal smoking during pregnancy and the risk of lower academic performance in adolescent children.
Methods
Data were obtained from the New South Wales (NSW) Perinatal Data Collection, which included all live births in the Australian state of NSW from January 2003 to December 2005. This was linked with NSW admitted data collection and National Assessment Program for Literacy and Numeracy (NAPLAN). A total of 168, 528 mother-offspring pairs were involved in the final analysis. Maternal smoking during pregnancy was assessed using self-reports of smoking during pregnancy. NAPLAN was used to assess the educational performance of the offspring. A logistic regression model was used to explore the association.
Results
The findings show that exposure to cigarette smoke in utero was associated with an increased risk of poor academic performance in adolescent offspring in all domains, including numeracy [OR, 2.43 (95%CI 2.30-2.58)], reading [OR, 2.49 (95%CI 2.37-2.62)], writing [OR, 2.97 (95%CI 2.84-3.11)] and spelling [OR, 3.12 (95%CI 2.98-3.26)]. In our sensitivity analysis by gender, maternal smoking during pregnancy demonstrated stronger effects on the academic achievements of females in all domains.
Conclusion
The results show that exposure to cigarette smoke in utero was associated with an increased risk of lower educational achievements in adolescent children with greater effects in female than male children in all domains. The findings suggest the potential for targeted screening and early intervention of academic performance in exposed offspring.
Keywords: Psychiatric hospitalization, academic performance, maternal, offspring, adolescent

Healthy diet associated with less clinical severity in people with multiple sclerosis

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background:
Multiple sclerosis (MS), is a progressive neurological disorder with diverse symptoms, commonly including fatigue, disability, and depression. Diet has been implicated in MS risk and progression but the nature of this relationship is understudied.
Aims:
To assess diet and its relationships with MS severity (ambulatory disability) and symptoms (fatigue, depression and anxiety) in a national UK sample of people with MS.
Method:
Data were extracted from the UK MS Register, a national register of people with MS capturing clinical, lifestyle, and health outcomes across the UK. Diet intake was assessed using self-completed digital EPIC-Norfolk Food Frequency Questionnaire, limited to energy content between 3,000 and 20,000 kJ. Principal components analysis was applied with orthogonal rotation, from which component scores were estimated for each participant. Clinical severity measures included ambulatory disability (MS Walking Scale, MS Impact Scale-Physical (MSIS)), fatigue (Fatigue Severity Scale), and depression and anxiety (Hospital & Anxiety Depression Scale). Diet and clinical severity relationships were assessed by quantile, log-binomial, and log multinomial regression, as appropriate, adjusted for energy content, age, sex, and MS phenotype.
Results:
In 2,278 and 2,887 participants from 2016 and 2022, two diet components were derived: Prudent and Western. In 2016 and 2022, Prudent score was associated with lower MSWS (aβ=-1.41; aβ=-1.02), lower MSIS-Physical (aβ=-0.83; aβ=-1.15), and lower frequencies of depression (PR=0.91; aPR=0.86). Western score was associated with higher MSWS (aβ=+3.07; aβ=+3.21), higher MSIS-Physical (aβ=+1.89; aβ=+2.43), and higher frequencies of fatigue (aPR=1.09; aPR=1.09), depression (aPR=1.20; aPR=1.26), and anxiety (aPR=1.10; aPR=1.15).
Discussion:
Healthier diet pattern scores were robustly associated with disability and depression, and worse diet quality associated with 4 measures of MS clinical severity. These findings support a potential role for positive diet change to improve health outcomes in people with MS. Prospective studies are needed to confirm these relationships.

Housing and Homelessness in Adolescence: Evidence from Growing Up in New Zealand

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1B - Health Equity 1, Ballroom 2, October 19, 2023, 10:30 AM - 12:00 PM

Housing quality, safety and stability has a profound impact on the wellbeing and health equity of young people. Homelessness is also a growing concern for ensuring healthy lives for children and young people, particularly in Aotearoa New Zealand. The longitudinal study Growing Up in New Zealand has followed the housing context for over 6000 children since before their birth in 2009 and 2010, demonstrating high levels of residential mobility, ethnic and socioeconomic inequities in access to home ownership, and inequitable exposure to poor housing quality (such as dampness, cold and mould). This paper focuses on the recent information gathered from the young people of Growing Up in New Zealand when they were 12 years old, highlighting the patterns of young people's housing by tenure type, ethnicity and socioeconomic status as well as patterns in residential mobility from the time they were born.

Home-ownership was the most common tenure type for young people and their whānau (families) at age 12 years, with 23% living in private and public rentals. Tenure type was associated with housing quality, with poorer quality experienced by those living in public housing and private rentals. Residential mobility was again common – also patterned by housing tenure, ethnicity and socioeconomic position. The reasons for moving home were described, with 21% of moves 'involuntary' (for example due to loss of tenancies, financial hardship, family separations). Recent experience of homelessness was also found for over 300 young people in this cohort. The most common form of homelessness experienced was staying with family/friends because they had nowhere else to live, with small but important numbers of young people describing other forms of emergency and transitional housing as well as living on the streets or in a car/caravan/garage.

This important cross-sectional and longitudinal information housing quality, safety and security are associated with the persistent inequities in wellbeing observed in Aotearoa New Zealand, particularly for Māori and Pacific young people. Therefore, policies that address housing quality and instability provide opportunities to achieve health equity and meet the New Zealand Government's goals towards Child and Youth Wellbeing.

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The performance of MHI-5 depression screening tool in people with multiple sclerosis

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Background:
Depressive symptoms are highly prevalent among people with Multiple Sclerosis (pwMS), with approximately 27% of pwMS reporting clinically significant levels of depression. Self-reported measures of depressive symptoms, such as Patient Health Questionnaire (PHQ), have demonstrated utility in determining the presence and severity of depressive symptoms. The five-item Mental Health Inventory (MHI-5) nested within the SF-36 and MSQoL-54 may enable clinicians to detect depressive symptoms, as part of a larger assessment of quality of life, however, MHI-5 has not previously been assessed as a depression screening tool in pwMS.

Aims: To assess the performance and agreement of MHI-5 in comparison to the PHQ-2 and 9 depression screening tools in a cohort of pwMS.

Methods:
Data from the Health Outcomes and Lifestyle in a Sample of pwMS (HOLISM; n=644) was analysed. Reliability of MHI-5 compared to PHQ-2/9 was assessed by unweighted Kappa test. Validity and optimal cut-off of MHI-5 indicating depressive symptoms were assessed by: 1. comparisons with PHQ-2>2 and PHQ-9>9 results, 2. calculation of area under the ROC curve (AUC), and 3. sensitivity and specificity analyses.

Results:
MHI-5 (mean 73.2 ±17.6) showed significant agreement with PHQ-2>2 and PHQ-9>9 (k=0.74 and 0.70, $p<0.001$, respectively). The optimal cut-off for MHI-5 to identify depressive symptoms was 62 when compared with PHQ-2 (AUC=0.92, 95% CI=0.89-0.96; sensitivity=83%; specificity=90%), and 66 when compared to PHQ-9 (AUC=0.85, 95%CI=0.82-0.89; sensitivity=74%; specificity=76%).

Conclusion:
MHI-5 is comparable to PHQ-2/9 for detecting depressive symptoms in pwMS. Studies utilising the SF-36 and MSQoL-54 may potentially assess the presence and severity of depressive symptoms using the nested MHI-5, pending confirmation in further studies.

Long COVID: Persistence of symptoms six-months after SARS-CoV-2 infection in Western Australia

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4B - Infection/Injury 2, La Trobe, October 20, 2023, 1:30 PM - 3:00 PM

Objective: To quantify the proportion of persons with long COVID 3 months after initial SARS-CoV-2 diagnosis experiencing persistent symptoms at 6 months and describe symptoms, health service utilisation and work/study absenteeism in this cohort.
Methods: We conducted a follow-up survey of individuals testing positive for SARS-CoV-2 between 16 July and 3 August 2022 who met the case definition for long COVID when surveyed at 3 months post infection. In this study, long COVID was defined as the presence of new or ongoing COVID-19-related symptoms or health issues persisting 6 months post-diagnosis. Over 90% (n=2,086) of those with long COVID at 3 months agreed to further follow-up and were sent an SMS with a survey link 6 months after SARS-CoV-2 infection. Three outcomes were assessed: the persistence of long COVID, health service utilisation, and reductions in work/study. We used Poisson regression with robust error variance to examine factors associated with the outcomes of interest.
Main findings: 1,293 participants completed the follow-up survey, at which time 772 (59.7%) had persistent long COVID. Respondents who reported long-standing health issues prior to their initial SARS-CoV-2 diagnosis were more likely to have long COVID at 6 months than those without long-standing health issues (RR:1.2, 95% CI: 1.1-1.3). Fatigue was the most commonly reported symptom (74.6%), followed by difficulty thinking or concentrating (62.4%). A third of individuals with persistent long COVID sought medical care for associated symptoms 150- to 180-days post-infection, most commonly consulting a General Practitioner (32.3%, n=249); emergency department presentations (3.2%, n=25) and hospital admissions (1.8%, n=14) were rare. Of those with long COVID who had stopped or reduced hours of work/study at 3 months, 65.6% (82/125) reported not resuming work/study at 6 months. Having long-standing health issues at the time of infection was a predictor of not resuming work/study compared to those without long-standing health issues (RR=1.4, 95% CI 1.1-1.8).
Conclusion: 60% of people with long COVID at 3 months had not fully recovered by 6 months post SARS-CoV-2 Omicron infection, and substantial proportions continued to seek medical care and had not resumed work or study, emphasising the need for ongoing support.

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Association between residential greenness and diabetes risk in Indian adults

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Residential exposure to greenness can provide health benefits to the populations by minimising the exposure to environmental risks and promote more physical exercise. However, it is unclear if greenness affects diabetes, especially in developing nations like India with limited administrative health data. We aimed to assess if a cross-sectional association existed between residential greenness and the odds of prevalent diabetes.

We used the MODIS Normalised Difference Vegetation Index (NDVI) product, which has 16 days temporal and 250m spatial resolution that represent vegetation cover. We used the fifth round India's National Family and Health Survey (NFHS-5) data which collects information on a range of health, socio-economic, demographic, and anthropometric variables, among others. In this study, the random glucose (measures of blood sugar at any time of the day, without overnight fasting) levels, which is measured using finger prick method, of participants were assessed as an indicator of blood sugar levels. The mean random glucose level observed was 111.5 mg/dL (SD ±28.09 mg/dL). We categorised the glucose level into two categories with no diabetic (random glucose level < 200 mg/dl) and diabetic (random glucose level > 200 mg/dl), based on standard guidelines. We used logistic regression model to adjust for age, gender, education, smoking, alcohol consumption, type of residence (urban/rural), and air pollution (PM2.5).

The prevalence of diabetes among in the sample population (total size = 782,118) was 1.20%. We found surrounding NDVI was inversely associated with odds of having diabetes, with an IQR increase in NDVI having an OR of 0.96 (95% CI: 0.94 - 0.98). The cross-sectional findings suggest that exposure to residential greenness may affect odds of prevalent diabetes in India. These initial findings will be further expanded in additional sensitivity analyses using different model specifications and covariates.

Pandemic impact on admissions and readmissions among NSW congestive heart failure patients

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
New South Wales, Australia had among the lowest COVID-19 incident rates between 2020 and 2021 until international border and public health restrictions were eased in late 2021. It was among the few, large jurisdictions internationally to experience more than one pandemic wave that was proceeded by no incidents of COVID-19.
Methods
Using congestive heart failure (CHF) as a case example of the impact of the pandemic on high users of hospital services, we used single and controlled interrupted time-series designs, using segmented regression analyses, to assess the immediacy of impact of the commencement of the first COVID-19 and subsequent Delta waves on admissions, 30-day readmission and average length of stay, as well as following changes in trends. The NSW Admitted Patient Data Collection linked with the Registry of Births, Deaths, and Marriages for a census of all admissions to public and private hospitals from 2016 to 2021 was used.
Findings
Among CHF patients, there were immediate reductions in weekly admissions per 100,000 population after the first COVID-19 wave (-1.89, 95%CI: -3.03, -0.75) and Delta (-1.58, 95%CI: -2.85, -0.30) and reductions in readmission rates (-2.30% and -3.59%, respectively) were sustained with a positive trend change of 0.29% per week (95%CI: 0.10, 0.48) after Delta. In terms of average length of acute hospital stay, no statistically significant level, or trend change following commencement of the first COVID-19 and subsequent Delta waves was observed.
Conclusion
The COVID-19 pandemic and public health restrictions in New South Wales resulted in rapid and sizable reductions in the rate of acute admissions and unplanned readmissions among CHF patients. Future research should focus on determinants of these outcomes, including shifts in behaviour of populations and providers, among non-COVID patients during the pandemic.

Approaches to identify health disparities by ethnicity using Australian Census ancestry data

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3D - Methods 1, Delacombe, October 20, 2023, 11:00 AM - 12:30 PM

Objective: Ethnicity is not routinely measured in Australian health data despite increasing ethnic diversity of the Australian-born population. The proxy of ancestry is measured in the Census, however even when available this data can be difficult to use due to the lack of a defined reference group, different interpretations of the question, the presence of two responses, and the high degree of granularity. We aimed to work with an expert and community panel to develop an approach to using this data to group the population by ethnicity to examine health disparities.

Methods: An expert panel was formed including representatives from the Federation of Ethnic Communities' Councils (FECCA) and the Australian Bureau of Statistics (ABS), a demographer, an Aboriginal academic (Darkinjung/Ngarigo), and epidemiologists with experience using linked data. A community panel was formed through an expression of interest process through FECCA and local health districts. We used an iterative consensus method where literature review and analysis of data was used to inform panel discussions. Data analysed was 2016 Census data linked to death registrations for 2016-2021 in 20.9 million people. We examined the health outcome of all-cause mortality.

Results: The approach led to a number of recommendations including: (1) To group those reporting any combination of Irish, Scottish, English, Welsh and Australian ancestry responses as an Anglo-Celtic reference group; (2) To create multiethnic groups for those reporting two ancestries; (3) To use a prioritization approach for those reporting Australian + another ancestry where respondents were categorized based on the other ancestry; (4) To analyse data at the maximum level of granularity to identify inequalities, but then collapse up granularity where no disparities were identified to facilitate conveying results to community members and policy makers.

Conclusions: We used an iterative consensus approach to develop a set of principles for how Census Ancestry data can be used to identify health disparities by ethnicity. The ability to link health datasets to the Census through the Multi-Agency Data Integration Project (MADIP), mean that such recommendations are important to be able to fully harness the value of Census data in identifying health disparities.

Patient-reported experiences associated with readmission risk among adults with chronic health conditions

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2A - Chronic Disease, Ballroom 1, October 19, 2023, 1:00 PM - 2:30 PM

Aims
Adults with chronic health conditions represent a large share of patients served by health systems in nations with advanced economies, and potentially preventable inpatient stays among this population are estimated to be high and costly. This study quantifies the association between patient reported measures (PRMs) and readmission to inform efforts to improve hospital care.
Methods
A retrospective, cross-sectional study was conducted with adults who had chronic obstructive pulmonary disease (COPD) or congestive heart failure (CHF) and were admitted for acute care in a public hospital in New South Wales, Australia for any reason (n = 2394 COPD and 2476 CHF patients in 2018–2020). Patient- level survey data were linked with inpatient data for one year prior to risk adjust outcomes and after discharge to detect all cause unplanned readmissions. Shared-frailty Cox regression models were used to assess the association between key aspects of patient experience and readmissions.
Results
Ninety-day readmission rates for respondents with COPD or CHF were 17% and 19%. Crude rates for adults with COPD were highest among those who reported that hospital care and treatment helped "not at all" (28%), compared to those who responded, "to some extent" (20%) or "definitely" (15%). After accounting for patient characteristics, adults with COPD or CHF who said care and treatment didn’t help at all were at twice the risk of readmission compared to those who responded that care and treatment helped "definitely" (Hazard ratio for COPD 1.97, CI: 1.17–3.32; CHF 2.07, CI 1.25–3.42). Patients who offered the most unfavourable ratings of overall care, understandable explanations, organised care, or preparedness for discharge were at a 1.5 to more than two times higher risk of readmission. Respect and dignity, effective and clear communications, and timely and coordinated care also matter.
Conclusion
PRMs were strongly associated with readmission even after accounting for risk related to age and co-morbidities. More moderate ratings were associated with attenuation of risk, and the most positive ratings were associated with the lowest readmission rate. These results suggest that increasing each patient’s positive experiences progressively reduces the risk of adults with chronic conditions returning to acute care.

Characteristics and outcomes of Hyperemesis Gravidarum for women and babies in NSW

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3C - Maternal/Women's, La Trobe, October 20, 2023, 11:00 AM - 12:30 PM

Background: Hyperemesis Gravidarum (HG) is a debilitating complication of pregnancy characterised by severe nausea and vomiting in pregnancy. This condition has a significant impact on the physical and mental health of women and their babies, with considerable costs and burden to women, their families, and the health system. The aims of this study were to determine prevalence rates of HG in NSW and examine the maternal characteristics and birth outcomes associated with this condition.

Methods: Women who gave birth in NSW from 2010 to 2019 were identified from the NSW Perinatal Data Collection. Linked NSW hospital and emergency data were used to identify health service visits within pregnancy. HG was identified using relevant ICD-10-AM/ICD-9/SNOMED diagnosis codes and classified by at least one hospital admission or emergency presentation for HG during pregnancy. HG prevalence was calculated as a proportion of all pregnancies and negative binomial regression used to examine standardised prevalence trends over time. Chi-Square analyses were used to examine associations between HG status (yes/no) and maternal and pregnancy characteristics and birth outcomes.

Results: Of the 955,107 pregnancies in the study period, 21,702 were classified as HG, corresponding to a prevalence rate of 2.3%. The rate of HG in pregnancy increased over the 10-year period, with an average annual increase of 6.8% (95% CI: 5.3-8.3). HG rates were higher among teenage mothers (4.9%), women in regional/remote areas (2.9%) and women in the 1st/2nd quintiles of socioeconomic disadvantage (2.9%). Among HG pregnancies, the proportion of multiple births (2.7% versus 1.4%, p<.0001), smoking during pregnancy (11.7% versus 9.5%, p<.0001) and asthma in pregnancy (0.7% versus 0.3%, p<.0001) was slightly higher than in pregnancies with no HG. Babies born to mothers with HG had higher rates of preterm birth (<37 weeks; 11.1% versus 7.4%, p<.0001), low birthweight (<2,500g; 9.9% versus 6.3%, p<.0001), and infant formula feeding at discharge (13.5% versus 9.7%, p<.0001) compared to babies born to mothers without HG.

Conclusions: Women and babies had differing characteristics and outcomes by HG status. Providing NSW estimates of HG burden ensures population-based evidence is included in the planning, development, and delivery of HG services.

Machine learning to identify people who inject drugs for hepatitis C surveillance

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2D - Student Session, Delacombe, October 19, 2023, 1:00 PM - 2:30 PM

Background: People who inject drugs are the population most at risk of hepatitis C infection and related sequelae. In Australia, routinely extracted de-identified electronic medical records (EMR) from sentinel primary care clinics are used to monitor trends and evaluate the impact of interventions. However, a major limitation is the absence of systematically recorded behavioural risk factors. Machine learning methods have demonstrated success in phenotyping risk groups where risk factor data are incomplete.

Aims: develop a machine learning model that identifies people who inject drugs and uncover important phenotyping variables for this population using primary care EMRs.

Methods: We used an iterative active learning approach to build a Random Forest classification model using EMRs from an Australian sentinel surveillance system, 2009-2022. The model was trained and tested (70/30) on a balanced sample of 2422 people who inject drugs (indicated in practitioner notes) and 2422 randomly selected patients. Predictive performance was measured using accuracy (correct predictions/total). Once tested, we ranked features (88 derived variables) in order of importance and manually reviewed false positives reclassifying them to people who inject drugs based on pre-defined rules. To find important variables for phenotyping people who inject drugs, we iterated these steps, each time retraining the model with the highest-ranking feature removed and newly classified people who inject drugs added to the sample, until there was no plausible explanation for the highest-ranking feature.

Results: The model demonstrated high predictive accuracy (92.85%). The most important features were prescription of opioid agonist treatment, the presence of a hepatitis C test record, and total hepatitis C tests proportional to the time between first and last clinical visit. Once these features were removed less obvious features appeared including prescriptions for general medications, whether care was provided by a doctor or nurse, time between first and last clinical visit and HIV testing.

Conclusion: While the most important features discovered are known to predict injecting drug use, the iterative approach uncovered variables that can phenotype people who inject drugs when known predictors are unavailable. We built a highly predictive classifier for monitoring hepatitis C among an important risk group using EMR data.

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The causal effect of tooth loss on bullying in adolescents

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background
Dental caries (tooth decay), periodontal disease (gum disease) and dental trauma can lead to premature tooth loss. Tooth loss negatively impacts daily functioning by restricting mastication, impacting on speech, smiling and aesthetics. We examined if tooth loss leads to bullying and victimisation among adolescents in Australia using a population-based cohort study.

Methods
We analysed data on 15,150 observations from 4,427 adolescents from wave 3 (age 8-9 years) to 6 (aged 14-15) of the Longitudinal Study of Australian Children. Our exposure was tooth loss that may due to dental caries or any accident. The outcome was bullying as reported by the parents in the last 12 months. We fitted a fixed effects regression model which omits time invariant confounding and adjusted for time varying confounding factors including income, maternal education and disability. We performed sensitivity analysis to examine both lagged effect of tooth loss on bullying and using a negative control of exposure to substantiate our finding.

Results
At baseline 11% of the adolescents lost teeth due to either dental caries or accident. Compared to those adolescents who did not experience tooth loss, those who experienced tooth loss had 1.42 times higher odds (95% Confidence Interval 1.15 – 1.77) of experiencing bullying. Both sensitivity analyses substantiated our findings.

Conclusion
Our study shows that adolescents who experience preventable tooth loss are more likely to experience bullying. Therefore, tooth loss during adolescence can leave long-lasting negative impact on adolescents and consequently may lead to poor mental health.

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Pharmaceutical opioid use and cancer incidence in the 45 and Up Study.

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background:
The International Agency for Research on Cancer recently classified opium consumption as carcinogenic to humans, causing larynx, lung and bladder cancer. We evaluated the relationship between pharmaceutical opioid use and cancer incidence in a New South Wales (NSW) prospective cohort study.

Methods:
Cox proportional hazards regressions were used to calculate hazard ratios (HR) and 95% confidence intervals (CI) for cancer incidence in relation to opioid dispensing claims within 12 months prior to baseline, among 64,464 (24%) of 267,357 participants in the 45 and Up Study (2005-2009). Opioid dispensing claims were ascertained via record linkage to the Pharmaceutical Benefits Scheme (PBS; 2005-2009; provided by Services Australia). Cancer incidence was ascertained via linkage to the NSW Cancer Registry to December 2019. Participants without concessional PBS claims, diagnosed with cancer prior to baseline, and who died within six months of baseline, were excluded. Participants were censored at the study period conclusion (December 2019), cancer diagnosis, or death (ascertained from the NSW Registry of Births, Deaths and Marriages to December 2019). Record linkage was performed by the Centre for Health Record Linkage (CHeReL). Secure data access was provided by the Secure Unified Research Environment (SURE). Exposure variables included number of opioid dispensing claims, annual per person oral morphine equivalents, opioid strength, duration of use, natural or synthetic opioids, opioid receptor type, and opioid acting duration.

Results:
Of the included participants, 12,829 (19.1%) had at least one opioid dispensing claim within 12 months prior to baseline. Over a median 11.3 years follow-up, 12,277 (19%) participants were diagnosed with cancer. Participants with at least one opioid dispensing claim prior to baseline had significantly higher risk of lung cancer (HR=1.18; 95%CI=1.04-1.34), respiratory cancers combined (1.18; 1.04-1.33) and urinary cancers combined (1.22; 1.01-1.47), compared to participants not dispensed opioids. Risk for oesophageal, liver, pancreatic and bladder cancer, and all cancers combined, was significantly increased in association with the other exposure variables examined.

Conclusions:
Pharmaceutical opioid use is associated with increased risk of several types of cancer. These data will be key to informing the Opioid Cohort Consortium (OPICO), a global pooled analysis of opioids and cancer risk.

Comparing actual and modelled morality in the absence of influenza transmission

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Influenza-associated mortality is estimated using an excess mortality model that includes a proxy for influenza. Possible influenza proxies include either on their own or in combination: test positive rates, notified influenza cases, GP influenza-like-illness presentation rates, emergency department presentations and healthcare seeking behavior for influenza-like-illness. Previously it has not been possible to assess how the choice of proxy influences the veracity of the model's estimated mortality under the counterfactual: no influenza activity. However, in 2020 and 2021 measures to limit the spread of COVID-19 temporarily eliminated influenza in Australia. Within Queensland, following the relaxation of restrictions on 1 June 2020, residents were able to resume most activities without having to contend with the transmission of influenza or COVID-19. This provides a unique opportunity to observe morality under the counterfactual.
We will compare morality data for the period June 2020 to October 2021 in Queensland with the estimated mortality which will be derived by parameterizing models using historical data, applying different proxies and assuming no influenza activity. We will demonstrate the impact of the choice of proxy on the difference between the actual and estimated mortality assuming no influenza activity. By demonstrating the impact of proxy choice, the project aims to improve the quality and consistency of mortality estimates associated with influenza and with other similar diseases such as COVID-19 and RSV.

p-value is a Poor Measure of Evidence Strength in Multiple Sclerosis Research

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

The ‘p value’ from the null hypothesis significance testing framework plays a central role in scientific research. Nevertheless, it provides a limited measure of strength of evidence for or against the null hypothesis, especially when interpreted using the conventional threshold of $p < .05$. The overall aim of this study was to examine the strength of evidence in the multiple sclerosis literature to determine whether p values provided strong grounds for statistical inference. This was achieved via a Bayesian reanalysis of published p values.
We examined 135 issues across three journals of varying impact-factors. After screening for inclusion criteria, we extracted 711 p values which were converted to the Bayes factors.
The results indicated that the use of the conventional p values threshold of $p < .05$ provided a poor measure of strength of evidence. For the statistically non-significant results, the proportions of ambiguous evidence were 100% for p between .05 and .1 and 39% for $p > .1$. For those results that were interpreted as statistically significant, this proportion of ambiguous results was 60% for p between .005 and .05. Only at a threshold of $p < .005$ did the proportion of ambiguous findings reach 0%.
These findings confirmed that $p >= .05$ does not provide conclusive evidence for the null hypothesis and $p < .05$ might not be a sufficient statistical significance threshold. If p values must be used for statistical inference, a threshold of $p < .005$ is appropriate. Bayesian statistical methods should be considered as a complement to conventional frequentist methods, especially for non-significant findings or situations where p values fall between .005 and .05.

Independent and additive healthy lifestyle behaviours and health outcomes in multiple sclerosis

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4E - Conversation Starter 2, Ballroom 2, October 20, 2023, 1:30 PM - 3:00 PM

Background:
Engaging with healthy lifestyle behaviours has been associated with better health outcomes in people with multiple sclerosis (pwMS). However, it is unclear whether specific lifestyle behaviours are beneficial or whether engaging in multiple healthy behaviours has potential additive benefits.

Aims:
To assess the independent and additive associations of healthy lifestyle behaviours on fatigue, depression, and disability.

Methods:
Data from baseline, 2.5-, and 5-year surveys from the Health Outcomes and Lifestyle in a Sample of pwMS (HOLISM; n=839) were analysed. Behaviours assessed were consumption of a no meat/dairy plus omega-3 supplementation diet, ≥once/week meditation practice, ≥30min/day ≥thrice weekly physical activity, non-smoking, and vitamin D intake (≥5000IU/day supplementation and sun exposure). Linear mixed effects models assessed associations between individual and number of behaviours and health outcomes of fatigue (via fatigue severity scale), depression (via patient health questionnaire), and disability (via patient determined MS severity score).

Results:
At baseline, physical activity and non-smoking were inversely associated with all 3 outcomes; additionally, diet was associated with lower depression and fatigue, and meditation with lower depression. Prospectively, associations with physical activity and outcomes were retained. Prospective associations were observed between non-smoking and reduced fatigue (β = -0.33 points), and between diet and reduced disability (β = -0.30 points) at 5- but not 2.5-year. Vitamin D intake was associated with reduced fatigue (β = -0.34 points) at 2.5-year. At baseline, engagement with ≥3 behaviours was associated with reduced depression, fatigue, and disability with strongest associations observed when engaging with 4-5 behaviours. Prospectively, engagement with ≥2 behaviours was associated with reduced fatigue (β = -0.36 - -0.71 points) at 2.5-year, and engagement with ≥3 behaviours with reduced depression (β = -0.49 - -0.54 points) and disability (β = -0.42 - -0.43 points). At 5-year, engagement with multiple behaviours was associated with optimal outcomes.

Conclusions:
Independently, physical activity consistently showed benefit on health outcomes of fatigue, depression, and disability. Engaging in multiple healthy lifestyle behaviours is associated with additive benefits on health outcomes. Future research to elucidate which behaviors may be primary contributors are needed; this may inform both clinical and self-management for people with MS.

Physical Activity is Associated with Improved Quality of Life in Multiple Sclerosis

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background
Undertaking physical activity (PA) is associated with higher quality of life (QoL) in people with multiple sclerosis (pwMS). As pwMS are less active than the general population, assessing minimum levels of PA required may inform best practice guidelines for this community.

Objective
To determine the minimum duration and intensity of PA required to observe a positive association with QoL.

Methodology
Data from 1,401 pwMS was analysed. PA was queried by International Physical Activity Questionnaire (IPAQ) and assessed based on World Health Organisation recommendations for adults (≥150min/week), as well as based on daily duration (< 15 min, ≥15 min, ≥30 mins, ≥60 mins) and overall intensity (low, moderate, high). QoL was queried by MSQoL-54. Associations were assessed by multivariate linear-regression models adjusted for appropriate confounders.

Results
Cross-sectionally, ≥150/week PA was associated with 12% higher QoL. PA duration and intensity were dose-dependently positively associated with QoL. Prospectively, over 2.5 years, associations persisted for ≥150min/week (aβ= 1.08, 95%CI: 0.01-2.15), and moderate PA intensity (aβ= 1.35, 95%CI: 0.23-2.47), but not daily durations.

Conclusion
Undertaking PA of ≥150min/week appears to be beneficial for improved QoL in pwMS. Moderate intensity being optimal thus should be considered in recommendations of PA for well-being. Future studies assessing type of PA and temporality may provide further insight.

Engagement in an online educational lifestyle-related course for people with multiple sclerosis

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4F - Digital Posters, October 20, 2023, 1:30 PM - 3:00 PM

Background:
Few educational courses designed for people living with multiple sclerosis (plwMS) are available online. We developed a novel educational online course to provide information on lifestyle-related risk factors for plwMS, the Multiple Sclerosis Online Course (MSOC), and examined barriers and enablers of engagement in the MSOC by plwMS.

Aim:
To examine associations between participants' demographic and clinical factors and MSOC commencement and completion.

Methods:
Two MSOCs were developed by researchers in conjunction with plwMS for testing in a large randomised controlled trial (RCT); (1.) the standard-care MSOC based on information from MS websites and (2.) the intervention MSOC based on the Overcoming MS program, an evidence-based lifestyle modification program for plwMS. PlwMS were internationally recruited for the RCT via online advertisements. Baseline data on participant demographics (e.g., age, education, marital status, employment) and clinical characteristics (e.g., MS type, disability, fatigue) were collected prior to participants gaining access to the MSOC. Associations between MSOC commencement and completion and demographic and clinical factors were examined using multivariate logistic and linear regression, adjusted for relevant confounders.

Results:
Amongst 663 participants enrolled in the RCT, no difference in MSOC engagement was observed across the two study arms; of all participants enrolled in the RCT, ~69% commenced the MSOC and ~43% completed the MSOC. A university degree was associated with a higher likelihood of MSOC commencement (24%) and completion (31%). Having a partner and receiving support from friends, family or significant others was associated with a higher likelihood of MSOC commencement (22%) and completion (18%), respectively. Participants with healthier lifestyle behaviours; higher quality-of-diet, following a diet program or practising meditation were 54%, 22% and 37% more likely to complete the MSOC, respectively. Progressive MS type was associated with a lower likelihood of commencing (16%) and completing (26%) the MSOC.

Conclusion:
Consideration of the influence of participants' demographical and clinical factors may help improve engagement with and/or completion of MS-related online courses that may be applicable to other online educational courses.

Inequalities in hospital outcomes for Australian children from priority populations

Dr Jahidur Rahman Khan[1], Dr Cecily Keogh[2], Seaneen Wallace[2], Safa Majidi[2], Dr Anna Van Beek[2], Anna Kearns[2], Dr Nan Hu[1], Professor Raghu Lingam[1], Professor Karen Zwi[1,2]
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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background: Priority populations include Indigenous, culturally and linguistically diverse (defined as preferred language and/or country of birth), national disability insurance scheme recipients, refugee/asylum seeking, and out-of-home care backgrounds. A substantial proportion of children and young people in New South Wales, Australia, belong to priority populations. Disparities in hospital access and outcomes are known for children and adolescents from priority populations. However, previous studies have focused on limited access and/or outcome metrics and a specific priority population, failing to document the full extent of inequities. This study is the first to evaluate inequalities in access and outcome measures for children and young people from priority populations.

Methods: We analysed prospectively collected data (January 2015 and December 2019) from the Sydney Children's Hospital Network (SCHN), the largest provider of children's services in Australia. Hospitalisation due to a chronic condition (defined based on diagnosis code), potentially preventable hospitalisation, discharge against medical advice (DAMA), readmission within 28 days, and length of stay (LOS) were the outcome measures. Generalised estimating equations quantified the association between priority population status and outcome measures, controlling for sociodemographic factors (age, sex, residential area socioeconomic status) and patient-level clustering.

Results: Data was analysed from 253,934 inpatient admissions by children and young people aged 0-17 years. There were 52.4% of admissions by children and adolescents for chronic conditions and 28.6% for potentially preventable hospitalisations. DAMA occurred in 0.66% of admissions, and 22.7% were readmitted within 28 days of their last admission. The average LOS was 2.34 days (SD 3.44, excluding outliers). Priority population children and young people were more likely to have chronic condition-related hospitalisation (adjusted odds ratio [AOR] 1.11, confidence interval [CI] 1.08-1.14; $p<0.001$), potentially preventable hospitalisation (AOR 1.39, 95% CI 1.35-1.42; $p<0.001$), DAMA (AOR 1.31, 95% CI 1.16-1.47; $p<0.001$), readmission (AOR 1.55, 95% CI 1.48-1.62; $p<0.001$), and a longer LOS (adjusted β 0.21, 95% CI 0.17-0.24; $p<0.001$).

Conclusions: The study reveals large disparities in healthcare status and hospital usage among children and young people from priority populations. Monitoring health outcomes and implementing targeted interventions for populations with poorer outcomes is essential to addressing inequity.

Causation between body size measures Over Time: Implications for timing of prevention

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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

Background
Body size measures including height, weight, body mass index, waist circumference and hip circumference are associated with the development of cancer, cardiovascular disease, type 2 diabetes, and some psychopathologies.
Many genetic and environmental risk factors interact to affect body size throughout the lifespan. Therefore, associations between body size measures over time may not be due to a causation, but the result of confounding by genetic and environmental factors. Understanding causal effects that body size measurements have over time and on themselves and one another is critical for identifying effective targets and timings for intervention, especially interventions intended to influence body size to improve health.
Methods
Our study included 41,496 first-degree relatives (inferred based on their genomic data) in 20,136 families aged 40 to 70 years (mean 56.8, SD 7.4, 58% female) from the UK Biobank study. Body size measures including weight, height, waist circumference, hip circumference, and body mass index were measured at three time points: baseline, mean 4.3 years (SD0.9) after baseline, and 8.5 years (SD 1.6) after baseline.
The Inference about Causation from Examination of FAmiliaL CONfounding (ICE FALCON) method, which uses the relative's exposure as a proxy instrumental variable, was used to investigate the causal effect underlying the longitudinal associations between body size measures, controlling for age and sex.
Results
There was substantial longitudinal Body measures were cross-sectionally correlated between first-degree relatives, however, there was no evidence that the longitudinal change in the measure was correlated between relatives. The ICE FALCON analysis provided evidence consistent with measures of body size, particularly BMI, weight, and waist circumference, at baseline having a causal effect on the same measures at both follow-up 4.3 and 8.5 years after baseline, and little evidence that the longitudinal associations were due to genetic or environmental confounders.
Conclusions
This study found body measures associated with adiposity are causally related over time in a general population sample of middle-aged adults. This provides evidence that weight, BMI and waist circumference can be changed across adulthood. Consequently, interventions on body size at younger ages could change the body size and related disease risk at older ages.

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Neonatal PFAS and asthma and lung function at 18 years

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Increased manmade toxin use correlates with increased asthma at an ecological level, suggesting a link. Early life is a vulnerable time for immune system development. We investigated associations of neonatal per and poly fluoroalkyl substances (PFAS) with asthma and lung function in a prospective birth-cohort followed up to 18 years.

A total of 620 children, born between 1990 and 1994, were enrolled in the Melbourne Atopy Cohort Study, all of whom had a family history of allergy. Serum from neonatal blood was collected for 293 participants, which we assayed for 18 PFAS. Participants were followed up to age 18 years, when asthma was defined using questions from the International Study of Asthma and Allergy in childhood (ISAAC) and lung function measured (spirometry) using z-scores (GLI). Relationships between individual PFAS and asthma/lung function (adjusted for other PFAS, gender, SES , sibling order, and weight at 4 weeks) were modelled using logistic/linear regression.

Of 293 participants, 105 (35.8%) had ever and 57 (19.5%) current asthma. We detected 10 PFAS in varying percentages of samples: PFOA (100%), PFOS (100%), NEtFOSAA (100%), PFHxS (48%), NMeFOSAA (28%), PFBS (27%), PFHpA (10%), PFNA (6%), PFHxA (2%), (PFBA (1%). PFBS in neo-natal serum was associated with increased risk of ever asthma at 18 years (OR=2.10, 95%CI 1.06, 4.16) and reduced pre-BD FEV1, z-score (-0.42 , 95%CI -0.76, -0.08).
Neonatal PFHxS was associated with increased risk of current asthma (OR=2.10; 1.02, 4.35) In contrast, PFHpA was associated with reduced odds of ever asthma (OR=0.31; 0.11, 0.90) and NEtFOSAA with increased preBD FEV1 z-score(FEV1: z=0.29; 0.01, 0.56)

We found different relationships for individual neonatal PFAS and asthma/lung function at 18 yrs. Some (PFBS, PFHxS) were associated with increased asthma risk and poor lung function. Others (PFHpA, NEtFOSAA) were associated with decreased risks. Perinatal toxin exposure may be interfering with immune system development in early life and contributing to asthma burden. Further research is needed to corroborate these findings and explore potential mechanisms.

Housing as a Health Intervention for Asthma

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4A - Environment Health, Ballroom 1, October 20, 2023, 1:30 PM - 3:00 PM

Asthma poses a significant health burden globally, with an estimated 300 million people affected by the condition. Australia has one of the highest prevalence rates of asthma in the world. Despite this and the strong evidence suggesting that housing conditions can be both a risk factor for the development of asthma and a trigger for symptoms exacerbation, assessment and remediation of home environments are not routinely used in asthma treatment plans. This mixed-method analysis draws on three distinct pieces of research: a nationally representative consumer survey conducted by Asthma Australia; the Australian Housing Conditions Dataset 2022; and a focus group with people with asthma. In doing so, we describe the housing conditions of people with asthma and the triggers present in their home environments, as well as the actions they take and barriers they face to preventing or remediating triggers in the home. The inclusion of these three data sources triangulates, augments and adds depth to our findings. To examine associations between housing conditions and asthma, we perform logistic regressions, adjusting for socio-demographic covariates. We find more people with asthma to be residing in homes that may be worsening their asthma symptoms, when compared to those without the condition. Notably, people with asthma have greater odds of living in a home with mould (OR 1.25, 95% CI 1.16-1.35) and damp (OR 1.36, 95% CI 1.26-1.47), as well as experiencing elevated odds of energy poverty (OR 1.25, 95% CI 1.15-1.36). While findings suggest that people with asthma undertake substantive and far-ranging measures to address triggers in their homes, multiple, interacting, and complex barriers to effective remediation exist. Common barriers identified are a lack of knowledge about both risk factors in the home and remediation strategies, as well as financial limitations and housing tenure status. Our findings draw attention to housing as a site for multi-faceted asthma intervention and, ultimately, prevention. In doing so, we highlight factors that sit outside of health to address the stark asthma disparities that persist in the Australian community. Indeed, for some, improving housing conditions may prevent the onset of asthma altogether.

Colostrum microbiome and childhood allergy

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1E - Child/Perinatal/adolescent Health1, La Trobe, October 19, 2023, 10:30 AM - 12:00 PM

Background
Substantial evidence links gut microbiome and immune system development. We investigated the relationship between colostrum microbiome and allergic disease up to 18 years in an Australian birth cohort at high risk of allergy.

Method
Mothers (n=189) from the Melbourne Atopy Cohort Study provided colostrum samples. Microbial DNA was extracted using Power Food DNA (MoBio) and sequenced using V3-V4 regions of 16S rRNA gene (Illumina). Shannon and Inverse Simpson indices measured alpha diversity. Beta diversity was assessed using PCoA and PERMANOVA. Differentially abundant taxa were determined using ANCOM.

Clinical characteristics of offspring were recorded over childhood using questionnaires on wheeze/asthma/eczema/hayfever and Skin Prick Tests for common food and aero-allergens at 1,2,12 and 18 yrs. Using all time points, two separate Latent Class analyses were performed: one on clinical characteristics that determined 2 classes of clinical allergy: minimal/resolved (72%), persistent(28%), and the second on atopic sensitization that found 3 classes: minimal(41%), late aero(46%), high food/aero (13%).

Results
Colostrum from mothers contained 273 Operational Taxonomic Units. Top 5 genera (relative abundance) were Rothia (18%), Acinetobacter(6%), Staphylococcus (5%), Neisseria (3%) and Streptococcus (3%). Children with persistent clinical allergies had consumed colostrum with higher median relative abundance of Veillonella, Rothia and Acinetobacter. Increased α diversity in top three quartiles of Shannon index was associated with reduced odds of late aero sensitization by 96%, 85%, and 93%, respectively compared to 1st quartile (least diverse) (eg Q4vsQ1 OR 0.071 95%CI 0.006, 0.889). Similar results were observed for the Inverse Simpson index. There was weak evidence of a similar association for the clinical allergy classes. No associations found for β diversity. Chrysobacterium was found to be more abundant in the resolved allergy class (2%) compared with the persistent allergy class (0.8%)

Conclusion
Colostrum microbiome composition differs between children with sensitization and clinical allergy up to age 18 years. Reduced α diversity was associated with increased risk of allergy and atopy up to 18 years. Strategies that protect or promote microbial diversity in colostrum may reduce allergy risk in breastfed children.

Solid cancer risks from CT scans in Australian Radiation Study

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2C - Cancer 2, Ballroom 3, October 19, 2023, 1:00 PM - 2:30 PM

Background

Computed tomography (CT) scans, involving exposures to low-dose ionizing radiation, have become a valuable diagnostic tool. As a consequence, the use of CT scans has increased, raising concerns about the potential development of radiation-induced cancers, especially in children who are more vulnerable to radiation effects and have longer lifetimes remaining.

Methods

By linking Medicare billing records with the Australian Cancer Database (ACD) and National Death Index (NDI) data, the Australian Paediatric Exposure to Radiation Cohort (Aust-PERC) captured deidentified medical service information and outcome records. This large cohort included over 11 million Australians registered with Medicare when aged 0-19 in 1985-2005 and followed-up to December 2012. Radiation doses from CT exposures for 34 specific organs were retrospectively determined. We used Cox regression models, using age as the time scale, with stratification by sex, year of birth and socio-economic indexes to estimate the dose-response relationship between CT scan radiation and cancer outcomes, reporting results as excess relative risks (ERR per 100mGy = HR-1). To manage reverse causation bias, we applied a two-year lag period between actual CT scan date and the exposed date in the analysis.

Results

In total, 11,802,846 Australians who were born between 1966 and 2005 were registered with Medicare while aged younger than 20 years between 1985-2005. There were 902,031 CT scans performed on 692,879 Australians. The mean cohort follow-up was 22.3 years overall, with 15.5 years from first CT exposure and 18.0 years to the first cancer diagnosis. There were 107,208 cancers registered, including 13,488 following CT exposures (with lag period applied. The ERR (95%CI) per 100 mGy for digestive tract cancers was 1.05 (0.55-1.55); respiratory tract 2.02 (0.69-3.37); female breast 1.47 (0.34-2.62); female genital: 1.64 (1.07-2.22); male genital: 1.07 (-1.29, 3.49); urinary tract: 1.25 (0.64-1.85); brain: 0.43 (0.38-0.48); female thyroid: 2.27 (1.39-3.16).

Conclusion

Risks of solid cancers are increased following low dose radiation from CT scans. Further work is needed to estimate the magnitude of any residual biases arising from reverse causation or potential confounders.

Breast cancer risk prediction based on an artificial intelligence created detection algorithm

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1C - Cancer 1, Ballroom 3, October 19, 2023, 10:30 AM - 12:00 PM

Background: Artificial Intelligence (AI) algorithms to detect breast cancers in mammographic images contain information about future breast cancer risk.

Methods: We studied a random cohort of 92,045 women attending BreastScreen Victoria from 2016-17 (BRAIx program). We used an image-specific AI-based detection score for invasive breast cancer to create a woman-specific standard normal BRAIx risk score. We estimated risks of cancer detected at baseline (461 cases) and, if not, diagnosed in the short-term thereafter (536 cases) defined by diagnosis in the interval between (177) or at (359) the next 2 yearly-scan, as a function of the BRAIx risk score, age, and first-degree family history. We evaluated prediction using the area under the receiver operating characteristic curve (AUC) and odds ratio per adjusted standard deviation (OR).

Results: BRAIx risk score was associated with detection, interval and next-screen cancers with ORs (95% confidence interval) 28.2 (23.6-33.8), 2.88 (2.42-3.43) and 2.20 (1.95-2.47), respectively. Mean BRAIx risk score was 0.1 (standard error 0.01) greater for women with a family history. Including age and family history, the AUCs for detection and short-term cancers were 0.98 and 0.74, respectively.

Conclusions: The BRAIx risk score predicts both detection and short-term breast cancer risk, better after taking into account age and family history, and could reveal insights into both familial and non-familial causes. If AI-based algorithms are used for detection, they will identify women at substantial risk of cancer in the short term for whom informing and appropriate management pose challenges for the implementation of AI in screening.

Prenatal antipsychotic exposure and risk of developmental disorders: A multinational cohort study

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2E - Child/Perinatal/adolescent Health2, La Trobe, October 19, 2023, 1:00 PM - 2:30 PM

Objective: To evaluate whether children prenatally exposed to antipsychotic medication are at increased risk of neurodevelopmental disorders and learning difficulties, including specific developmental disorders and poor academic performance.

Methods: Our population-based cohort study used nationwide register data (2000 to 2020) on pregnant women and their live-born singletons from Denmark, Finland, Iceland, Norway, and Sweden. We defined prenatal exposure to antipsychotics as prescription fills from the first day of last menstrual period to date of birth. To control for confounding, we restricted to children of mothers with a psychiatric disorder and applied propensity score (PS) overlap weights. Cox proportional hazard regression yielded PS-weighted hazard ratios (aHRs) and 95% confidence intervals (CIs) for risk of intellectual developmental-, developmental speech or language-, developmental learning-disorders, and a composite outcome of any of the listed disorders. We defined poor performance as scoring within the lowest quartile on national school tests in mathematics language arts. We estimated PS-weighted risk ratios (aRRs) using Poisson regression. The individual-level data from Finland, Iceland, Norway, and Sweden were pooled and analysed together and data from Denmark was analysed separately using the same analysis program on harmonized datasets. The results were pooled using fixed-effects meta-analysis.

Results: Among 213 302 children (median follow-up: 6.7 years), 11 626 (5.5%) were exposed to antipsychotics prenatally. Adjusted risk estimates did not suggest an increased risk of neurodevelopmental disorders: aHR of 1.06 (95% CI 0.94 to 1.20) for the composite outcome, or for poor academic performance: aRR of 1.04 (95% CI 0.91 to 1.18) in mathematics, and aRR of 1.00 (95% CI 0.87 to 1.15) in language arts. Results were generally consistent across trimesters of exposure, sibling- and sensitivity analyses.

Conclusion: The findings of this large multinational cohort study do not suggest an increased risk of child neurodevelopmental disorders or learning difficulties after prenatal exposure to antipsychotics.

Bringing human intelligence to application of Artificial Intelligence in epidemiology

Professor Joohon Sung[1], Prof John Hopper[2]
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3E - Conversation Starter 1, Ballroom 3, October 20, 2023, 11:00 AM - 12:30 PM

The use of artificial intelligence (AI) in epidemiology, and vice versa, is evolving rapidly. There is enormous promise in the inevitable and irreversible transition occurring in the current era of “big data” that is redefining the historical roles of epidemiology. But there are many challenges.

Epidemiology has been dedicated to discovering knowledge that can improve the health of populations by trying to identify true or likely causal signals against a background of confounding and random errors.

AI, also referred to as machine learning (ML) or deep learning (DL), is an automated process whereby information is extracted from a given dataset to make predictions and/or classifications.

The key difference is that epidemiology builds models based on explicit assumptions about what matters and how, so that the results can be directly interpretable, while AI builds predictive models discovered only from the past without necessarily understanding why.

While AI is having numerous successes, the use of ‘historic’ big data alone by AI suffers problems. For example, electronic health records change over time with changes in clinical practice. AI-based methods will not work for “minority” sub-groups, however defined, that are underrepresented in the training dataset, leading to “unfairness”. Overfitting is inevitable and there are major issues in generalizability that are less transparent when models are based on estimating absolute, rather than relative, risks. Extrinsic real-world problems stem from the interactions between AI tools and humans due to technical or other hurdles. The terminologies used by AI and epidemiology also overlap and contradict, posing difficulties for a successful dialogue between the disciplines.

In summary, we believe that AI’s outstanding ability to optimise prediction models by an and opaque approach can be both empowering and limiting factors for improving health. AI’s intrinsic weaknesses, such as overfitting producing unfairness and underperformance when applied in the real-world, together with its strengths, necessitate a new role for epidemiology in improving designs and analysis to extract more knowledge. Epidemiologic discipline has evolved through confronting health problems and customising practice using well-designed studies, and we believe this experience and expertise should be brought to the application of AI.

Get ready for Generation Victoria (GenV)! - a statewide intervention-capable parent and child cohort

Melissa Wake[1], Mr William Siero[2], Dr Susan Clifford[2], Dr Elizabeth Hughes[2], Dr Susan Long[2], A/Prof Margarita Moreno Betancur[2], Mr Jatender Mohal, Prof Richard Saffery[2]
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1A - Data Linkage Methods, Ballroom 1, October 19, 2023, 10:30 AM - 12:00 PM

Background:
Designed to help solve complex problems facing today's children and mid-life adults, GenV is the largest birth cohort mounted internationally in the last decade, and the only one launched during the COVID-19 pandemic. This presentation introduces unique features of GenV that fit it to drive evidence in multiple areas of unmet health, social, educational and economic need, and its suitability to 'stop describing and start fixing' both via embedded trials and causal analytic methods.
Methods:
GenV is authorised by the Victorian government, supported by multi-sectoral funding, and the product of extensive consultation and co-planning. It's designed as a very large, whole-of-state longitudinal cohort open to all Victorian children born October 2021-October 2023 and their parents. Recruitment is face-to-face shortly after birth, with additional recruitment by phone or online. Participants provide samples (saliva, breastmilk, infant stool) and consent to access routine clinical biosamples (pregnancy bloods; group B step swabs; newborn blood spot). Participants consent to data linkage (geospatial, clinical and other services, administrative), and complete brief online surveys via the 'GenV and Me' website or App. Integrated studies enable collaborative co-participation in registries, trials and observational studies embedded within or alongside GenV, increasing the value of both. An Open Science dataset will be available to researchers from 2025.
Results:
Following an Advance cohort comprising a single Vanguard hospital and scale-up phases, GenV commenced recruitment at all 58 birthing hospitals across Victoria from October 2021. As of June 2023, >95,000 participants (babies, mothers and second parents/guardians/kin) had joined. Uniquely, GenV has achieved proportionate representation of culturally and linguistically diverse (>70 languages), regional/rural domicile and First Nations participants. Over 90% of families consent to biospecimens, with >300,000 biosamples already stored. Parents have completed 30,000 'GenV and Me' surveys and uploaded >3000 baby photos and videos. To date, GenV has leveraged >$27M in academic funding and established collaborations with 24 trials, registries and observational studies. Planning for GenV's Intervention Hub and major face-to-face school entry wave has commenced.
Conclusions: With its establishment phase now ending, the time is ripe for epidemiologists to start planning novel research approaches exploiting this major new Australian asset.

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