





# Wednesday 3rd July 2024

College of Health and Medicine

# Research Showcase 2024

## Presentation Abstracts Booklet

## ABSTRACTS – SHORT TALKS (10-MIN)

**Amanda Neil**

Isabelle Bartkowiak Theron, Rosalie Martin, Adriana Nevarez-Flores, Clarissa Hughes, Kimberley Norris

Literacy and its relationship with mental health: insights from Australian speech pathologists

In 2021, we started a program of foundational research on literacy as a social determinant of health. An initial focus was obtaining insights from Australian speech pathologists as to the importance of literacy to mental health.
A convenience sample of professional experts were recruited online and via professional networks between 23 May and 31 July 2023. Study data were collected and managed using REDCap. Of 67 respondents, most (63, 94.0%) were certified and practicing speech pathologists with predominantly paediatric only caseloads (n=57, 85.1%), with an average 12.5-years in practice. Respondents were from every state and territory except the ACT, predominantly QLD (n=35, 52.2%). 58 of 59 respondents rated literacy as a pillar of wellbeing and health, of which 23 (39.7%) identified "mental health" as a key consequence, and the first identified consequence for 12 (20.7%). Other consequences raised included poor self-esteem, behavioural issues, isolation, school refusal, bullying, shame, frustration, trauma, poor life course trajectories and as a potential contributor to suicide. "Mental health is core business" for speech pathologists. In turn, clinicians, particularly mental health clinicians need to be keenly aware of the potential for low literacy in their clients, and its potential impacts on their mental health.

**Anuk Kruawan**

Rajendra K.C., David A Gell, Jocelyn M. Darby, Kirsten A. Fairfax, Andrew S. Flies

Development of a point-of-care field diagnostic test for DFT1 and DFT2

A transmissible cancer known as devil facial tumour 1 (DFT1) now affects Tasmanian devils in 90% of Tasmania and is the primary driver of an 82% population decline where DFT1 is present. DFT1 has skewed the age class structure and breeding age towards younger devils. Devil facial tumour 2 (DFT2), which originated independently of DFT1, was discovered in southern Tasmania in 2014 and is now emerging from the peninsula where it originated. Understanding the distribution and prevalence of DFT1 and DFT2 is challenging as they can only be detected when tumours are large enough to be visually observed. This also impedes our ability to understand how the devil population is evolving in response to the tumours. To overcome these hurdles, we developed an ultrasensitive and field-deployable rapid diagnostic tool. We used a technique called Specific High-Sensitivity Enzymatic Reporter Unlocking (SHERLOCK), combined with an isothermal nucleic acid amplification technique called Recombinase Polymerase Amplification (RPA). This system eliminates the need for various non-portable laboratory equipment, making it more amenable to field conditions. The results showed that our test can detect DFT1 and DFT2 DNA within the picogram range. We then conducted pilot field testing which revealed that our test can detect DFT1 from all devils with tumour lumps (n = 7) with 100% sensitivity and specificity. Furthermore, our test could detect DFT1 from a devil with no visible tumour. Together with current ongoing management efforts, our test will pave the way towards active management approaches that are not currently possible.

**Brianna Atto**

Stephen Tristram, Robyn Marsh

Exploiting bacterially-derived proteins in the fight against nontypeable Haemophilus influenzae

The bacterium Nontypeable Haemophilus influenzae (NTHi) is a major cause of infections in the respiratory tract, including middle ear infections (otitis media; OM) in children and chronic obstructive pulmonary disease (COPD) exacerbations in adults. OM is one of the most common reasons for health care visits and antibiotic prescription, and the leading cause of conductive hearing loss in children. Furthermore, NTHi is a primary driver of disease progression, morbidity and mortality in COPD - a disease which kills ~7000 Australians every year. Despite the substantial disease burden associated with NTHi-associated disease, there are currently no vaccines available to prevent infection and treatment options are limited by the rapid development of antibiotic resistance. Thus, new therapeutic agents are needed to treat/prevent NTHi infections. One approach under investigation by our laboratory is the use of bacteriocins – bacterially-derived peptides which have inhibitory activity against closely-related species. Here we present our development progress on two novel bacteriocin-based therapies directed against NTHi - from initial in vitro feasibility testing, to animal efficacy models.

**Bryony Thorne**

Jana Talbot, Andrew Phipps, Rachel Atkinson, Anna King, Sharn Perry, Anthony Cook

Exploring the Cell Biology of Gene-Environment Interactions in ALS using Human iPSCs

The development of amyotrophic lateral sclerosis (ALS) has been described as a multistep process in which different genetic and environmental factors interact and contribute to disease progression. In some cases, high penetrance mutations in ALS-associated genes account for most of these steps, however, around 90% of cases have no clear genetic cause and are considered sporadic. Genetic and epidemiological studies have identified a range of mutations and environmental exposures that may increase the risk of developing disease, suggesting that gene-environment interactions may be central to understanding the multistep process of ALS. Using neurons and neural stem cells derived from a panel of induced pluripotent stem cells (iPSCs) carrying either disease-causing mutations or risk variants alongside their isogenic controls, we are exploring whether these genetic variants confer increased vulnerability when exposed to toxins implicated in disease. Preliminary data shows that exposure to three different organophosphate pesticides for 72 hours results in a concentration-dependent increase in cell death, while exposure to cyanotoxins up to 1000 µM does not reduce cell viability. To complement these findings, we are conducting cell painting experiments to identify organelle-specific changes at sub-lethal concentrations, and to explore in greater detail whether ALS-associated gene variants differentially influence toxin sensitivity.

**Cameron Bell**

Rebecca St George, Cynthia Honan, Allison Matthews

Virtual nature/urban exposures and nature relatedness have interactive effects on brain activity, attention, mood, and heart rate variability

Attention Restoration Theory (ART) suggests that natural environments offer greater restorative benefits compared to urban settings. While previous research has used behavioural and questionnaire measures to demonstrate these effects on cognition, mood, and stress, fewer studies have explored the nervous system activity associated with nature exposures. This study aimed to use EEG and ECG to investigate the behavioural and psychophysiological markers of nature restoration. The method included 40 participants randomly assigned to view either natural or urban images in a short virtual exposure. EEG and ECG were continuously recorded, and various psychophysiological outcomes were assessed before and after exposure. EEG results showed an increase in 'alpha power' during both exposures, with the urban condition showing greater increases. Additionally, a neural index of inhibitory control (N2 ERP amplitude) was decreased for the nature group but increased for the urban group, despite no differences in behavioural performance. Nature Relatedness (NR) moderated the effects of environment on positive affect, with high NR resulting in nature exposure benefits only.
In conclusion, the study suggests that nature exposure can influence cortical inhibitory mechanisms involved in suppressing distractions. Multiple effects were moderated by NR, indicating that individuals' connection to nature influences the restorative effects.

**Chaw Hsu Thwe**

Bennet McComish, Nicholas Fountain-Jones, Phillip Melton

Detecting natural selection signatures in multiple sclerosis genetic variants using landscape genomics

Multiple sclerosis (MS) is an autoimmune disorder with complex genetic and environmental associations in its disease pathophysiology. MS prevalence is characterised by a complex geographical profile, with both populations of European ancestry and populations at higher latitude experiencing higher prevalence. Our hypothesis is that the complex geographical pattern of MS prevalence is likely to have been shaped by natural selection, specifically local adaptation. Landscape genomics uses advances in computational capacity to determine the relationship between genomics and spatial information to identify candidate genes under local adaptation. Landscape genomics has largely been used in ecological studies, not human genetics. MS is an excellent candidate to employ a landscape genomics approach because MS prevalence has a strong latitudinal gradient. We conducted a gene-environment analysis using UK Biobank data, focusing on the correlation between vitamin D levels and MS pathogenesis to detect risk loci that show local adaptation signals. Genotyping and associated metadata, including latitude, longitude, and UV exposure, were obtained from UK Biobank. Logistic regression models were run on chromosome 2 for 20,000 individuals to identify genetic regions with selection signals. Ongoing analysis aims to determine variable importance related to the genomic regions of interest and identify SNPs undergoing local adaptation.

**Claire Morley**

Deirdre McGowan, Alex Kitsos, Kelly Shaw, Amanda Neil, Tania Winzenberg

Understanding longitudinal patterns of service use and long-term outcomes for people who are high users of healthcare services: a Tasmanian data linkage study.

Background: A small portion of people disproportionately use high amounts of healthcare resources, termed high healthcare service utilisation (HSU). Little is known about the longitudinal patterns of HSU and long-term outcomes for these people. Aim/s: To investigate the longitudinal patterns of health service utilisation in people with different forms of HSU defined in different ways. Methods: HSU was defined as >5 emergency department (ED) presentations, >4 hospital admissions and/or top 5% of healthcare costs in a 12-month period. We analysed three years (2017-2019) of Tasmanian linked hospital administrative and death data. We identified adults with each type of HSU and determined health care utilisation in the subsequent 12 and 24-months. Findings: Approximately one quarter of HSU self-resolved within 12-months. Across the three categories, frequent ED presentations, frequent admissions, and high cost, 28.4, 13.4 and 16.9% were classified as having persistent or recurrent high service use respectively. A greater proportion of individuals classified by frequent admissions or high costs died within 1-year (12%), compared to those classified by frequent ED presentations (4.6%). Implications: Understanding longitudinal patterns of service use for people identified as being high users of healthcare services could inform in whom and/or when interventions might best assist.

**Fatemeh Vazirian**

Fatemeh Vazirian, Jing Tian, Jane Alty, Dawn Aitken, Michele L. Callisaya, Flavia Cicuttini, Graeme Jones, Feng Pan

Chronic pain and risk of incident Parkinson's disease: a 13-year longitudinal study

Chronic musculoskeletal pain is highly prevalent and often co-occurs with Parkinson's disease (PD). We investigated how chronic musculoskeletal pain relates to risk of all-cause parkinsonism, PD, multiple system atrophy (MSA), and progressive supranuclear palsy (PSP). 355,870 participants (mean age 56.51, 48.40% male), using the UK Biobank study without parkinsonism at baseline, were investigated. Chronic Musculoskeletal pain, pain ≥ 3 months, was self-reported. Incident all-cause parkinsonism, PD, MSA, and PSP were determined through the hospital records and death registries Participants were categorized by chronic pain sites and presence/absence of chronic pain. Cox regression was used for the analyses. During 13-year follow-up, 2,290 and 2,044 participants developed all-cause parkinsonism and PD, respectively. In fully adjusted model, there was a dose-response relationship between number of chronic pain sites and the risk of developing all-cause parkinsonism (hazard ratio [HR]1.15 (95% confidence interval [CI]) 1.08-1.22) and PD (1.15 (1.08-1.23)). Chronic pain was also associated with an increased risk of all-cause parkinsonism and PD. There were no associations between chronic pain and MSA or PSP. Chronic musculoskeletal pain was associated with all-cause parkinsonism and PD, suggesting that chronic pain could be used to identify individuals at risk of developing PD.

**Kristina Maximous**

Pieter Francsois Fouche, Martin Nichols, Raquel Abrahams, Jason Bendall

Evaluating the Effectiveness of the Maximum Permitted Dose of Midazolam in Seizure Termination: Insights from New South Wales, Australia

Out-of-hospital seizures necessitate swift intervention, with midazolam being crucial for cessation. Occasionally, the initial dose is inadequate, leading to the administration of additional doses. In the New South Wales Ambulance (NSWA) service, the maximum midazolam dose is 15 mg, yet its effectiveness and safety at this limit remain underexplored. A retrospective study analyzed New South Wales' electronic health records from 2022, focusing on adult patients who received the maximum midazolam dose for seizures. The research aimed to assess the success in stopping seizures and the occurrence of adverse effects. Out of 818,790 NSWA patient engagements, 11,392 adults experienced seizures, with 2,565 receiving midazolam. Of these, 2,352 cases showed successful seizure termination post-midazolam, and 176 patients needed the maximum dosage for control. This high dosage effectively ended seizures in approximately 50% of these instances. The findings highlight that while the maximum midazolam dose is rarely used, it proves to be effective in half of the refractory seizure cases. This underscores the need for evaluating further doses or alternative medications following the initial midazolam treatment in such emergencies.

**Grace Fitzallen**

Isobel I. Newton-Bennett, Samudragupta Bora

Psychological Transformation Following Trauma: Posttraumatic Growth of Birthing Parents After Preterm Birth

Background: Preterm birth is a global concern. Parental posttraumatic stress is well-documented after preterm birth; yet posttraumatic growth, defined as adaptive psychological change following a traumatic event, is poorly understood. Objective: Describe posttraumatic growth in birthing parents of children born preterm, stratified by child chronological and gestational age groups; identify child and sociodemographic factors associated with posttraumatic growth. Methods: Sample comprised 866 birthing parents of children born preterm. Using an online cross-sectional study design, self-reports on the standardized Posttraumatic Growth Inventory were collected at a single time-point. Results: Parents of infant-toddlers reported significantly higher scores than those of preschool-aged children for relating to others ($p=.002$) and appreciation ($p=.02$). Parents of children born extremely and very preterm reported significantly greater total posttraumatic growth than moderate-late preterm ($p<.001$), and on all subscales ($p<.001$). Greater posttraumatic growth was significantly ($p<.05$) associated with higher neonatal risk, accessing more child therapy services, younger birthing age, ethnic minority, and greater self-reported well-being, accounting for 18% of variance. Conclusions: Findings identified differences in posttraumatic growth by child chronological and gestational age, with parents most at-risk reporting greater adaptation. Findings highlight the importance of acknowledging adaptive experiences following preterm birth with opportunities to optimise long-term wellbeing.

**Holly Emery**

Ingrid van der Mei, Christine Padgett, Cynthia Honan

Disability, health-related quality of life, and self-concept change in people with Multiple Sclerosis: A moderated mediation

Background and Objectives: Disability informs self-concept (i.e., opinions of self) and importantly, how it changes following Multiple Sclerosis (MS) diagnosis. Health-related quality of life (HRQoL) and relationship satisfaction are also known to influence self-concept in people with MS. Whether these psychosocial factors account for the relationship between disability and self-concept change however is not known. This study investigated the potential mediation effect of HRQoL on the relationship between disability and self-concept change in people with MS, and whether relationship satisfaction is a moderator of the mediated relationship. Method: 995 people with MS (79.5% female; Age M = 59.72 years, SD = 11.15) completed the Self-Reported Disease Steps Scales (assessing disability), the Assessment of Quality of Life – 8 dimensions (assessing HRQoL), and the MS Self-Concept Change Scale. Of these, 726 participants who indicated they were currently in a relationship also completed the Relationship Assessment Scale (assessing relationship satisfaction). Moderated mediation (conditional process) and parallel mediation analyses were used to analyse the data in SPSS. Results: The relationship between disability and self-concept change was partially mediated by HRQoL. Across the eight subdomains of HRQoL, only the 'relationships' and 'coping' subdomains mediated the relationship between disability and self-concept change. However, for those participants in a relationship, relationship satisfaction did not moderate any mediation effects. Conclusion: The findings highlight the role that perceptions of HRQoL in some domains may have in explaining the relationship between disability and self-concept change. Further research is needed to explicate the causal direction of these relationships in longitudinal studies.

**Claire Eccleston**

Alex Kitsos, James Vickers, Kathleen Doherty

Dementia risk literacy in older Australians: beyond knowledge

Dementia risk reduction is underpinned by knowledge of dementia risk, and the capacity to appraise and apply dementia risk information, key elements of dementia risk literacy. We developed a multi-component online instrument to assess general knowledge about dementia risk, recognition of risk mitigation strategies and appraisal of common misconceptions to inform our understanding of dementia risk literacy in ISLAND participants. Participants were Tasmanians over 50 (N=3334), median age 62, and mostly female (72.5%). 44.5% had a university education; and 49.1% had a family history of dementia. 79.5% agreed that you can reduce your chances of developing dementia. Physical activity, social activity and cognitive stimulation were identified as risk mitigation strategies by more than 93%. More than 25% were 'not sure' about cholesterol management and the Mediterranean diet. Only 16.0% of participants responded correctly to one or more of the six misconception items and only 0.2% of participants correctly identified all misconception items. The study demonstrates that the population is aware of dementia risk and risk factor mitigation strategies but show poor capacity to appraise common misconceptions. Targeting risk reduction messaging to include appraisal of information about dementia risk may result in more effective public health campaigns for future risk mitigation.

**Kirsten Fairfax**

Ariel Simpson, Primrose Mandalawatta, Raj KC, Alex Hewitt

Using CRISPR editing to correct inherited mutations in Bone Marrow Failure Syndromes

Inherited bone marrow failure syndromes (BMFS) are genetic disorders characterised by impaired haematopoiesis. Our work explores the efficacy and safety of using base and prime editors to correct inherited mutations in BMFS-associated genes, capitalising on the cutting edge tools emerging using the CRISPR-Cas9 system, offering a more precise, safer therapeutic approach to restore haematopoietic function without introducing double stranded DNA breaks in the genome. We have used a screening approach to understand how CRISPR editing can be used to edit over 100 different pathogenic single base mutations in inherited bone marrow failure syndromes, incorporating 30 non-targeting guides as background editing controls. We tested the efficiency of two different base editors (micro ABE and ABEmax) to correct our large collection of mutations in two different cell types. Varied targeted correction efficiencies were seen in our pathogenic variants (range 0-100%, mean = 4.72%, SD = 0.19) across different loci. Micro ABE (a novel base editor developed in-house) exhibited enhanced editing efficiency at selected target sites, including the GATA2 target site with 5.73% editing, compared to 1.36% editing for ABE max. Off-target edits (range 0-100%, mean = 5.51%, SD = 17.10) showed variability. Together these results enable us to analyse efficiency of different CRISPR tools at a wide range of loci, and enable us to test the efficiency of these editors at target sites that are at a variety of distances from the PAM site. These screening results enable us to choose the most appropriate combinations of mutations to be corrected with the most efficient CRISPR base editors to use therapeutically.

**Kylie Smith**

Verity Cleland, Laura Sutton, Nicodemus Masila, Brooklyn Fraser, Fiona Proudfoot, Julie Dunbabin, Monique Reardon, Claire Galloway, Kate DePaoli, Kim Jose

Evaluation of the 2022-23 Tasmanian School Lunch Project

Most Australian school students take a packed lunch to school. However, foods eaten during school hours are often not consistent with the Australian Dietary Guidelines, and some children do not have lunch at school due to financial pressures. To address these issues, the Tasmanian government funded the School Lunch Project, a two-year trial that provided free nutritious cooked lunches for kinder to grade 10 students attending 30 Tasmanian government schools in areas of high socioeconomic disadvantage. This study aimed to evaluate the School Lunch Project. Using a developmental evaluation approach, data collection included surveys (parents, school staff) interviews/discussion groups (parents, students, school staff, implementation team staff) and workshops. During 2023, 191,968 meals were provided to 4,088 students (7,252 lunches per week). The evaluation identified expectations, barriers and enablers to providing the lunches, which were generally positively received by stakeholders and the school community, although some concerns about project sustainability were raised. The median cost to provide a cooked lunch was $9.98. No associations between the school lunches and school attendance or student wellbeing were evident. This is the largest school lunch project in Australia. The evaluation findings will inform decisions about scale-up of the program and adoption in other states.

**Leesa Van Niekerk**

Louise Gibson, Kimberley Norris

Body Compassion, Body Image, and Body Self-Consciousness in Sexual Functioning of Individuals with Endometriosis

The current study investigated the relationships between endometriosis-related and body-related characteristics and sexual functioning in individuals with endometriosis. Two-hundred and forty participants presumed female at birth, with self-reported symptomatic endometriosis, completed a cross-sectional online survey investigating the relationship between body image, body compassion, body self-consciousness and sexual function. Endometriosis-related symptoms of dyspareunia, voiding pain (bowel, urination), and nausea were found to be significant negative correlates of sexual function in individuals with endometriosis. Higher levels of distress associated with these symptoms was associated with a lack of body familiarity and higher levels of body self-consciousness during sexual intimacy. A lack of body familiarity, negative appreciation of body size, and body dissatisfaction were found to be associated with the sexual function domains of arousal, lubrication, satisfaction, and sexual pain. The findings suggest that consideration of an individual's unique endometriosis-related symptom profile and perception of their body may be useful indicators in recommending early referral for multidisciplinary management of endometriosis-related impacts. Future research investigating the potential efficacy of psychosexual interventions for addressing body image and sexual function concerns for individuals living with endometriosis is recommended.

**Lorenzo Odierna**

Laura Reale, Kathryn Maskell, Jyothi Srinivasalu, Catherine Blizzard

Early die-back signatures in a die-forward model of ALS

Motor neuron disease (MND) is a fatal neurodegenerative condition that causes paralysis and death within 2-5 years of diagnosis. There are currently no treatments for MND. One obstacle to generating new therapies for patients is that we do not understand the aetiology of MND or where in the nervous system disease begins. There is substantial evidence supporting early pathology in the brain and in the muscle. These have led competing models of disease known as the 'die-forward' and 'die-back' hypotheses. To date, which of these are correct remains unresolved. In this study, we have characterised a mouse model of MND that recapitulates die-forward pathology by only initiating disease in the brain. We assessed motor behaviour, muscle atrophy and neuromuscular connectivity at several ages in these mice to build a comprehensive timeline of pathological changes in the periphery. Our findings indicate a striking early disruption to the peripheral nerve-muscle interface despite initiation of pathology in the brain. These findings challenge our understanding of the die-forward and die-back hypotheses and demonstrate that while pathology can start in the cortex and spread forward to induce dysfunction, degeneration instead moves backwards from muscle.

**Lynette Bronwyn Staff**

Jennifer Ayton, Meredith Nash

Becoming a first-time mother via a scheduled Caesarean section: A multi-method study

Becoming a first-time mother via a scheduled Caesarean section: A multi-method study
Currently 37% of Australian women have a Caesarean section. Thirty nine percent are first-time mothers and two thirds of these will have a scheduled CS (SCS) making entry to first-time motherhood via a SCS a common event. Considerable literature exists about becoming first-time mothers via emergency CS, or by maternal request SCS. Research exploring becoming a first-time mother via SCS is limited. Symbolic interactionism (SI) was the methodological approach and data collection methods included 28 face-to-face in-depth interviews the making of 26 pieces of participant-created visual data. Both data sets were analysed by thematic analysis. Seven themes were evident and demonstrated the complexity of meanings women attributed to having a scheduled caesarean section. These included mixed feelings: a spectrum of emotions; control and decision-making; what women wanted to make clear about their experiences; interactions with care-providers; women's views of maternal bodies; missed ritual and the creation of new ritual; time, SVCS and labour and vaginal birth, and, 'becoming a first-time mother': difficulty creating a birth story. Recommendations for practice and further research were made in view of this important but neglected field of research and the significance the findings have for women, their infants, families and ultimately society.

**Matthew Jose**

Jan Radford, Kim Jose, Alex Kitsos, Tim Saunder, Rajesh Raj

CKD.TASlink: using data linkage to report the (kidney) health of an island.

Background: The number of Australians requiring dialysis or a kidney transplant continues to rise. Contemporary quality data on the epidemiology and outcomes of kidney disease in the community are lacking, so the changing need for chronic disease care is difficult to assess. Methods: The CKD.TASlink study uses data linkage to examine the epidemiology and outcomes of kidney disease in Tasmania. Results: Statewide age-standardised prevalence increased 28% in the decade to 2020, from 516 to 659 per 10,000 population. Age-standardised prevalence in men increased 31.3% and women 24.8%. The greatest increase was seen in rural & remote regions with an increase of 36.6% with considerable variation including increases up to 80% over the decade in smaller rural or remote communities. This translates to an increase in actual number of people with CKD by 67% in the decade to 2020 (with the number of women increasing by 58% and men 79%). For the small rural or remote communities this meant a near doubling in the number of people with CKD, yet they remain with limited health services. Conclusion: The age-standardised prevalence of CKD in rural and remote regions has changed considerably over the past decade. Provision of quality, accessible chronic disease care in these rural and remote communities is essential.

**Nenagh Kemp**

im writing 2 u :) The language of digital communication

Digital communication is an essential part of most people's lives today, with many of our interactions taking place in writing, online. One consistent hallmark of this writing style is that it's different from formal writing: we often omit capitals and punctuation, or add extra letters and emojis, yeeaaahhh :) Our digital writing style, called "textese", expresses who we are, but also has a profound effect on how others view us. For 15 years, I've been building a database of undergraduates' sent digital messages and measuring people's responses to such messages. This presentation summarises how textese use has changed over time, and how people write differently according to, for example, their age, gender, and whom they're writing to. It also touches on the effects of textese on the recipient: even school students think that students who use extensive textese writing to teachers are less intelligent and appropriate that those who write more formally. Recent findings confirm that adults view messages as more negative when they end with a full stop than with no punctuation, but only if the message is short. Overall, this work provides important implications for improving communication and connection in today's digital world.

**Nina Daniels**

Aidan D Bindoff, James C Vickers, Anna E King, Jessica M Collins

Selective vulnerability of neurofilament expressing neurons in frontotemporal dementia

Frontotemporal dementia (FTD) is an umbrella term for several early onset dementias, caused by frontotemporal lobar degeneration (FTLD), which involves the atrophy of the frontal and temporal lobes of the brain. Neuron loss in the frontal and temporal lobes is a characteristic feature of FTLD, however the selective vulnerability of different neuronal populations in this group of diseases is not fully understood. Neurofilament-expressing neurons have been shown to be selectively vulnerable in other neurodegenerative diseases, including Alzheimer's disease and amyotrophic lateral sclerosis, therefore we sought to investigate whether this neuronal population is vulnerable in FTLD. Post-mortem human tissue from the superior frontal gyrus (SFG) of FTLD-TDP (n=15), FTLD-Tau (n=8) and aged Control cases (n=6) was immunolabelled using antibodies against non-phosphorylated neurofilaments (SMI32), calretinin and NeuN, to explore neuronal cell loss. The presence of non-phosphorylated neurofilament immunolabelling in axons of the SFG white matter was also quantified as a measure of axon pathology, as axonal neurofilaments are normally phosphorylated. We demonstrate the selective loss of neurofilament-expressing neurons in both FTLD-TDP and FTLD-Tau cases compared to aged Controls. We also show that non-phosphorylated neurofilament axonal pathology in the SFG white matter was associated with increasing age, but not FTLD.

**Rachel Atkinson**

Anthony Cook, Anna King

Freezing MND in its tracks

When our core body temperature is cooled, we switch on protective processes regulated by a family of proteins known as cold stress proteins which prevent damage to our nervous system by slowing metabolism and protecting cell structures. These pathways are activated in mammals that hibernate in winter and in humans during therapeutic cooling following stroke and spinal cord injuries. Amyotrophic lateral sclerosis (ALS) is a complex, multifactorial disease involving degeneration of the upper and lower motor neurons. Over 90% of cases are sporadic with no known genetic cause. There has been limited success in halting or reversing the disease when targeting individual disease mechanisms, highlighting the need for treatment strategies encompassing multiple disease pathways. Strikingly, the myriad of pathways protected in cold stress and those adversely affected in ALS show considerable overlap. This project investigates whether artificial induction of cold stress can provide protection to the nervous system in animal and cellular models of MND using either drugs targeting temperature centres within the brain or anti-sense oligonucleotide-based drugs that directly act upon cold stress proteins. If these treatments can improve MND-related phenotypes, there is real potential to advance new treatment options for the majority of MND cases with sporadic aetiology.

**Verity Cleland**

Melanie Sharman, Oliver Stanesby, Kim Jose, Stephan Greaves, Anna Timperio, Leigh Blizzard, Lisa Stafford, Elizabeth Reid, Petr Otahal, Alison Venn, Kylie Ball

Get BusActive!: Protocol of a single-blinded randomised controlled trial incentivising public transport use for physical activity gain among young people and adults

Background: Many Australians are insufficiently physically active for health, but public transport use offers a strategy for incorporating incidental physical activity (PA) into daily routines. This study aimed to determine the effect of financially incentivising public transport use on PA. Methods: Get BusActive! is a 9.5 month single-blinded parallel group randomised controlled trial. Participants (15+ years) are randomised to a 14-week incentive-based intervention (bus trip target attainment rewarded by bus trip credits; weekly supportive text messages) or an active control and followed up ~24 weeks later. Both groups receive written PA guidelines. Key outcomes are accelerometer-measured daily step count, smartcard-measured bus trips, and self-reported transport-related and total PA. Findings: 370 Tasmanians have consented, with 101 randomised. 3% of those randomised are aged 15-17 years, 69% identify as women, 18% are students, 70% have at minimum a Bachelor's degree, and 82% are from the Greater Hobart region. The main motivations for participating have been for the financial rewards (79%), to participate in research (71%), and to increase PA (68%). Conclusion: Get BusActive! will fill an important knowledge gap about the causal relationship between financially incentivised public transport use and PA; findings will benefit health and transport-related decision makers.

**Viet Tran**

Giles Barrington, Simone Page

The Tasmanian Emergency Care Outcomes Registry

Emergency Departments (EDs) are an inherently challenging area of clinical practice.1 Over time, guidelines, policies and pathways have been developed and re-developed to assist emergency clinicians in the management of the entire spectrum of disease and conditions.2 The high intensity nature of Emergency Care, along with the complexity of patients and an increasingly ageing population, continues to result in a significant number of adverse events in the ED, with some being repeated over and over again. Many patients with potentially life-threatening conditions will present in an unusual or atypical manner and/or fail to respond to initial management for a condition as expected. It is these presentations in high-risk or complex patients that constitute a significant proportion of ED-related incidents and adverse events. Tasmania has four public EDs which saw 178,292 presentations in 2021. Tasmanian EDs also have the unfortunate reputation for suffering some of the worst ED overcrowding in the nation, a catalyst for further harm that is unmeasured. The purpose and aims of this clinical quality registry are to monitor emergency care processes and outcomes through the provision of timely extraction and analysis of ED clinical data.

**Xinyi Wang**

Aidan Bindoff, Rebecca St George, Katherine Lawler, Alastair Noyce, Son Tran, Quan Bai, Katharine Salmon, James Vickers, Jane Alty

Investigating a Novel Hand-Motor Biomarker Across the Dementia Continuum: Incorporating and Validating of TAS Test in the ISLAND Cognitive Clinic

INTRODUCTION: We need accessible tests to aid discrimination of Subjective Cognitive Decline (SCD), Mild Cognitive Impairment (MCI) and dementia. Evidence suggests hand motor function declines in MCI and dementia but it has rarely been evaluated, and never in SCD. We evaluated language-agnostic and low-cost keyboard tapping tests for discriminating cognitive groups and cognitively healthy controls (HC). METHODS: 212 participants (69.0 ± 9.3 years old) with consensus diagnosis of SCD, MCI or dementia, or HC were recruited and completed a 60-second key-tapping test. Regression models including motor features, adjusted for age and sex, were compared to null models using area under ROC curves (AUC). RESULTS: Hand tapping motor data improved the classification of individuals with dementia (AUC = 0.89, p=0.025), MCI (AUC = 0.8, 95% CI = [0.73, 0.87], p=0.002), and SCD (AUC = 0.75, 95% CI = [0.63, 0.86], p = 0.004) compared to cognitively healthy controls. Additionally, motor features aided in distinguishing dementia (AUC = 0.9, p = 0.024) and MCI (AUC = 0.79, p = 0.022) from SCD, though not dementia from MCI (p = 0.221). DISCUSSION: Motor tests aid stratification of diagnostic cognitive groups. This provides a rapid accessible method to stratification in cognitive clinics.

## ABSTRACTS – SHOWCASE TALKS (2-MIN)

**Adelene Chiam Suk Leng**

Sueanne Chear, Natalie E King, Jana Talbot, Richard Wilson, Brad A Sutherland, Anthony L Cook

Deconstructing the impacts of CLN3 disease on the blood-brain barrier

CLN3 disease is a lysosomal storage disorder and a childhood-onset subtype of neuronal ceroid lipofuscinoses (NCL). Previously, we generated an induced pluripotent stem cell (iPSC) line from an individual harbouring compound heterozygous mutations in CLN3 (E295k / 1kb deletion) and employed CRISPR/Cas editing to correct the 1kb deletion. Using neuronal models derived from these iPSCs, we identified lysosomal alterations, as well as aberrations in electrophysiological activity and protein homeostasis. Given that there is evidence in literature which suggests blood brain barrier (BBB) dysfunction in CLN3 disease, our goal is to determine the extent to which specific BBB cell types are compromised. Therefore, we used our isogenic iPSC resource to generate models of the three cardinal BBB cell types, i.e. astrocytes, pericytes, and endothelial cells. We will present our current progress for the validation of successful cell differentiation, as well as the characterisation of disease-related effects on cell morphology, function, and proteome. Simultaneously, we will delineate a systematic workflow that incorporates various techniques including co-cultures, high-content imaging, and -omics analysis that can be adapted for other applications related to the neurovascular unit. We believe our findings can provide new perspectives on how multicellular cross-talk contributes to CLN3 disease pathophysiology, thus highlighting prospective areas for therapeutic target.

**Angela Rao-Newton**

W Lee, C Sheehan, J Lee, L Brown, B Fazekas, M Chapman, A Mohamudally, G Webb, T Perich, B Mulhern, M Agar

Meditation for the reduction of psycho-existential distress and anxiety in people with advanced cancer who are receiving palliative care (MEDITATEPallCare): Protocol for a multi-site, phase II mixed-methods feasibility study

Background: Psycho-existential distress is associated with deep, unrelieved suffering in one in four people with advanced cancer in their final year of life. How to best screen and manage psycho-existential distress in palliative care is unclear. Meditation has potential to improve distress in earlier stages of cancer, but its effectiveness in palliative care cancer patients is not well established. Aim: To evaluate the feasibility and acceptability of a concentrative meditation practice on existential distress and anxiety in people with advanced cancer who are receiving palliative care, to inform a larger phase III trial. Methods: A phase II mixed-methods, multi-site, single arm study, comprising of a:
* Phase II meditation intervention delivered over 3 weeks.
* Qualitative sub-study of patients' experience of the intervention.
* Qualitative sub-study of meditation facilitator's experience of delivering the intervention, and to check for intervention fidelity.
MEDITATEPallCare will recruit 42 patients aged >18 years who are known to palliative care services (inpatients, outpatients, or people living in the community) with advanced cancer (Stage III or IV) who screen positive for psycho-existential distress (PESAS≥4). Participants will complete 5 x 15-minute individually facilitated meditation sessions over a 3-week period, which will be supported by audio-guided home practice.

**Bibek Khatiwada**

Johanna L. Jones, Bennet J. McComish, Phillippa C. Taberlay, Kathryn P. Burdon

Investigating the genetic cause of a novel syndrome consisting of paediatric cataract in an Australian family

We previously reported a novel syndrome characterised by paediatric cataracts with linkage to 1p35.3-p36.32 in a large Australian family. We hypothesised that a variant in the linkage region causes the syndrome. Whole genome or exome sequencing was used to identify rare (MAF<0.00022, gnomAD) and predicted deleterious (CADD PHRED score≥15) variants within the linkage region. Sanger sequencing was used to assess segregation in the wider family. Variants were prioritised based on conservation, location in regulatory motifs, constraint metrics, expression profile of the gene, and function of proteins they encode. Eight variants passed the filtering criteria and segregated with the disease. The three highest prioritised variants included two missense variants SELENON c.976G>A p.(Gly326Ser) and YTHDF2 c.910C>T p.(Pro304Ser), and one 5' UTR variant HNRNPR c.-3259T>A. We investigated the impact of the gene on cataract formation in the lens of larval zebrafish using CRISPR-Cas9 knockouts of selenon, ythdf2, and hnrnpr. Knockout of hnrnpr resulted in significant cataract formation in experimental group (30.67%) compared to control group (12.5%) F0 zebrafish 4 days post-fertilization (p value= 0.006). Ongoing experiments using reporter gene assay aim to ascertain the effect at the variant level. HNRNPR has not been associated with cataract or cataract syndromes previously and will be a novel finding in this field.

**Cassandra Thomson**

Joanna Sun, Pauline Marsh, Hoang Nguyen, Janet Thomas

Nurturing a community of practice to optimise nature connection for Tasmanians living with dementia: A journey of development

Connecting with nature has known benefits for mental, physical, social, and cognitive health; however, barriers exist that make accessing nature more challenging for people living with dementia. To overcome these barriers, a community-driven response is required. Established in 2023 in Tasmania, the Venture Out Community of Practice (VOCoP) is a collective of individuals and organisations with the shared goal of enabling people living with dementia and their carers to access nature-based activities and experiences in their local community. The VOCoP comprises members with varied knowledge and experience, including dementia care advocates, healthcare professionals, outdoor health specialists, local government representatives, staff and volunteers from nature-based programs, and dementia researchers and educators. This presentation will explore the formation of the CoP, the creation of a shared vision, the group's role in the co-design of the Venture Out Living Lab (UTAS), and our achievements and plans for the future. This presentation will generate discussion about the exciting potential of CoPs to build dementia friendly societies that support those living with dementia to remain connected to both nature and their local community.

**Claire Otten**

Nenagh Kemp, Vaughan Cruickshank, Jules Kemp, Rosie Nash

Examining three primary school curricula for their ability to promote health literacy development

Primary schools have been identified as key settings in which to develop childhood health literacy. However, little is known about how well existing curricula promote health literacy development amongst primary school aged children. Using Nutbeam's Levels of Health Literacy (functional, interactive, critical) and Hjelm's Dimensions of Health, this study used content analysis to analyse the health and physical education curricula of Australia, New Zealand, British Columbia (Canada). Similar trends were found between all three curricula, with the greatest emphasis placed on social health and physical health, and less emphasis on emotional and spiritual health. Consistent with other research, learning descriptors were found to most commonly relate to interactive health literacy, with critical health literacy occurring the least frequently. Findings from this study may guide the development of future iterations of each curriculum. Further, this paper provides an example of how other curricula can be analysed for their ability to comprehensively promote health literacy development.

**Dawn Aitken**

Guoqi Cai, Flavia Cicuttini, Anita Wluka, Yuanyuan Wang, Catherine Hill, Helen Keen, Benny S. Eathakkattu Antony, Xia Wang, Barbara deGraaff, Michael Thompson, Tania Winzenberg, Kathy Buttigieg, Petr Otahal, Graeme Jones

DICKENS: A randomised controlled trial of diacerein for knee osteoarthritis

Therapies targeting inflammation offer a novel approach to osteoarthritis treatment. Diacerein is a prescription medication commonly used in Europe and Asia to treat osteoarthritis. It blocks one of the key osteoarthritis inflammatory markers, interleukin-1β. This study aimed to determine the effect of diacerein on knee pain and inflammation in Australian patients with symptomatic knee osteoarthritis. The DICKENS study is a NHMRC-funded multicentre, randomised, double-blinded, placebo-controlled trial over 24 weeks. Patients aged 40–64 years who had significant knee pain and inflammation were recruited from Hobart, Adelaide, Melbourne and Perth and randomised to receive either diacerein (50 mg twice daily) or identical placebo. The primary outcome was improvement in knee pain on a 0 – 100mm visual analogue scale (VAS) at 24 weeks. Secondary outcomes included improvements in inflammation, knee function, and stiffness. 262 patients (mean ± SD age 55±6 years, 147 females) were enrolled, and 89% completed the trial. After 24 weeks, there was no significant difference in changes in knee pain (diacerein vs placebo VAS change: -19.9mm vs -18.6mm, p=0.77). Diacerein did not improve inflammation, knee function or stiffness. Contrary to our hypothesis, diacerein was not effective at treating knee osteoarthritis in an Australian population.

**Gayathry Krishnamurthy**

Eric K Moses, Shaun P. Brennecke, Hoang T Phan, Phillip E. Melton.

Genetic dissection of polygenic risk scores for cardiovascular disease following preeclampsia

Objectives: Cardiovascular disease (CVD) is a leading cause of morbidity and mortality in women. Sex-specific risk factors, including hypertensive disorders of pregnancy such as pre-eclampsia (PE), confer a five-fold increased risk of later-life CVD. However, the genetic variants underlying this relationship often have small effect sizes. This study analyses the genetic landscape of CVD risk in PE using polygenic risk scores (PRS) to highlight cumulative genetic risks, aiming to improve clinical understanding and alert high-risk individuals. Methods: PRS were calculated for 1,582 participants from the Western Australian Busselton Health Study cohort, employing 834 CVD-related scores from the Polygenic Score (PGS) Catalog and adjusting for ancestry. Differences in PRS across PE and CVD categories were analysed. Results: A single PRS (PGS000735) associated with the PR interval, developed using 44 variants, was significantly different in individuals with both PE and CVD compared to those without, post-adjustment for multiple tests. No significant PRS differences were found between individuals with CVD, with and without PE. Conclusion: These results support the need for sex-specific PRS studies to better understand the differential impact of PE on CVD risk and to explore the genetic complexities in greater detail to develop tailored preventive and treatment approaches for women.

**Ignacio Martinez Escobedo**

Kathleen Doherty, Claire Eccleston

'Infographing' dementia prevention: A co-design approach

Designing effective public health messages is challenging, particularly when communicating complex and relatively new health messages such as dementia risk prevention which are still largely unfamiliar to the public. The accessibility of these messages, especially for individuals who speak English as an additional language, remains uncertain in large scale educational interventions. A key strategy to enhance the communication of evidence-based information is to co-design infographics that optimize the accessibility and impact of visual health messages. This study reports on the co-design process of infographing dementia prevention messages. Qualitative data were analysed using reflective thematic analysis to generate three themes reflecting the message design preferences of participants: 'all hands on deck', 'charting the course', and 'get on board'. This work explores the key elements to consider when designing effective visual messages, and the role of codesign to help create meaningful and accessible health educational tools that will resonate with the intended audience. Doing so may help health communicators navigate the creation of visual messages across diverse health domains and populations.

**Jake Newland**

John P.D McMullen, Caroline Delandre, Owen J Marshall

Differing modes of epigenetic repression in the Drosophila brain revealed by large-scale Targeted DamID profiling and chromatin state analysis

Brain development is a complex process requiring precise control of a multitude of cells and their genomes. Epigenetic changes have become established as a key driver of cell fate, with spreading of HP1 heterochromatin seen as a mark of terminal differentiation. However, little is known in Drosophila about the epigenetic landscapes of the primary cell types in the brain, neurons and glia. Here we show that the epigenomes of brain cells are highly varied, with glia in particular exhibiting unexpected approaches to gene repression. We used Targeted DamID (TaDa) to generate cell-type specific binding profiles of 7 key chromatin proteins and H3K4 trimethylation, in neuron and glial cells at both larval and adult stages. Using these data, we determined chromatin states via a Hidden Markov Modelling approach and identified the epigenetic differences between cell populations. In neurons we saw repression driven primarily by spreading of HP1 associated heterochromatin, a trait expected in a terminally differentiated cell. In glia, however, we saw a relative absence of HP1 heterochromatin. Instead, genes in these cells were repressed primarily in chromatin states with potential for later activation. These findings were consistent across gene bodies, promoter regions and enhancer elements identified from previous single-cell RNA-seq data. Our data show that repression of genes in terminally differentiated cell types is more complex than previously thought. As the first comprehensive profiling of chromatin states within the larval and adult brain, our datasets also represent a major resource for the Drosophila community.

**Jan Leng Cheng**

Adelene Chiam, David Stellon, Jana Talbot, Rachel Atkinson, Anna King, Sharn Perry, Anthony Cook

Using iPSCs to explore SARM1-dependent neurodegeneration

Excitotoxicity is a pathological feature shared by many neurodegenerative diseases, and results in axon degeneration. SARM1 inhibition prevents vincristine- and axonal injury-induced axon degeneration, however its role in excitotoxicity-induced neurodegeneration is unknown. We have used human induced pluripotent stem cell (hiPSC)-derived neurons to explore the role of SARM1 following glutamate analogue kainic acid-induced excitotoxicity. We introduced MYC-tagged human SARM1 variants (MYC-hSARM1 and MYC-hSARM1-K193R, a dominant-negative hSARM1 variant) into the AAVS1 locus of hiPSCs using CRISPR/Cas technology. hiPSCs from both lines expressed undifferentiated cell markers, and embryoid bodies cultured from these cell lines demonstrated each line retained pluripotency. DNA sequencing confirmed the absence of off-target edits, and virtual karyotyping showed no evidence of chromosomal instability in either cell line. Image analysis showed that MYC-hSARM1 variants are co-localised with mitochondria in hiPSC-derived neural stem cells. Using neurons derived from these hiPSC lines, and a small molecular SARM1 inhibitor, we will study the effects of SARM1 inhibition in kainic acid-induced excitotoxicity. Preliminary results show kainic acid reduced cell viability, caused neurite degeneration, and altered electrophysiological properties of hiPSC-derived neurons. We are extending these studies to other neurotoxins, genetic models of ALS, and will employ ‘omics studies to identify downstream pathways in SARM1-dependent neurodegeneration.

**Johanna Jones**

Bennet McComish, Nicholas Blackburn, Jamie E Craig, Kathryn P Burdon

A deep intronic deletion in the Nance-Horan gene causes isolated paediatric cataracts

Paediatric cataracts are a rare, heterogenous disease causing visual impairment or blindness. We aimed to identify the genetic cause of disease in an Australian family with apparent autosomal dominant or X-linked paediatric cataracts without any syndromic features. Genome-wide parametric linkage analysis (Merlin) and genome sequencing (Illumina) was used to identify linkage regions and detect rare, predicted pathogenic variants. The family's phenotype showed suggestive linkage to a 9.6Mb region at Xp22.2-p22.11 (LOD=1.63) and three additional regions at 1p31.3-p22.3, 3p12.1-q11.2, and 14q31.3-q32.11 (LOD=2.23). Both an intergenic SNP in the 1p31.3-p22.3 and a 2.86kb deletion (g.X:17554493_17557354del) in the Xp22.2-p22.11 linkage region met the filtering criteria. The 2.8kb deletion is in intron 1 of the NHS gene and overlaps another deletion that has previously been linked to isolated paediatric cataract. Loss of function variants in NHS cause Nance Horan Syndrome, an X-linked condition characterised by congenital cataracts, dental abnormalities, and dysmorphic features. The deep intronic NHS variant is the likely cause of disease in this family. The mechanism by which intronic variants in the NHS gene cause an isolated cataract has not been elucidated but likely involves dysregulated gene expression. Understanding these mechanisms will greatly assist in guiding appropriate clinical care in these families.

**Jo-Maree Courtney**

Hannah Coombe, Ashnika Sami, Patrick Harrington, Lindsay Edwards, Peter Dargaville, Brad Sutherland

The Peri-Peri Project: does placental pericyte dysfunction contribute to fetal growth restriction?

Blood flow in the placenta is critical for maintaining growth of the fetus throughout pregnancy. Disruption of blood flow in the placenta may lead to fetal growth restriction which can result in an increased risk of premature delivery and poor perinatal outcomes. Pericytes, cells located on capillaries, can regulate blood flow in the brain and other organs but little is known about their role in placental function. The Peri-Peri Project, a collaboration between the Tasmanian School of Medicine and the Royal Hobart Hospital, has been collecting tissue and cells from donated placentas since 2019. Our bank of tissue from healthy and fetal growth restricted placentas is now being used to assess whether pericyte dysfunction may contribute to fetal growth restriction. Preliminary results suggest that placentas affected by fetal growth restriction have increased capillary diameter, a phenomenon seen in other organs when pericytes are lost. In addition, pericytes isolated from fetal growth restricted placentas appear less susceptible to hypoxia than those from healthy placentas which may represent a compensatory mechanism. Ongoing work on this project aims to further understand the distribution and function of pericytes in both healthy placentas and those affected by fetal growth restriction.

**Kaylee Rudd**

Michele Callisaya, Aidan Bindoff, Sigourney Chiranakorn-Costa, Renjie Li, James S McDonald, Katharine Salmon, Alastair J Noyce, James C Vickers, Katherine Lawler, Jane Alty

Detection of subtle hand motor function impairment across the dementia continuum: Results from the ISLAND Cognitive Clinic, Tasmania

Background: We urgently need accessible and cost-effective tests to help detect the early stages of dementia as currently available tests are specialised and expensive. Subtle gait impairments precede cognitive symptoms by years, progressively worsening across the dementia continuum. However, hand movements have been sparsely investigated. We assessed the classification accuracy of a key-tapping test for subjective cognitive impairment (SCI), mild cognitive impairment (MCI) and dementia.
Methods: Participants with SCI (n=40), MCI (n=58), dementia (n=50) and 60 cognitively healthy (CH) were recruited. An interdisciplinary team gave consensus diagnosis after completing a comprehensive standardised assessment. Participants completed a validated 30s online computer keyboard tapping test with each hand. We analysed frequency, mean dwell-time on keys, variance of travel time between key-taps (rhythm), number of errors and speed, adjusting for age, sex and education.
Results: MCI and dementia showed increasing movement impairment (lower frequency/speed, longer dwell-time, irregular rhythm) compared to CH and SCI. Impaired key-tapping classified ≥90% dementia and ≥79% MCI from the CH. Frequency and rhythm were associated with SCI (P≤.03).
Conclusions: Increasing subtle impairments in hand movement present across the dementia continuum. Key-taping test is simple, non-invasive, language/culture-agnostic and accessible online. Key-tapping test can be used to screen for early motor symptoms of cognitive impairment in remote or in-person routine health checks.

**Maddie Spencer**

Rosie Nash, Vaughan Cruickshank, Nenagh Kemp

Addressing community health: Local perceptions on the role of a Health Literacy Mediator

Background: Health literacy is crucial for practicing positive behaviours around one's health. It has been suggested that programs involving the community may empower individuals to take control of their own health. The research team expanded on this idea and has explored the development of an emergent role, a "Health Literacy Mediator".
Aims: The aims of this study were to engage with local community members to acquire local stakeholder perspectives on and the potential of a "Health Literacy Mediator" role.
Methods: Qualitative semi-structured interviews were conducted with local community members and then thematically analysed. This method of analysis was selected as it encompasses the process of evolving themes that are important to the phenomenon of interest, in this case Health literacy and "Health Literacy Mediators". Results: Three main themes of importance were identified: 1) Health Empowerment, 2) Meeting Needs and 3) Navigation and Access. And that they should be positioned throughout a person's life course, with emphasis on during times of need. Discussion: Attention and priority should be focused on the individuals within our community who experience more health literacy challenges. It is vital that those working in the health sector adopt novel and innovative ways to improve Health literacy.

**Maria Bravo Aguilera**

Maria Bravo Aguilera, Matthew Gretton, Ben Sanderson, Clinicians Working Group, Amy Peacock, Raimondo Bruno

Developing practical tools for identifying and supporting treatment-relevant cognitive dys/functions

Background: While there are effective treatment interventions for substance use disorders, there is substantial scope for enhancing client outcomes. Cognition is understood as a factor that can contribute to key outcomes in substance use treatment. The National Institute on Drug Abuse has summarised much of its work on cognitive factors into the 'Addictions Neuroclinical Assessment' framework, which describes negative emotionality, incentive salience and executive function as the essential cognitive functions associated with client's treatment outcomes. However, there is a substantial gap between these theoretical neuroscience-based frameworks and what can be practically implemented in treatment services. This is because these cognitive domains are broadly defined and often require excessive time, specialist skills and expensive equipment to assess. Description of Model of Care/Intervention: We have conducted systematic reviews on how these cognitive domains are defined and evaluated. In collaboration with experts working in D&A treatment services in Australia, we have developed a simple, brief, and open-access battery to assess the core cognitive domains: attentional bias, distress tolerance and inhibition, which we will demonstrate. Conclusion and Next Steps: Current and future steps include working with clinicians and people with lived experience of substance use to develop appropriate automated feedback for this battery. It will be personalised based on individuals' obtained scores and will include practical interventional approaches that can enhance people's skills in these targeted cognitive domains. After testing its acceptability, this package might complement existing approaches to substance use treatment to help improve outcomes.

**Maria Hobbs**

Kim Jose, Ceridwen Owen, Verity Cleland

"If we stay at home, we become invisible" Navigating the inclusion of people with disabilities in a doctoral research project.

Stubborn and avoidable inequities continue to impact the quality of life and health of people living with disability worldwide. Inequity also permeates the research landscape with a deficit of research relevant to the disability community. More empowered forms of collaboration and engagement are also scarce despite recognition that community involvement strengthens the quality of research. This mixed methods, doctoral research incorporated consultation with people living with disability. The purposes of the consultation group were a) to share lived experiences and insights on the topic of liveability to inform the content of data collection tools, and b) to provide feedback on the accessibility of data collection tools and processes. Of central concern, was how to best facilitate meaningful engagement during the consultation process. Group members were recruited and screened for suitability, group activities were planned with consideration of individual and group capabilities, and attention given to the physical and virtual environments. Sessions were flexible so as to respond to the needs of group members. Consultation has led to the design of a survey tool that is sensitive to the needs of people living with disability. For the researcher, several lessons were learned about the effective engagement of community members in research.

**Natalie King**

Alastair Fortune, Ariane Gelinas-Marion, Ashish Mehta, Kimberley Pitman, Himanshu Saraswat, Jac Charlesworth, Kathyrn Burdon, Nicholas Blackburn, Kaylene Young, Jessica Fletcher

The effect of rare high-risk gene variants on cellular function in multiple sclerosis

Multiple sclerosis (MS) is a complex brain disease, causing fatigue, balance problems, sensory disturbances, and brain fog. A person's environment, lifestyle and genes influence whether they will develop MS. To understand the genetic components that contribute to the development of MS, we recruited families with a high MS incidence. Whole genome sequencing of family members with and without MS, identified 2 rare gene variants associated with MS that are highly expressed in astrocytes and microglia of the central nervous system and are predicted to be highly deleterious (Phred-scaled Combined Annotation Dependent Depletion (CADD) > 25). These were in the genes encoding kainate receptor subunit GRIK4 and the pattern recognition receptor NLRX1. To determine if the variants cause intrinsic CNS dysfunction contributing to MS development, we generated induced pluripotent stem cells (iPSCs) from family members with MS and unrelated non-MS donors without the variants. We differentiated these iPSCs into astrocytes and microglia, and other key CNS cell types. We are performing RNA sequencing and functional tests on these cells. Initial results indicate that astrocyte homeostasis may be intrinsically dysfunctional in astrocyte-like cells generated from the MS family. These experiments will determine if intrinsic CNS dysfunction contributes to MS development and progression.

**Nicodemus Masila**

Kylie Smith, Verity Cleland, Laura Sutton, Julie Dunbabin, Kim Jose

Stakeholder perspectives on allergy and anaphylaxis management in the Tasmanian School Lunch Project

Food allergies are prevalent in Australian schools, with approximately one in 20 students having a food allergy. The Tasmanian School Lunch Project is a two-year state-government funded project providing free nutritious cooked lunches to students in 30 Tasmanian government schools. To address food insecurity while enhancing inclusivity, it is important to support involvement of students with food allergies. This study explored stakeholder perspectives to enable students with food allergies to safely participate in the School Lunch Project. A developmental evaluation approach with qualitative data collection included review of project documentation, stakeholder interviews and focus groups in 2022-23. Data were analysed thematically, and five themes were identified: collaboration and communication, allergen risk assessment and management, resource support for schools, inclusion and equity of food access, and enhanced awareness and information sharing among stakeholders. Arising from these, adequate planning and resources were identified as being critical for refinement of allergen management processes and protocols before allergen-free meals can be provided in all schools. Allergy management within the School Lunch Project is a complex public health, nutrition, and environmental health issue. It requires collaboration, coordination, and capacity building of stakeholders to safeguard students' health, enhance food security and equity of access.

**Samantha Bramich**

Alastair Noyce, Laura Perez-Carbonell, Anna King, Xinyi Wang, Aidan Bindoff, James Vickers, Jane Alty

Dream Big: detecting prodromal Parkinson's disease by in-depth analysis of male and female dreaming

Rapid eye movement (REM) sleep behaviour disorder (RBD) is a sleep disorder in which people 'act out' their dreams. It is a prodrome of Parkinson's disease and difficult to detect, especially in females. Current screening questionnaires focus on vivid and aggressive dreams, with little research investigating sex differences in dream characterisation in RBD. We investigated dream characteristics in a large cohort (n=2,829) to explore sex differences in the dreams of healthy controls (HCs) and those with 'probable' RBD (pRBD). In the HC group, males reported dreams that were less emotionally intense and had a more positive emotional tone, whereas females reported more frequent, recurrent and distressing nightmares. Those with pRBD recalled their dreams more frequently than HCs, and also reported more emotionally intense dreams, experienced more frequent and recurrent nightmares, and felt that dreams affected their mood more during the day. In the pRBD group, females experienced more emotionally intense dreams, more recurring nightmares related to waking life, and more childhood nightmares compared to pRBD males. These sex-specific differences in dream characteristics in the general population and in pRBD show that RBD screening questionnaires should consider questions on emotional dream intensity and recurrent/childhood nightmares to accurately identify females with pRBD.

**Sayed Koushik Ahamed**

Fionnghuala James, Sanket B. Raut, Vanni Caruso, Sukhwinder S. Sohal, Luke R. Johnson

Investigation of NMDA effects on fear memory and neuronal plasticity

Post-Traumatic Stress Disorder (PTSD) is characterized by persistent fear-related memories. The glutamatergic N-methyl-D-aspartate (NMDA) receptor plays an important role in synaptic plasticity and memory processes, including fear memory consolidation and reconsolidation, Disruption of fear memory reconsolidation processes have been proposed as a therapeutic approach for PTSD.This research aimed to investigate the synergistic impacts of the NMDA agonist D-cycloserine (DCS) and the NMDA antagonist MK801 on fear memory reconsolidation in male C57BL/6 mice. We tested the hypothesis that DCS can labilize a recalled memory which can then be disrupted by MK801.

**Sophie Navickas**

Sophie Navickas, Phillippa Taberlay

Live-cell imaging of medulloblastoma cells investigating BRG1-regulated chromatin dynamics

Epigenetics refers to heritable changes that exist on top of DNA and modify gene expression without altering the genetic code. The SWI/SNF chromatin remodeling complex physically rearranges DNA to regulate accessibility for transcription. Epigenetic dysregulation is known to be a major driver of cancer and the SWI/SNF complex is frequently mutated in multiple cancer types, at a rate second only to TP53. Medulloblastoma is a paediatric malignant brain tumour, divided into four subgroups. In the Sonic Hedgehog (SHH) subgroup of medulloblastoma, the ATPase subunit of the SWI/SNF complex, BRG1, has been implicated in driving expression of oncogenes to promote cell proliferation. However, how BRG1 is working at an epigenetic level to influence chromatin organisation is unknown. To explore BRG1-associated chromatin dynamics, we performed live-cell imaging of SHH-medulloblastoma cell lines (ONS-76 and Daoy) in the presence of a BRG1 inhibitor (BRM014). We used two different fluorescent labelling systems, H2B-mCherry and the FUCCI system, to track cells through the cell cycle, classify cell division outcomes, and identify signs of genome instability. We observed that BRG1 inhibition caused altered cell cycling and a decrease in normal mitotic outcomes. These insights expand upon the current understanding of the role BRG1 has in supporting SHH-medulloblastoma.

**Suzie Waddington**

Seana Gall, Rishita Chandra, Monica Mellefont, Nicola Gadd

Removing nicotine from the lives of young people; using participatory approaches to work with young Tasmanians

Vaping is a major public health issue that has gained momentum over the last few years in Tasmania. In previous research with young people, we have been advised by young people to co-design solutions with them. Since 2023, our tobacco research team have been working with young people aged 12-24 to understand their knowledge and understanding about vaping, understand and design relevant messages to warn young people about the dangers surrounding addiction and co-design a program to pilot that has a focus on cessation of nicotine products. Participatory approaches and action research principles have guided the mixed-method design of collaborative research. The presentation will share what we have completed with 18-24 year olds, preliminary findings from 12-18 year olds and what methods we have used to maximise participation from young people that still align with rigorous ethical standards. One message from young people is clear, we need to work with them to ensure our messaging is relevant and meaningful for young Tasmanians.

**William Reay**

William Reay, Dylan Kiltschewski, Maria Di Biase, Zachary Gerring, Kousik Kundu, Praveen Surendran, Laura Greco, Erin Clarke, Clare Collins, Alison Mondul, Demetrius Albanes, Murray Cairns

The genetic architecture of circulating retinol: biological insights and clinical implications

All-trans retinol (retinol) is a fat-soluble vitamin that plays an essential role in numerous biological processes. Whilst circulating retinol detected from blood is under tight homeostatic control, there is still variability amongst individuals to which genetics contributes. Here, we report findings from the largest to-date genome-wide association study (GWAS) of circulating retinol in up to 22,274 participants. We identified eight common variant loci associated with retinol, as well as a rare-variant signal. After comprehensive gene prioritization, these data revealed novel genetic signals for circulating retinol beyond the main retinol transport complex (RBP4:TTR) related to lipid biology, energy homeostasis, and endocrine signaling. Genetic proxies of circulating retinol were then used to estimate causal relationships with almost 20,000 clinical phenotypes via a phenome-wide Mendelian randomisation study (MR-pheWAS). The MR-pheWAS suggested that retinol may exert causal effects on inflammation, adiposity, ocular measures, the microbiome, and MRI-derived brain phenotypes, amongst several others. We will also discuss how these data are now being used to investigate clinically important questions, such as how retinoid acne treatments influence the brain. In summary, we demonstrate the complex nature of genetic influences retinol and how these data could be leveraged to better support the implementation of retinoid related interventions.

**Zemene Demelash Kifle**

Zemene Demelash Kifle, Jing Tian, Dawn Aitken, Phillip E. Melton, Flavia Cicuttini, Graeme Jones, Feng Pan

Serum levels of endogenous sex hormones are associated with chronic musculoskeletal pain

Background: Sex-differences in pain perception have been reported; however, whether sex hormone levels play a role in chronic musculoskeletal pain (CMP) is unclear. Therefore, this study aimed to investigate whether endogenous sex hormone levels are associated with multisite and site-specific CMP. Methods: We used data from a large population-based prospective cohort study (n=357,424; mean [SD] age, 56.5 [8.1] years; females [51.6%]). Serum levels of estradiol, testosterone, and sex hormone–binding globulin (SHBG) were measured at baseline. Musculoskeletal pain in the neck/shoulder, back, hip, knee, or 'all over the body' was assessed at baseline and subsequent three follow-ups. Mixed-effects multinomial/logistic regression models were used for the analyses.Results: In multivariable analyses, lower levels of testosterone were associated with greater number of CMP sites in both females [OR=0.80 per SD, 95% CI (0.76, 0.83))] and males [0.81 (0.77, 0.86)]. Lower testosterone levels were associated with neck/shoulder, back, hip, and knee CMP in both sexes. Neither estradiol nor SHBG levels were associated with number of CMP and site-specific CMP in both sexes, while lower levels of SHBG were associated with neck/shoulder CMP in both sexes. Conclusion: Lower testosterone levels were associated with number of CMP sites and site-specific CMP, while lower levels of SHBG were associated with neck/shoulder CMP. These findings suggest that sex steroids may have a role in the pathogenesis of CMP.

**Oliver Johnstone**

James Crane, Sharn Perry

Investigating Structural Amygdala Changes in the SOD1 G39A Mouse Model of Amyotrophic Lateral Sclerosis

Amyotrophic lateral sclerosis (ALS) is an aggressive and debilitating neuromuscular disorder predominantly characterised by the progressive degeneration of motor neurons to result in dysfunctional motor control. However, symptoms are not purely motor, and pathology is not exclusive to motor neurons. ALS patients live with multiple extra-motor symptoms associated with cognition, memory, social behaviour, and anxiety levels. Regulating these areas within the limbic system, the amygdala is potentially involved in extra-motor changes. The current literature regarding amygdala pathology in ALS patients is scarce and non-existent regarding animal models of ALS. To alleviate this literature gap, amygdala pathology was determined by quantifying neurons, microglia, and astrocytes in the SOD1G93A Tg mouse model of ALS at the end-point of the disease in the lateral and anterior nuclei of the basolateral complex, the central nucleus, and the medial nucleus of the amygdala using immunohistochemistry. Neuronal density was significantly reduced in the lateral and anterior aspects of the basolateral amygdala and the central amygdala in the SOD1G93A Tg mice compared to wild-type mice. Astrocyte and microglia count and density were significantly increased in the central and medial amygdala in the SOD1G93A Tg mice compared to wildtype mice. Collectively, the data of this thesis demonstrates that pathology exists in the amygdala in SOD1G93A Tg mice and occurs in a region-specific manner. This finding suggests that amygdala pathology in ALS may contribute to the extra-motor symptoms in ALS patients, however, more research is needed to determine this association.

**Rosie Nash**

Vaughan Cruickshank, Shandell Elmer, Karen Pearce, Claire Otten, Nenagh Kemp, Louisa Peralta, Joseph Scott, Donald Reid, Jordan De Hoog, Nnamdi Eseme, Carolyn Wolsey

A Synthesis of HealthLit4Kids Findings: Stakeholder perspectives of a health literacy intervention delivered in Tasmanian Schools.

An individual's health literacy is their ability to find, use and apply health information and services to promote their health and the health and wellbeing of others. Improving health literacy can result in individuals making more educated and informed health related decisions and consequently having better health outcomes. In locations such as Tasmania, where health and educational outcomes are lower than the national average, improving health literacy has the potential to have a large positive influence on the community. While improving health literacy is beneficial at any age, improving children's health literacy can be particularly impactful, as it has been shown to improve their health outcomes throughout their lives. HealthLit4Kids is an education package designed for use in schools to raise awareness of health and promote discussions about health among teachers, students, families and communities. The program has been running in five Tasmanian primary schools since 2018 to support classroom teachers to develop health literacy in their students and encourage schools to embrace it across their curriculum. This presentation will present findings from research undertaken with teachers, parents and school leaders from these five schools as well as detail the next steps required for scalability and sustainability of the program.

**Alan Morrison**

Deborah Debono, Daniel Demant

Health Practitioner Motivational Postures: The application of motivational posture theory to health practitioner regulation.

The objective of Australian health practitioner regulation is to protect the public. The efficacy and impact of Australian health practitioner regulation in achieving this objective is dependent, in part, on the extent to which health practitioners accept the purpose of regulation and engage with its standards, systems and regulatory agencies. Understanding what motivates engagement or disengagement of practitioners, which subsequently influences compliance or non-compliance, cooperation or defiance, may assist in achieving more effective regulation for everyone involved. The purpose of this research is to understand the attitudes of registered health practitioners towards health practitioner regulation and to what extent this reflects their level of engagement with regulation from the professions of pharmacy and paramedicine. The research will apply the theory of motivational postures, developed by Valerie Braithwaite, to explore these health practitioner attitudes and their subsequent impact on engagement within these professions. The theory has been successfully applied to other areas of regulation e.g. taxation and environmental regulation, but never to health practitioner regulation.

**Andrew Phipps**

Sueanne Chear, Fariha Kabir, Rachel AK Atkinson, Jana Talbot, Samuel Dwyer, Deepika Dixit, Sharn Perry, Richard Wilson, Anthony L Cook, Anna E King

To die or not to die: What is the mechanism of excitotoxic axon degeneration in MND?

Nerve cell axonal processes, which connect our brain, spinal cord, and muscles are vulnerable to degeneration in motor neuron disease (MND), leading to loss of motor function and mortality. Excitotoxicity is believed to be a driving mechanism for axon degeneration in MND. However, the precise mechanisms resulting in excitotoxic axon degeneration are not fully understood due to complex molecular profiles involving localised transcripts and protein synthesis, or distinct structural phases of degeneration. Delineating axon degeneration mechanisms is crucial for developing neuroprotective strategies, as growing evidence suggests it is distinct from cell soma-based degeneration. We have developed a model of excitotoxic axon degeneration using human induced pluripotent stem cell-derived cortical neurons, characterising the molecular profile of axons across the distinct phases of excitotoxic axon degeneration using transcriptomics and proteomics. The earliest changes in excitotoxic axon degeneration feature depletion of pathways associated with cytoskeletal organisation, vesicle formation, post-translational modifications, and enrichment of RNA processing. Dynamic regulation of pathways involving mitochondria, RNA transport, and synaptic vesicles, are altered across distinct phases of axon degeneration, including proteins TOMM20, ACTN1, UBQLN1/2. This is the first comprehensive characterisation of excitotoxic axon degeneration in human neurons and provides insight into novel candidates for therapeutic intervention in MND.

**Cheryn Coleman**

Satish Melwani, Jasmine Angus, Stuart Ferguson, Rosie Nash

Free nicotine replacement therapy and specialist support through community pharmacies: Pharmacists and smokers views of a pilot programme

Background: Smoking is a leading cause of preventable disease worldwide and disproportionately affects people living in lower socioeconomic areas. This study aimed to evaluate the feasibility of offering free nicotine replacement therapy and cessation advice through pharmacies. Methods: An exploratory mixed methods approach was used to evaluate the programme, and provide insight into barriers and facilitators of the service. Two groups of individuals were involved: pharmacists (n=8) and smokers interested in quitting (n=55). At the conclusion of the programme, 7 pharmacists and 10 smokers completed semi-structured interviews. Findings: Pharmacists reported finding the experience rewarding but felt constrained by external factors, such as having to fit the service in around other tasks. The existing relationships pharmacists have with their customers helped to engage smokers. Smokers reported few barriers to the programme itself, but life circumstances, access to healthcare, as well as social norms were barriers to quitting smoking more generally. Conclusions: Overall, pharmacists were supportive of the initiative and smokers appreciated the service. Smokers recognised that removing the barrier of finance and making smoking cessation services accessible through pharmacies was beneficial. These outcomes further build local knowledge around what works to support people from priority populations who quit smoking.

**Eddy Roccati**

Larissa Bartlett, Aidan Bindoff, Kathleen Doherty, Sarang Kim, Claire Eccleston, Alex Kitsos, Jane Alty, Anna King, James Vickers

An online, public health framework supporting behaviour change to reduce dementia risk in Tasmanians over 50: Interim results from ISLAND (Island Study Linking Ageing and Neurodegenerative Disease)

Island Study Linking Ageing and Neurodegenerative Disease (ISLAND) is a longitudinal public health initiative that seeks to positively impact dementia risk in Tasmania. Participants complete surveys annually and are provided tailored feedback on their risk level (low, medium, high) across 9 domains via a traffic-light style Dementia Risk Profile (DRP). Participants are provided information about managing risks and encouraged to do our Preventing Dementia Massive Open Online Course (PDMOOC). Here we used linear mixed effects regression models to assess changes in the number of high-risk domains indicated in DRP data over time and relative to PDMOOC exposure. Data from baseline (n=7270) to 36 months (n=3428) were included in analyses (73.2% female, average age 64 years). Baseline DRP data showed a mean total 2.08 (95%CI 2.00, 2.16) at-risk domains, which reduced by 0.11 domains (95%CI 0.08, 0.13) for each month in the program. Overall, we found participating in ISLAND was associated with sustained improvement in health behaviours related to dementia risk over 3 years, further enhanced by engagement with our PDMOOC. Here we show how providing education and tailored feedback on dementia risk provides benefit, however some health risk factors may be more easily targeted for improvement than others.

**Emilia Hawkey**

Nenagh Kemp, Annie Worthing, Matt Palmer

Influences and interventions: Understanding spelling decision-making through capitalisation

Literacy is crucial to our capacity to function in modern society and, therefore, to our wellbeing. English spelling is complex, combining sound-based, meaning-based and letter-sequencing patterns with grammatical patterns like capitalisation. There is no sound-based information to help children make capitalisation decisions, so they must learn to capitalise 1) proper nouns and 2) the first word in a sentence; these rules serve as “cues” to capitalisation. This presentation will describe the factors that influence children’s and adults’ capitalisation decisions. Our recent studies show that adults make few capitalisation errors, but may perform better with two capitalisation cues than one, regardless of the format or writing modality of the task. Children only capitalise two-cue words better than one-cue words when they write consecutive (cf. single) words in a sentence. We are currently preparing an intervention to help children improve in their use of capitalisation and of another silent pattern, apostrophes. Children will be taught to look for cues to these spelling patterns in their writing, and will be tested in pre- and post-intervention fill-in-the-blanks tasks. This research has implications for spelling theory, and can contribute to the learning and teaching of foundational spelling skills to increase children’s confidence in writing.

**Emily Attrill**

Oscar Scharapow, Renee M Ross, Stephen M Richards, Brad A Sutherland, Dino Premilovac

Biological sex, not age, alters skeletal muscle pericyte density in otherwise healthy mice

Both age and sex are known to influence vascular function, but the alterations and exact mechanisms by which this occur has not been elucidated. Pericytes wrap around capillaries and regulate capillary structure and blood flow in many organs in the body. Whether muscle pericyte density changes with age, and how this is impacted by biological sex is not known. Therefore, the aim of this study was to characterise skeletal muscle pericyte density in young and aged mice.
Young (~5 months) and old (18 months), male and female NG2-DsRed transgenic mice (pericytes express DsRed) were cardiac perfused with PBS, followed by 4% paraformaldehyde. The tibialis anterior muscle was excised and processed to characterize pericyte and capillary changes using immunohistochemistry and microscopy.
Our results show that age had no effect on muscle fibre size in females, but muscle fibre size decreased with age in males. In young mice, females had higher capillary density compared to males, however, there was no change in capillary density with age. Despite having higher capillary density, young female mice appeared to have decreased pericyte density compared to males and this biological sex difference remained in the aged mice. There was no difference in pericyte density between young and old mice.
In conclusion, whilst muscle pericyte density appears to be conserved with age, pericyte density is altered by biological sex. Whether pericyte function in muscle differs between biological sex and how this may change in disease requires further investigation.

**Grace Russell**

Vicky Wilkinson, Stephen Pefanis, Andrew Thompson, Sarah Peck, Alison Dann, Ruth Pye, Scott Carver, Andrew S. Flies

Sarcoptic mange in a Tasmanian devil (*Sarcophilus harrisii*) and Bennett's wallaby (*Notamacropus rufogriseus*)

Sarcoptic mange, caused by the invasive parasitic mite Sarcoptes scabiei, is a highly contagious disease documented in 148 species worldwide. Mites penetrate and reside within the lower epidermis in infected animals, resulting in type IV hypersensitivity reactions. Left untreated, S. scabiei causes severe pruritis (itching) with the subsequent hyperkeratosis (skin thickening) and self-trauma resulting in skin fissures, fly strike , and secondary infections. In addition, increased energetic demands, decreased foraging, and loss of body condition contribute to high levels of morbidity and mortality in wildlife. Here, we report S. scabiei infection in two new Tasmanian host species, the Tasmanian devil (Sarcophilus harrisii) and Bennett's wallaby (Notamacropus rufogriseus). Morphological and molecular diagnostics confirmed S. scabiei as the causative agent in both animals. The Tasmanian devil was co-infected with devil facial tumour 1, Demodex spp., and Cylicospirura heydoni, suggesting systemic immunosuppression in this animal. These reports highlight the need for the development of enhanced surveillance and management strategies to mitigate the spread of S. scabiei in Australian marsupials, particularly endangered species such as the Tasmanian devil. Our study contributes to the growing body of evidence on the expanding host range of S. scabiei, emphasizing its significance as a global health concern.

**James Brady**

Aidan Bindoff, Larissa Bartlett, Kimberley Norris, Eddy Roccati, James C. Vickers, Duncan Sinclair

Intervening paths: A dual networks approach to modifiable dementia risk in healthy older adults.

Multi-domain modifiable dementia risk reduction interventions are promising tools for dementia prevention. Yet, those most at-risk may be least able to enact or maintain change. At-risk cohort outcomes could be improved by interventions which target up-stream determinants of dementia risk behaviours. Pairing regularised partial correlation networks (RPCNs) with Bayesian machine-learned directed acyclic graphs (DAGs), we unveil future targets for multi-domain interventions. Our cohort, aged over 50, included community-dwelling participants of the Island Study Linking Ageing and Neurodegenerative Disease (ISLAND) Resilience Initiative (n=1225). We used graphical lasso shrinkage and extended Bayesian criteria to generate an RPCN comprising stress-related, demographic and dementia risk factors. Multiple 10,000-bootstrap DAGs were learned and averaged, with a final stepwise-refined model informed by all networks. Highly influential factors, which occurred upstream of modifiable dementia risks, were identified through RPCN-DAG contrasts. Chronic Stress, Depression, and Social Support were high-influence RPCN components, identified below Coping and up-stream of cardiometabolic dementia risks in the refined DAG. A weaker ancillary path connected Coping with Social Support, through Cognitive Activity. Robust RPCN estimates alongside the forced directionality of Bayesian network DAGs show levels of Coping, Chronic Stress, Depression, and Social Support are probable determinants of our sample's cardiometabolic-related modifiable dementia risk behaviours.

**James Slimmer**

Johanna L Jones, Bruce V Taylor, Kathryn P Burdon, Nicholas B Blackburn

Discovery of structural variation and tandem repeat expansions in a family with multiple sclerosis

Multiple sclerosis (MS) has a strong genetic component with genome-wide association studies (GWAS) identifying 233 loci associated with MS risk; however, these loci only explain ~39% of the estimated heritability. Part of the remaining 'missing heritability' has been proposed to lie in rare genetic variation, particularly in variant types not analysed in GWAS such as structural variants (SV) and tandem repeats (TR). Structural variants are insertions, deletions, or rearrangements greater than 50 base pairs, while TRs are consecutive units of 1 or more base pairs. Tandem repeat expansions and SVs have been implicated in many monogenic and polygenic diseases, but have not been investigated in MS. We used short and long-read whole genome sequencing to analyse SVs and TRs genome-wide in a multi-case MS family. We identified two SVs segregating with MS that are not found in multiple long-read databases of SV allele frequencies. Additionally, we found 142 TR loci where repeat unit sizes greater than the population 99th percentile were only shared by affected family members. Discovery of a rare SV or TR that influences MS risk would represent a new avenue of research in MS and may have implications for our understanding of MS biology.

**Jane Alty**

Xinyi Wang, Renjie Li, Aidan Bindoff, Eddy Roccati, Guan Huang, Kaylee Rudd, Kate Lawler, Rebecca St George, Larissa Bartlett, Jessica Collins, Anna King, Quan Bai, James Vickers

TAS Test: Identifying preclinical Alzheimer's disease in older Tasmanian adults using AI-analysis of hand movements at home

Background: There is a lack of population-level tests for preclinical Alzheimer's disease (AD). We aimed to evaluate how TAS Test, a new online unsupervised hand-movement test, predicts preclinical AD biomarkers (plasma ptau181 and episodic memory decline). Method: Cognitively asymptomatic participants completed TAS Test's finger-tapping computer tests at home and CANTAB Paired Associate Learning [CANTAB], measuring episodic memory. A subset provided blood samples for ptau181 analysis. Accuracy of linear regression models comprising motor features to predict PAL scores and p-tau181 levels, adjusted for confounding, was compared to null models (confounders only: age, gender, education level, anxiety, depression) using R2adj and AIC. ΔAIC > 2 denotes statistical difference. Result: 1,228 adults (mean (SD) age, 65.8 (7.4) years; 73.0% female) completed TAS Test and CANTAB; 459 underwent ptau181 analysis. All keyboard tests improved prediction of episodic memory; the 3 step- (ΔAIC = 11.2; R2adj = 8.1%) test ranked highest and also improved ptau181 prediction (ΔAIC = 7.0; R2adj = 17.8%). All webcam motor measures improved CANTAB/ptau181 predictions; the best was dominant-hand tapping (CANTAB ΔAIC = 2.9; R2adj = 8.2%; ptau181 ΔAIC = 2.4; R2adj = 12.9 %). Conclusion: TAS Test provides an accessible language-agnostic home-based test for identifying preclinical AD risk.

**Lyzette Matthews**

James W. Crane, Anna E. King, Sharn E. Perry

Renshaw cell pathology in mouse models of ALS

The vulnerability and loss of spinal cord interneuron populations may drive lower motor neuron (MN) hyperexcitability and degeneration in ALS, but the involvement of specific interneuron populations remains unclear. Renshaw cells (RC) are found exclusively in spinal motor circuits vulnerable to ALS pathology, but whether RCs are responsible for MN hyperexcitability and death is uncertain. This project aims to investigate whether the RC circuit is vulnerable to ALS-linked degeneration. Cervical and lumbar spinal cord sections were collected at end-stage disease from SOD1G93A, TDP-43ΔNLS, and TDP-43Q331K ALS mouse models. Sections were labelled with cholinergic acetyltransferase (ChAT) for MNs and calbindin (CB) for putative RCs. Preliminary analysis revealed a significant decrease in cervical MNs in SOD1G93A mice, but not in TDP-43ΔNLS mice. Conversely, cervical putative RCs remained unchanged in SOD1G93A mice but increased in TDP-43ΔNLS mice. As expected, SOD1G93A and TDP-43Q331K mice showed reduced lumbar MNs compared to WT, with no change in lumbar putative RCs for SOD1G93A mice but an increase for TDP-43Q331K mice. TDP-43ΔNLS mice exhibited no difference in lumbar MNs compared to WT, yet putative RCs were significantly elevated in this model. This ongoing study will provide crucial insights into Renshaw cell vulnerability across different ALS mouse models.

**Rebekah Pullen**

Matthew J. Sharman, Ami Seivwright, Denis Visentin, Katherine Kent.

The association between socioeconomic position and diet quality in rural and regional Australian adults

Area-level socioeconomic position influences diet quality in rural and regional Australian adults. This cross-sectional study explored the relationship between diet quality and socioeconomic position among adults in rural and regional areas of Tasmania. The Australian Recommended Food Score (ARFS) measured diet quality, while area-level socioeconomic position was determined using the Socio-Economic Index for Areas (SEIFA). A key finding of our study highlighted that SEIFA quintiles 2–5 had similar mean total ARFS, with all three quintiles categorised as 'getting there'. However, quintile 1 had significantly lower total ARFS compared to all other SEIFA quintiles and was categorised as 'needs work'. Linear regression, adjusting for age, sex, income, education, employment status, and household composition, demonstrated lower overall diet quality for quintile 1 compared to quintile 3 and that the lower diet quality scores for quintile 1 were driven by lower subscale scores for vegetables, fruit and grains. In adjusting for individual confounders of diet quality, our results show that area-level socioeconomic position influenced diet quality in our sample of rural and regional Tasmanian adults. Further, it suggests that broader social and environmental factors unique to these areas may impact diet quality and amplify individual barriers to achieving a healthy diet.

**Ross Langley**

William Bennett, Aidan Bindoff, Alison J. Canty

Subthreshold repetitive transcranial magnetic stimulation modulates structural synaptic plasticity in skilled motor learning

Sub-threshold repetitive transcranial magnetic stimulation (rTMS) is a non-invasive brain stimulation technique employing magnetic waves to stimulate neuronal elements. Priming with rTMS (administering it immediately before an event) has been shown in rodents to increase accuracy whilst learning a skilled reaching task. The effects of rTMS can be long-lasting, however the mechanism remains unclear. Our study aims to investigate the impact of priming with rTMS on structural synaptic plasticity within the motor cortex. We employed longitudinal in vivo 2-photon microscopy to examine changes in the structural plasticity of pyramidal neuron dendritic spines in the motor cortex. Mice received either rTMS or sham rTMS immediately prior to a skilled reaching task every day for ten days. Relative to baseline, reaching coupled with rTMS priming resulted in an increase in dendritic spine gains, with the most significant rise occurring within the initial three days of exposure to the skilled reaching task, before reverting to baseline levels upon task cessation. In contrast, animals subjected to sham rTMS priming exhibited suppressed gains during the initial three days of exposure, returning to baseline levels by day four. These findings provide evidence that rTMS, when employed as a primer for a learning task, modulates synaptic plasticity.

**Sophie Mayne**

Emily Attrill, Renee Ross, Darren Henstridge, Dino Premilovac

Regular Insulin Administration Impacts Skeletal Muscle Strength and Body Composition in Sedentary Healthy Rats

Exogenous insulin is injected by patients with type 1 diabetes to control blood glucose levels. It is unclear what effect repeated insulin injections may have on skeletal muscle and adipose tissue mass and function. Therefore, the aim of this study was to determine whether exogenous insulin administration alters muscle and adipose tissue function in sedentary healthy rats. Male rats weighing ~200g were injected intraperitoneally three times/week for four weeks, with either saline (0.9% NaCl; n=5), glucose (0.2g/kg; n=4), or insulin plus glucose (1U insulin + 0.2g/kg glucose; n=4). After 28 days, force development in one hindlimb was assessed using field stimulation. Immediately after this, calf muscle (soleus, gastrocnemius and plantaris) and adipose tissue (epididymal) were excised, weighed, and stored for future analysis. Regular insulin administration in otherwise healthy rats did not impact body weight, with an average weight of ~340g in all three groups. Insulin administration reduced total calf muscle mass by ~8% and maximal force generation by ~3.5% compared with glucose and saline rats. In contrast, epididymal fat pad mass increased in insulin injected rats by ~20% compared to saline and glucose injected rats. In summary, our data suggests that four weeks of exogenous insulin administration may decrease calf muscle strength and mass, and increase fat mass in sedentary healthy rats. The mechanisms responsible for these physiological changes, and whether exercise training is able to attenuate these changes, remains to be determined.

**Surbhi Agarwal**

Thomas S Lewis, Alastair J Fortune, Yiing C Yap, P Tram Nguyen, Jake M Cashion, Natalie E King, Kaylene M Young, Jessica L Fletcher

Exploring the Microglia-Specific Function of Nlrx1 in the Healthy Adult Brain

Nod-like receptor X1 (NLRX1) is a pattern recognition receptor involved in anti-viral signaling. It has a unique mitochondrial targeting sequence in its N-terminus suggesting it has a crucial role in the mitochondrial function. Recent studies in which Nlrx1 is globally deleted in mice highlight the critical involvement of NLRX1 in regulating the inflammatory responses of the central nervous system (CNS) after peripheral immune system infiltration. However, the specific function of NLRX1 in microglia, the cell type that is central to local inflammatory responses in the CNS, is unknown. To understand the function of NLRX1 in microglia, we used the inducible Cre-LoxP system to selectively delete Nlrx1 from microglia using the Cx3cr1 promotor in healthy adult mice. Cx3cr1YFP-CreER (Litt) and Cx3cr1YFP-CreER (Litt):: Nlrx1fl/fl mice received 30mg/kg of tamoxifen for four days to induce Cre recombinase to facilitate the deletion of exon three in Nlrx1. At 30- and 90- days post-tamoxifen mice underwent a battery of 5 motor function tests. Brains were collected for histology at 7-, 30-, and 90-days post-tamoxifen. We validated the conditional deletion of Nlrx1 by reconstructing microglial cells using 3D analysis software, which confirmed a successful reduction in NLRX1 volume within microglia in the Nlrx1-deleted mice compared to control mice. Rotarod and beam walk motor tests revealed no difference in motor function between Nlrx1-deleted and control mice. This study will provide us with knowledge of the microglia-specific role of NLRX1 and its potential implications in pathological conditions. In the future, its potential role in immune-mediated neuroinflammatory diseases like multiple sclerosis will be explored.

**Thomas Guinan**

Helena Liang, Sandy Hung, Rajendra KC, Alexander Barnett, Primrose Mandalawatta, Kirsten Fairfax, David A Mackey, Stuart MacGregor, Jamie E Craig, Alex W Hewitt

Expression Quantitative Trait Loci mapping of Trabecular Meshwork Cells at single cell resolution

Primary open angle glaucoma (POAG) is a chronic, progressive and irreversible multifactorial optic neuropathy with an unclear aetiology. Elevated intraocular pressure (IOP) - from increased resistance by trabecular meshwork against aqueous humour outflow - is widely considered a significant risk factor. One possible contributing factor to IOP - and, though debatable, the propagation of POAG - is the use of anti-inflammatory glucocorticoids, particularly dexamethasone, in ophthalmology. This project aims to better outline a previously observed distinct gene signature, and to elucidate how dexamethasone can affect IOP by inducing meshwork remodelling. Following consensus recommendations for the cell type, nine single cell datasets of pooled trabecular meshwork samples were generated in previous work, alongside per sample genotyping data. Fifty nine samples passed single cell and genotype quality control before being demultiplexed from pooled data by genotype with an average 4278 single cells per sample. Supervised classification was used for cell type calling. Cis expression quantitative trait loci analysis was performed per cell type, prior to colocalisation against IOP genome wide association summary data. With this work, and in further steps, we aim to demonstrate causative loci of IOP in the context of dexamethasone treatment, and how these contribute to glaucoma.

**Vimarsha Kodithuwakku**

Monique Breslin, Elaine Urbina , Pierre Boutouyrie , Rosa-Maria Bruno , Seana Gall , Rachel Climie

The Youth Vascular Consortium – a resource to understand early vascular ageing in children, adolescents and young adults

Cardiovascular disease (CVD) is a leading cause of global mortality. Therefore, it is important to identify the development of CVD at the subclinical stage, particularly in young people. An assessment of functional and structural alterations of the vasculature, or vascular ageing, could be a possible way to capture those who are at risk of developing CVD. There are a number of different markers to assess vascular ageing. Reference intervals (RI) for these biomarkers have been developed for adults but have not been well-established for young people. This study aimed to describe the characteristics of participants in a large, international collaborative study, the Youth Vascular Consortium (YVC), that will be used to create RI for vascular ageing in young people. We obtained raw, de-identified data of healthy participants from 35 collaborators from 24 countries. Participants were stratified into groups based on sex, age, height and blood pressure and then RI will be developed for children, adolescents and young adults separately as the percentile curves for each age group. For developing RI for the biomarker pulse wave velocity, 23,006 participants (48% female, mean age 16.6 ± 8.5 years) between the ages of 3 years to 39 years were included.

## ABSTRACTS – POSTERS

**AiMei Chang**

Chen-Chih Chen, Jai-Wei Lee

Enhancing wildlife conservation strategies: Using non-invasive fecal IgG profiling for GnRH vaccine efficacy monitor in Sika Deer

The Formosan sika deer (Cervus nippon taiouanus) is an endemic subspecies of sika deer in Taiwan. Without its native predators, the population of sika deer has exploded, leading to increased conflicts between humans and wildlife. Due to concerns about animal welfare and human safety, there is a growing demand for the prohibition of lethal methods. As an alternative approach, immunocastration, such as the GnRH vaccine, could present a novel strategy for fertility control. Furthermore, a non-invasive method would be necessary for surveillance of fertility control efficacy in the field. In this study, we evaluated the effectiveness of a recombinant subunit GnRH-1 vaccine for immunocastration in a group of 11 vaccinated sika deer, comparing them with a control group over a 6-month period (Total=22, 6 males and 16 females). All deer were considered clinically normal both prior to and during the experiment. Specific anti-GnRH immune responses were detected at Week 4, persisting for at least 24 weeks after vaccination in both serum and fecal extractions. Furthermore, we observed significantly decreased levels of sexual hormones, including testosterone, as well as a reduced testis volume-to-body weight ratio. Notably, antler abnormalities were found in two-thirds of the vaccinated males. Our findings provide strong support for the efficacy of the recombinant subunit GnRH-1 vaccine and validate the non-invasive surveillance method in sika deer.

**Alison Canty**

Mia Lindgren, Panos Alexopoulos, Sven Vanneste and Samantha Pouslon

Digital storytelling of dementia for healthcare students: working with lived experience experts to co-produce learning resources

As we prepare for escalating cases of dementia across the globe, there is an urgent need to effectively prepare our healthcare workforce. Digital storytelling has emerged as a high impact teaching and learning tool, presenting authentic, personal narratives of another person's experience directly to students in their education setting. For this project, 10 in-depth, empathy driven, video-interviews will be conducted to help people living with dementia, and their carers share their lived experience of dementia. More structured interviews with a range of health and social care experts will follow, to generate a collection of high quality, high impact and flexible videos resources that take an interprofessional approach to help students see the person in the centre, and not just the dementia. Mixed methods will be used to explore (i) why people with lived experience choose to share their experience to educate health care professionals, (ii) the benefits experienced by participating in the co-design or co-production of education resources and (iii) the impact of the videos to build knowledge, skills, interprofessional perspectives and empathy in the higher education setting. This project has the potential to reach thousands of healthcare students, boosting understanding and awareness of the lived experience of dementia and the importance of working in interprofessional teams.

**Alix de Jersey**

Jack Rivers-Auty, Jennifer L. Lavers, Alexander L. Bond, Richard Wilson, Graeme Zosky

Plastic ingestion induces proteomic signatures of multi-organ failure and neurodegeneration

It is now clear that humans and wildlife are ingesting plastic and there is a growing list of potential health effects from this exposure. However, the systemic nature and severity of these effects are not well understood. Adopting a data-driven proteomics approach, we assessed changes in the abundance of 745 proteins in the plasma of a free-living non-model organism (Flesh-footed Shearwaters Ardenna carneipes) with low or high levels of plastic exposure. Over 200 proteins significantly differed between the two groups. High plastic exposure revealed a range of negative health consequences: intracellular components were frequently detected in the blood, indicative of cell lysis. Critical secreted proteins were less abundant, indicating the kidney and particularly the liver are not functioning as normal. The enrichment analyses further revealed protein signatures similar to those observed in neurodegenerative diseases. The myriad of sub-lethal effects reflects the impact of plastic distal to the site of exposure (i.e., the stomach) indicating plastic shedding and/or leachate toxicity in the plasma. The observed proteomic signatures of cell lysis, multi-organ failure and neurodegeneration indicates the health of seabirds with high plastic exposure is significantly compromised.

**Amy Coates**

Kathleen Doherty, Hannah Fair, Emma Lea

Toward dementia risk reduction among low socioeconomic groups: a scoping review of interventions from OECD countries

Over 55 million people globally (7 per 1000 population) are living with dementia. This comes at a high economic and human cost, with disproportionate effects on socioeconomically disadvantaged (low SES) groups who experience greater exposures to- and fewer protections from- the environmental, social and behavioural drivers of modifiable dementia risk. While several studies have demonstrated the feasibility of multidimensional dementia risk reduction interventions in relatively older, educated and wealthy populations, few studies target disadvantaged groups. To explore this phenomenon, we conducted a scoping review of intervention studies published between 2013 to 2023 targeting multiple 'dementia-relevant' risk factors among low SES adults in OECD countries. We reviewed 36 articles spanning 13 countries reporting on 32 multidimensional interventions targeting physical inactivity (27), diet (25), obesity (22), diabetes (10), hypertension (6), smoking (6), alcohol use (5), depression (4) and social isolation (1). Analysis revealed diversity in the design, approach and outcomes of the interventions. In 2024, Australia will launch a 10-year National Dementia Action Plan with a likely focus on minimising risk as well as delaying the onset and progression of Dementia. Findings of this analysis will be presented with insights for promoting greater social justice in the delivery of the Action plan.

**Azam Bazooband**

Kathleen Doherty

Dementia respite care training: is there a gap?

The effectiveness of dementia respite services hinges upon the ability of care providers to address the complex needs of individuals with dementia. While the need for dementia education of the aged care workforce is widely recognised, the specific needs of the respite workforce may not be considered. This scoping review aimed to assess whether available education is specifically designed for dementia respite careworkers. We sought to identify gaps in existing resources to inform the development of targeted dementia respite education. Online databases and online training opportunities were searched using dementia respite specific terms. Of 32 service providers offering aged care workforce training none specifically addressed respite training needs. Of 287 abstracts, 98 addressed dementia respite and two considered training of the workforce. Neither program was exclusively designed for careworkers, but was integrated with training for caregivers and individuals with dementia. Training design did not stem from workforce needs or service provider input. Given that uptake of dementia respite care and satisfaction is influenced by workforce knowledge and skill, efforts should be directed towards enhancing the capacity of the aged care workforce by providing them with tailored dementia respite care training.

**Bedru Jemal Abafita**

Ambrish Singh, Dawn Aitken, Changhai Ding, Steffany Moonaz, Andrew J. Palmer, Leigh Blizzard, Andrew Inglis, Stan Drummen, Graeme Jones, Kim L. Bennell, Benny Antony

Comparative effectiveness of yoga and strengthening exercise for treating knee osteoarthritis: A randomised controlled trial (YOGA Trial)

Background: There is little knowledge about the most effective type, frequency, and dosage of exercise for knee osteoarthritis (OA). There is also uncertainty about the effect that mind-body exercise, such as yoga, has on knee OA and to date no studies have directly compared yoga with strengthening exercise. This clinical trial aimed to compare the effectiveness of a 24-week yoga program to a strengthening program in patients with knee OA. Methods: The YOGA trial was an assessor-blinded, randomised, active-controlled, superiority trial that included a pre-specified non-inferiority margin (visual analog scale (VAS) 10mm). We recruited knee OA participants aged ≥40 years who fulfilled the American College of Rheumatology (ACR) clinical criteria with knee pain ≥ 40mm on 100mm VAS. Participants were randomly assigned to a 24-week yoga program or strengthening program, which both included two supervised sessions and one home-based session per week for 1-12 weeks and three home-based sessions per week from 13-24 weeks. The primary outcome was the change in VAS knee pain over 12 weeks. Results: 117 participants were randomised to a yoga (n=58) or a strengthening program (n=59). Change in mean VAS knee pain scores over 12 weeks (between-group mean difference -1.1mm [95%CI:-7.8,5.7]) was not significantly different between the yoga and strengthening groups. For the secondary outcomes, the yoga group showed significantly greater improvements than the strengthening group over 24 weeks. Adverse events were similar in both groups and mild in nature. Conclusion: A 24-week yoga program did not significantly reduce knee pain more than a strengthening program. The yoga program was non-inferior to the strengthening program and reported modestly greater improvements in several secondary outcomes including knee symptoms and QoL over 24 weeks and depression over 12 weeks, suggesting yoga may be helpful in knee OA. (Australian New Zealand Clinical Trial Registry, ACTRN12621000066886.)

**Belayneh Kefale Gelaw**

Gregory M. Peterson, Corinne Mirkazemi, Woldesellassie M. Bezabhe

The effect of pharmacist-led interventions on the appropriateness and clinical outcomes of anticoagulant therapy: A systematic review and meta-analysis

Objective: To evaluate the effectiveness of pharmacist-led interventions, compared with usual or physician-led care, in improving the appropriateness and clinical outcomes of anticoagulant (AC) therapy. Method: We searched PubMed, EMBASE, and Scopus databases to identify randomised controlled trials, quasi-experimental, and cohort studies published between 2010 and 2023. A random-effects model was used to calculate pooled intervention effects. We assessed heterogeneity (using I2) and publication bias (using Egger's test and visualisation of the funnel plot). Results: We included 35 studies involving 10374 patients in the intervention group and 11840 in the control group. The pharmacist-led interventions significantly improved AC appropriateness (odds ratio [OR]: 3.43; 95% confidence interval [CI]: 2.33-5.06, p < 0.01), decreased total bleeding (relative risk [RR]: 0.75, 95% CI: 0.58-0.96, p = 0.03) and hospitalisation (RR: 0.64, 95% CI: 0.41-0.99, P = 0.04). However, they did not significantly decrease thromboembolic events (RR: 0.69, 95% CI: 0.46-1.02) and mortality (RR: 0.76, 95% CI: 0.51-1.13). Conclusion: Pharmacist-led interventions improved the appropriateness of AC therapy and reduced the risk of AC-related bleeding and hospitalisation. These findings support the implementation of pharmacist-led interventions to enhance the safety of AC therapy. Further research is needed to identify impactful pharmacist-led interventions and determine their cost-effectiveness.

**Bhavika Yadav**

Nicola Stephens, Michelle McPherson, Shannon Melody

Respiratory Syncytial Virus Surveillance in Tasmania

Respiratory Syncytial Virus (RSV) became a notifiable disease under the Tasmanian Public Health Act 1997 from the 1st of July 2022. This descriptive analysis of the distribution of RSV in Tasmania in the first year since it became a notifiable disease will provide important baseline data for the ongoing surveillance, evaluation, and monitoring of this highly contagious virus. It will also evaluate the quality of the data collected by assessing the completeness of the data. A case was defined as a person with laboratory-confirmed RSV with specimen collection date from 01 July 2022 to 30 June 2023 and the laboratory evidence was defined under the Communicable Diseases Network of Australia guidelines. The data set for RSV notifications in Tasmania was extracted from the Tasmanian Notifiable Disease Database (TNDD) on 08 February 2024. The number and rates of notifications per 100,000 population were analysed by sex, age, geographic region, local government area, vaccination status, presentation type, and Socio-Economic Indexes. Population denominators were derived from the estimated resident population of each collection district obtained from the Australian Bureau of Statistics. Data were analysed using Microsoft Excel. This study was approved by the University of Tasmania Human Research Ethics Committee. A total of 3969 cases were included in the study. This study describes the epidemiology of RSV in the first year since it became a Notifiable Disease and will serve as a baseline for the ongoing surveillance of RSV in Tasmania. The results of this study will highlight whether the surveillance activities align with the surveillance objectives and will provide valuable information to evaluate vaccination programs when they are established.

**Bill Bennett**

Jane Alty, Rebecca St George

Hiding in plain sight: Early identification of Parkinson's disease with movement analysis

Early diagnosis of Parkinson's disease is currently difficult and time-consuming. We aim to develop a simple, computer-based test which combines movement analysis with our existing Tas-Test application. Using the Tasmanian Parkinson's Project and other channels, we are recruiting people with Parkinson's disease (pwPD) as well as healthy controls, and will run them through a series of tests for both cognitive and motor function. Much of the testing will be carried out in HIMAC - a recently constructed state-of-the-art centre for precisely analysing a range of human movements. HIMAC has several high-end instruments including a 12-camera Vicon system which can track body markers to within 0.1mm. HIMAC is based in the Medical Sciences Precinct, and is intended for use across the entire university and beyond. Gait, posture, facial expression, tremor, muscle firing patterns and eye movement will be measured in a cohort of pwPD. This data will establish the most relevant movement tasks and parameters to differentiate PD from controls. We will then use Computer Vision algorithms and machine learning to computationally assess videos of participants captured during testing. This will give us the tools to add CV analysis from simple video capture into the final diagnostic test integrated into Tas-Test.

**Cate Andrews**

Leesa Van Niekerk, Kim Jose, Marie-Louise Bird

A scoping review of interdisciplinary management of persistent pelvic pain in women and gender diverse people

The objective of this scoping review is to understand the role of interdisciplinary treatments for persistent pelvic pain experienced by women and gender diverse people presumed female at birth. Previous reviews have focussed on medical and surgical management and, despite expert consensus highlighting the need for evidence-based interdisciplinary programs (Armour et al., 2020), there is limited information pertaining to the design of interdisciplinary care and its inclusions. Scoping review inclusion criteria included interdisciplinary programs that include two or more disciplines, target adult women and gender diverse people, living with persistent pelvic pain. Studies with a variety of pelvic pain diagnoses were included such as endometriosis, painful bladder syndrome, or vulvodynia. Database searches were conducted in CINAHL, Scopus, Medline and PsychINFO for a ten-year period from June 2023, limited to studies available in English. Data extraction focused on the context of interdisciplinary care including organisation, delivery, and conceptualisation. Data extraction also included discipline-specific information, models of care, and program inclusions. Two researchers scanned titles and abstracts (n=1068), with 69 studies identified for full text review, and 20 studies identified as eligible for data extraction. Data extraction will be presented in tables with discussion of key themes.

**Cheng Yang**

Barbara Wimmer, Corinna Dwan, Richard Wilson, Luke Johnson, Vanni Cruso

10 weeks of fucoidan administration enhanced voluntary running activity and decreased inflammatory protein abundance in the mouse

Exercise intervention and lifestyle modification are the first steps in the cure of obesity. Regular physical activity has been shown to lower inflammatory biomarker concentrations. In the present study, we combined voluntary exercise (running wheels) with the administration of fucoidan for 10 weeks in mice consuming both standard chow and high fat diet (HFD). We found that fucoidan treatment increased mouse muscle mass and running activity compared to their control groups. Additionally, fucoidan significantly increased the relative abundance of gut microbiome bacterial Bacteroidetes and Lactobacillus species in the mice consuming HFD. We also found that fucoidan decreased the tyrosine-protein kinase Abl1 abundance (inflammatory protein) in the Nucleus Accumbens, and reduced interleukin 1 alpha (pro-inflammatory marker) protein concentrations in the blood. Therefore, we suggest that fucoidan administration can improve health and exercise performance by modulating the abundance of gut microbiotas.

**Chitra Sharma**

Bharati Kulkarni, Nuala M Byrne, Santhi Bhogadi, Judith Lieber, Poppy Alice Carson Mallinson, K V Rameshwar Sarma, KV Radha Krishna, Hannah Kuper, Ruby Gupta, Poornima Prabhakaran, Vipin Gupta, Gagandeep Kaur Walia, Aastha Aggarwal, Santosh Kumar Banjara, Hemant Mahajan, Sanjay Kinra, Andrew P Hills, Kiran DK Ahuja.

Intergenerational shift in life course body mass index trajectories in South Asia: Andhra Pradesh Children and Parents Study (APCAPS) 2003-2023

In 2023, South Asia constituted a quarter of the world's population with two-thirds residing in rural areas. Cardiovascular diseases (CVDs) are the leading cause of disability-adjusted life years in this region with South Asians experiencing CVD incidence half a decade earlier compared to other ethnicities. National surveys indicate that rural residents experienced adverse trends in CVD risk factors, including body mass index (BMI), within recent decades. Assessing these life course trajectories provides a unique opportunity to understand CVD aetiology. APCAPS intergenerational cohort study (2003-2023) data collected in rural South India, were assessed using multilevel linear spline models for life course trajectories of BMI. Children of both sexes (n=500) were followed at three life-stages including adolescence, early adulthood, and third decade. The mother cohort (n=500) ranged from early adulthood to menopause at the baseline and followed up at older life-stages of peri-menopause to young old. Initial findings show a period effect with all children and mother cohorts showing adverse trends in BMI. These trends are comparable to those seen in high-income countries of the UK and USA. Arresting these disease trends requires appropriate life course research and policy in South Asia, moving solely from an urban focus to include rural populations.

**Deirdre McGowan**

Claire Morley, Alex Kitsos, Kelly Shaw, Amanda Neil, Tania Winzenberg

Understanding the characteristics, similarities, and differences of people with high healthcare service utilisation defined by different criteria: a Tasmanian data linkage study

Background: A small portion of the population disproportionately use high amounts of healthcare resources, termed high healthcare service utilisation. Objective: To understand what overlap exists between Tasmanian adults classified as having high healthcare service utilisation defined in different ways: frequent hospital admissions, frequent emergency department presentations, and high-cost, and to investigate differences between groups. Methods: We conducted cross-sectional analysis of three years (2017-2019) of Tasmanian linked hospital administrative data, cause and date of death data. High healthcare service utilisation was defined as >5 emergency department presentations, >4 hospital admissions and the top 5% of healthcare costs in a 12-month period. Findings: We identified that 10.75% (n=24,823) of Tasmanian adults had high healthcare service utilisation in the 3-year period. Half (52%) were in the top 5% for costs, 36% had >5 emergency department presentations, and 2% had >4 hospital admissions in a 12-month period. Minimal overlap existed between categories. Implications: As people who experience different forms of high healthcare service use are from different populations, it is likely the rationale behind their healthcare seeking behaviours is also different. This is an important consideration for those undertaking health service planning, design or targeting for people with high healthcare service utilisation.

**Eleanor Clapham**

Dean Picone, Samuel Carmichael, James E. Sharman, Niamh Chapman

Home blood pressure measurement… “it’s so easy” …to do wrong.

Home blood pressure (BP) measurement is recommended by guidelines and should be performed in a standardised manner to create measurements which appropriately inform care. Adults who measure BP at home should be trained to measure BP as recommended by guidelines. This study aimed to determine the training provided to Australian adults for BP measurement, and whether BP is measured according to guideline recommendations. This mixed methods study included a nationally delivered 30-question online survey and an optional semi-structured phone interview. In total, 350 participants completed the survey (58.5±15.8 years, 54% women) and 34 completed a follow-up interview. 37% of survey participants received training for home BP measurement. Training ranged from basic instruction from a healthcare professional to online research. Most participants did not measure BP as recommended by guidelines. While 90% of participants measured BP while sitting, only 37% averaged the measurements taken each sitting. Despite the unstandardised approach to BP measurement, home BP was highly valued and most found it “very easy” to do. Most Australian adults did not receive standardised training for BP measurement and do not measure BP according to guideline recommendations. This suggests a need for effective training strategies to support high-quality home BP measurement.

**Eleanor Clapham**

Dean Picone, Samuel Carmichael, James E. Sharman, Niamh Chapman

Appropriateness of online resources for home blood pressure measurement: Resource alignment with guidelines, readability, and end-user involvement

Home blood pressure measurement (HBPM) is most effective when accompanied by patient education, which may be achieved via online resources. Online resources should provide accurate and readable information and engage end-users during development. Using these criteria, this study aimed to determine if online HBPM resources are appropriate to support home BP measurement. HBPM resources were identified on Google using search terms co-developed with consumers [17/10/2022]. Resources were appraised by two independent reviewers according to their alignment to 13 key BP guideline recommendations, grade reading level and end-user involvement in development. Twenty-four online resources were included. Thirteen (54%) resources aligned with ≤50% of the guideline recommendations. All resources exceeded the recommended grade 8 reading level (mean 11.75). No resource reported community member involvement during development, and five (21%) reported medical professional involvement. No HBPM resources were identified that both fully aligned with BP guidelines and met the recommended reading level for adults. Further, end-users were not adequately included in resource development. The use of online HBPM resources which are not appropriate to support adults for HBPM may lead to incorrect HBPM practice, causing inaccurate BP measurements. Co-design methods should be used to create resources appropriate for use by community members.

**Elise Cleary**

Fergus Scott, John Lin, William Connelly, James Crane

Investigating novel platform-mediated avoidance behaviours in female rats

Avoidance is a natural and adaptive response used by animals and humans alike to modulate their exposure to threats. Excessive avoidance, however, is a hallmark of anxiety and post-traumatic stress disorder. Despite a higher prevalence of anxiety disorders in females, research on female avoidance is limited. To address this, we established a Platform Mediated Avoidance (PMA) model that adult female Sprague Dawley rats learnt to avoid a tone-signalled footshock by stepping onto a non-conductive platform. This model produced consistent avoidance behaviours, accompanied by novel anxiety-like behaviours between tone presentations, exhibited as increased platform time and reaching/testing. Compared to controls, at test, shock rats spent significantly more time on the platform pre-tone (shock: 194.1s ± 24.94, n=11; control: 65.92 ± 17.02, n=8), and during 30s tone presentations (shock: 26.98s ± 1.642, n=11; control: 7.11s ± 4.375, n=8). In subsequent experiments, rats received a single dose of midazolam (0.375mg/kg i.p) 15 minutes prior to test. Initial analysis indicates avoidance behaviours are resistant to midazolam treatment, echoing lower efficacy reports of anxiolytics in women. Additionally, despite robust avoidance behaviours displayed during PMA testing, limited immunoreactivity has been shown within regions associated with anxiety and fear. Currently, we are exploring the efficacy of LIT-001, an oxytocin receptor agonist, and its impact on the expression and extinction of avoidance behaviours in PMA trained female rats.

**Emma Lea**

Kathleen Doherty, Helga Merl, Matthew Kirkcaldie

"The course gives me confidence to think critically and challenge practices I see that are not evidence based": Postgraduate dementia students' translation of education into practice

It is important to explore workforce participation in education aiming to enhance dementia knowledge, and the impact of education on understanding and agency to change systems and practices, to better support people living with dementia. This ongoing study investigates why people undertake online postgraduate studies in dementia at the University of Tasmania, and the associated impact on their practice. Findings from an online survey of 19 participants in the first recruitment round (August 2023) are summarised, including thematic analysis of responses to open-ended questions on how knowledge gained is used to influence practice. Participants were typically studying the Master of Dementia course "to influence change" in the workplace (aged or acute care). Key themes on how the course influences practice were: using an evidence base to support practice; developing confidence to educate others; and building dementia care and support skills. Participants stressed the need for workplaces and professional organisations to recognise learning. Postgraduate education can play an important role in translation of knowledge about dementia into practice, which is critical in the context of the need to increase the knowledge, capacity, and resilience of those who support people living with dementia and for development of the wider dementia policy arena.

**Emma Wilkinson**

Elizabeth Read, Jana Talbot, Sueanne Chear, Adelene Chiam, Tony Cook.

Visualising childhood dementia: A novel lysosomal and lipid imaging protocol to identify disorder-specific morphological signatures

Childhood dementia, caused by over 100 rare genetic neurodegenerative disorders with varied progressions, impacts an estimated 2,300 Australians. Globally, a child dies every 11 minutes, which is comparable to childhood cancer. Lysosomal storage disorders (LSDs), which account for most childhood dementia cases, arise from the accumulation of glycosphingolipids (GSLs) resulting from a disruption of lysosomal enzyme function. GSL accumulation results in a neuropathophysiology that causes memory loss, developmental delays, seizures, and other cognitive and psychiatric problems. Due to the nature of LSDs, understanding the difference in abundance and morphology of crucial cellular components, lipids and lysosomes, is imperative to understand the way these diseases are impacted by potential therapeutic agents. Here, we are optimising a lipid and lysosomal staining protocol, in patient fibroblast/iPSC cells derived from individuals with childhood dementia-causing LSDs, to discern morphological signatures associated with each disorder. This protocol incorporates lysosomal staining (Lysotracker) with dyes for lipids that are known to be dysregulated in LSDs such as: cholesterol (Filipin), GM1 ganglioside (Cholera Toxin Conjugates), and lipid droplets (LipidSpot). Furthermore, this panel will help to indicate the effectiveness of FDA approved drug Miglustat, a small molecule inhibitor which inhibits of the enzyme glucosylceramide synthase (GCS) to decrease GSL levels.

**Fatemeh Vazirian**

Jing Tian, Jane Alty, Dawn Aitken, Anna King, James C Vickers, Graeme Jones, Flavia Cicuttini, Feng Pan

Taking opioid and antidepressant medications increases the risk of developing neurodegenerative conditions: a 13-year longitudinal study

Chronic pain and neurodegenerative diseases may be connected. We examined pain medication use and risk of parkinsonism/dementia in chronic pain patients (n=146,386, mean age 57) from the UK Biobank. Participants with no dementia/parkinsonism were followed for 13 years, reporting pain and medication use (paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), opioids, antidepressants). Cox regression assessed links between medications and developing all-cause parkinsonism (741 cases), Parkinson's disease (PD, 656 cases), all-cause dementia (1741 cases), and Alzheimer's disease (AD, 710 cases). In multivariable analyses, taking opioids ((hazard ratio (HR)=1.23; 95% confidence interval (CI) (1.03-1.46)), antidepressants (1.77 (1.49-2.11)), and any pain medication (1.18 (1.03-1.35)) resulted in an increased risk of developing all-cause parkinsonism compared to no pain medications users. Antidepressant use was associated with a higher risk of developing PD (1.62 (1.34-1.96)) and taking any pain medication increased the risk of developing PD ((1.17 (1.01-1.35)). Taking paracetamol (1.16 (1.06-1.27)), NSAIDs (1.20 (1.10-1.30)), opioids (1.51 (1.36-1.68)), antidepressants (1.96 (1.75-2.18)), or any pain medication (1.39 (1.26-1.53)) showed a higher risk of developing all-cause dementia. A similar pattern was observed for AD risk, with antidepressants showing the highest risk (1.73 (1.44-2.08)). Pain medications link to higher neurodegenerative risk, highlighting the need for careful pain management to minimize complications.

**Gill Course**

Viet Tran, James Sharman

How safe is mountain bike riding? Understanding the health service impacts and risk factors for severe trauma in mountain biking

Mountain biking is growing in participation but carries risk for severe injury and burden on health systems. Little is known about the impact of these injuries on emergency medical services, definitive healthcare, and factors contributing to accidents. A systematic online literature search was conducted using databases PubMed and MEDLINE complete and grey literature relating to mountain bike injury since databases' inception to July 2023. This review aimed to determine the health service impacts of severe mountain bike trauma and risk factors, to understand critical gaps and needs. The results show that although mountain biking has relatively high injury rates that are increasing, the impacts on health services were rarely documented, with some evidence indicating that even small increases in injuries from race events can overwhelm local health services. Severe injuries were more common in downhill disciplines. However, definitions of what constitutes severe injury were variable. Severe injuries were influenced by rider skill level, demographics, participation in competitive events, trail design, environmental factors, and healthcare availability. Further research in these areas is needed, along with more consistent reporting of injury severity. This presentation will discuss findings from current literature, and deliver preliminary analysis of research on mountain bike injuries in Tasmania.

**Hannah Fair**

Claire Eccleston, Maree Farrow, Kathleen Doherty

A new paradigm for equity in dementia prevention: social networks promote dementia risk reduction among hard-to-reach populations

Given the need to improve equity in dementia prevention, we examined the role of informal interpersonal communication in increasing the reach of dementia risk information among hard-to-reach populations, including men and people with lower levels of education. A subset of May 2020 Preventing Dementia Massive Open Online Course (PDMOOC) completers provided comprehensive information sharing data ("network mapping participants"; n=37). All May 2023 PDMOOC feedback respondents provided summary information sharing data ("sharing overview participants"; n=874). Quantitative analyses used summary statistics and binomial generalized linear models with type II ANOVA omnibus tests, and qualitative analyses used reflexive thematic analysis. Nearly all participants reported sharing information (97% network mapping participants; 88% sharing overview participants). Information was reportedly shared with large numbers of people (1-455 network members per participant, mean 9). In May 2020, men ($\chi 2=26.9$, $p<0.001$) and people with less education ($\chi 2=106.9$, $p<0.001$) were more represented in the group of interpersonal information recipients than among PDMOOC enrollees. Information sharing was driven by personal interests, learning experiences, and network member receptivity. These results suggests that social networks warrant consideration as a meso-level paradigm for increasing equity in dementia risk reduction, contrasting the dichotomy of individual and whole-of-society approaches currently proposed in this space.

**Hannah McHardy**

Leesa Van Niekerk

Body Compassion, Transgender Congruence, and Health-Related Quality of Life in Transgender and Gender Diverse (TGD) Individuals

This study is the first to explore the relationship between body compassion, transgender congruence, gender affirming care, and Health-related quality of life (HRQoL) in transgender and gender diverse (TGD) communities. TGD people (n = 242), aged 18 years and over, participated in a cross-sectional online survey measuring body compassion (Body Compassion Scale), transgender congruence (Transgender Congruence Scale), and HRQoL (AQoL-8D). Higher levels of body compassion and transgender congruence were significantly positively correlated with HRQoL. Engagement in gender affirming actions was not found to be correlated the level of body compassion or HRQoL but was significantly positively associated with transgender congruence. Regression analyses determined that a greater ability to defuse from negative body-related thoughts and emotions, a greater sense of common humanity, and higher levels of transgender appearance congruence are significant positive correlates of HRQoL in the current TGD sample. Based on the findings of the current study, it is suggested that the constructs of body compassion and transgender congruence, and specifically the factors of defusion, common humanity, and appearance congruence may be of clinical relevance to the HRQoL of TGD individuals. Future research is needed to explore the application of these constructs in psychosocial supports for TGD communities.

**Henok Dagne Derso**

Kathleen Doherty, Julie Campbell, Alice Saul, Jessica Roydhouse

A scoping review on instructions for proxy reporting by informal carers of adults for quality-of-life assessment

Background: Informal carers ('proxies') may need to answer health questionnaires on behalf of cognitively impaired or ill adults. Reporting to others is difficult. Little is known about how proxies approach this task, which poses challenges for optimal questionnaire design. Objectives: We examined the questionnaire instructions, including whether the proxy was asked to answer from their own or the person's perspective when reporting and what information, if any, was captured about the proxy's experience of reporting. Methods: A systematic search was conducted across Medline, Psych Info, CINAHL, and Embase. Only published articles meeting the criteria of informal carers providing proxy reports for adults were considered. Results: Of 5816 publications, 60 articles were eligible for full-text review, and 13 were included for data extraction. Instructions varied, with proxies asked to adopt both their own and the individual's viewpoints in 9 studies and only the individual's viewpoint in 4. However, proxy reporting experiences were rarely captured. Conclusion: Providing clear instructions to guide proxy reporting and collecting information about their reporting experience to understand how to better support proxies is crucial. This may help proxies better report about others and thus make proxy reports more closely reflect the health of individuals who cannot self-report.

**Himanshu Saraswat**

Jessica L Fletcher, Kathryn P Burdon, Nicholas B Blackburn

Familial studies to understand the genetics of Multiple Sclerosis (MS)

Multiple Sclerosis (MS) is a chronic neurodegenerative and autoimmune disease of the central nervous system. The genetic component of MS risk is estimated to be approximately 50%. This genetic component remains unexplained despite population-based international efforts. A family history of MS is frequent and multi-incident families with 3 or more close relatives with MS do occur. Familial studies in MS aim to identify genetic risk factors shared by family members that have MS, that are not present in unaffected relatives. We hypothesize that studying families with MS may identify the missing genetic component of MS through rare variation. We reviewed the literature for familial studies designed to identify rare variants in MS using exome or genome sequencing. Sixteen studies were identified, varying considerably in their design and approach to rare variant discovery in MS families. Across the studies, 67 variants were identified in 67 genes. None of the identified variants were found in proximity to genes identified by the largest population-based MS study. Rare variant family studies to date have implicated different genes in MS risk than what population-based studies have identified. The biological pathways collectively identified across these families further our understanding of how MS develops.

**Ho Yeung Lam**

Sisitha Jayasinghe, Kiran D. K. Ahuja and Andrew P. Hills

Active School Commuting: A review of current evidence and future research implications

BACKGROUND: Active school commuting (ASC), encompassing walking, cycling, and non-motorised transport, holds promise for promoting physical activity and better health among school children. The aim of this study was to identify and collate current evidence, recent advances, and future opportunities for ASC research. METHOD: A comprehensive literature search was conducted to identify studies on ASC among children aged 6-12 years, followed by a narrative synthesis. FINDINGS: ASC is associated with physical and mental health benefits. However, there has been a global decline in prevalence over the past 50 years. Limitations of existing studies include the lack of standardised definitions, limited geographical and age coverage, intervention studies of limited scope and quality, and a scarcity of longitudinal and qualitative studies. Determinants of ASC are context-dependent, with factors like commuting distance and parental safety concerns consistently identified. Novel research techniques including multilevel regression and agent-based modelling are increasingly being employed to better account for the complex dynamics between determinants and inform effective interventions. CONCLUSIONS: To establish ASC as an effective strategy to reduce physical inactivity in childhood, future research should address the current research gaps and adopt techniques to capture the multilevel and context-dependent nature of ASC behaviours.

**Isabelly Maria Barros de Lima**

Johanna L Jones, Kathryn P Burdon

Splicing testing of crystallin gene variants In paediatric cataract

Paediatric cataract, an opacification of the crystalline lens, is a leading cause of childhood blindness. Genetic variants (including splice variants) in 13 genes encoding crystallin proteins are a relatively common cause of this rare disease. When applying the American College of Medical Genetics (ACMG) guidelines for variant classification, patient variants are often classified as Variants of Uncertain Significance (VUS). This is uninformative, leading to difficulties in the clinical decision making. Functional assays provide additional evidence of pathogenicity, facilitating a more accurate variant classification. A review of the ClinVar and Cat-Map databases identified 148 variants around donor (-10/-10bp) and acceptor (-25/+10bp) splice sites of crystallin genes. Of these, 66 were classified as VUS. SpliceAI predicted splice impact, selecting 18 variants with high score to be tested. A mini-gene splicing assay, which compares the splicing of wildtype and variant constructs, has so far tested splicing in 10 of the selected variants. Using these results, and the literature, a proper classification as pathogenic or benign is in progress. Lens tissues unavailability for RNA extraction complicates splicing prediction of variants. Moreover, crystallin genes are not expressed in the blood. Therefore, employing these assays, even if artificially constructed, provides crucial data for variant classification.

**Jasmine Bacon**

Johanna Jones, Guei-Sheung Liu, Joanne Dickinson, Kelsie Raspin

Examining nuclear-encoded mitochondrial-associated gene expression in advanced prostate cancer

Prostate cancer is one of the leading causes of cancer-related deaths in Australia, with over a third of patients with biochemical recurrence predicted to develop metastasis. The factors that drive cancer cells to invade, adapt, and ultimately form metastatic lesions, are poorly understood. A lethality-based genome-wide (CRISPR/Cas9) gene screen was performed in the 22Rv1 prostate cancer cell line, where five of the nine genes within the top-ranked gene list were nuclear-encoded mitochondrial-associated genes required for mitochondrial function: FDX1L, MARS2, MRPL4, MRPL36, and RECQL4. Mitochondrial-associated genes are of particular interest as metabolic shifts within cancer cells have been observed to alter metastatic potential, suggesting the mitochondria may be a key driver of metastasis. To investigate how dysregulation of nuclear-encoded mitochondrial-associated genes drives metastatic cell behaviour, gene knockdown, followed by functional and mitochondrial assays have been undertaken in prostate cancer cell lines to examine the effects of altered gene expression on metastatic capacity. Additionally, expression data from publicly available databases has been used to explore association of nuclear-encoded mitochondrial-associated genes with clinicopathological features of disease. This study has highlighted the potential of nuclear-encoded mitochondrial-associated genes as prognostic markers of metastatic disease. Future research assessing their potential as therapeutic targets is encouraged.

**Justin Cousins**

Colin Curtain, Bonnie Bereznicki, Nibu Parameswaran Nair, Blair Adamczewski, Duncan McKenzie, Annette Barratt, Michael Connolly, Tom Simpson, Elizabeth Webber, Luke Bereznicki

Preventing Adverse Drug Reactions in Older Australians After Discharge (PADR-AD)

Background: Adverse drug reactions (ADRs) occur in up to 30% of older people after hospital discharge. This study aimed to demonstrate the effectiveness of a pharmacist-led ADR risk-assessment intervention in reducing ADRs. Methods: An open-label randomised controlled trial recruited community-dwelling patients aged 65 years and older during unplanned overnight hospital admissions. The PADR-EC ADR-risk score was communicated to clinicians and discussed with participants. General practitioners and community pharmacists received the risk score with medication management advice after discharge. Control participants received usual care. Subsequent ADRs were identified on readmission to the hospital by a pharmacist and an assessment team comprising a GP and a geriatrician. Results: The incidence rate in the intervention group was 0.18 ADRs per person-years vs 0.22 ADRs per person years in the control group (incidence rate ratio [IRR] 0.82 [CI 0.02-1.56], p = 0.421). Most ADRs comprised kidney injury, hypotension and falls, with the majority involving cardiovascular medications. Conclusions: Enhancing hospital care with a risk score guided intervention did not significantly reduce ADRs. ADRs related to drowsiness, hypotension and falls trended towards an improvement, while kidney injuries remained difficult to avoid. Further research is required to tailor ADR prevention in this population.

**Kim Jose**

Claire Morley, McGrath G, Davern M, Timperio A, Campbell S, Garvey K, Leppard L, Rowbotham S, Laird Y, Verity Cleland

Communities4Walkability: empowering the community through citizen science to determine priority actions to support walkability in rural towns

Background: This project, delivered in partnership with local and state governments, used spatial assessments and citizen science to engage rural Tasmanian communities to audit walkability and identify priorities for action. Methods: Spatial analysis of walkability was conducted in 92 small rural towns (population 200 - 6,000) across Tasmania. Walkability scores were ranked and grouped into deciles. One town from each decile was selected and a citizen science approach adopted. Citizen scientists conducted walkability audits of 1-1.5km street segments and took photos of town features that supported or impeded walking. Researchers facilitated workshops to identify priorities for action and potential solutions. Observations were captured in town reports. Findings: All towns reported a similar mix of recreational facilities, walking/biking trails, natural assets and community infrastructure. Pedestrian safety due to traffic concerns or lack of pedestrian infrastructure, improving connectivity between existing town features and accessibility considerations were common walkability issues. Community members are using town reports to advocate for change. Conclusion: This project has provided an overview of walkability in 10 small rural towns and their common issues and priorities. It has highlighted how citizen science can empower citizens to use local data to support advocacy efforts to improve walkability in their towns.

**Laura De Paoli**

Rachel Atkinson, Anna King, Jessica Collins

NFH epitopes as blood biomarkers of MND and FTD utilising Ultrasensitive Simoa Technology

The dysregulation of neurofilament heavy (NFH) phosphorylation is implicated in the pathogenesis of motor neuron disease (MND) and frontotemporal dementia (FTD). Therefore, we propose that non-phosphorylated NFH (NP-NFH) and highly phosphorylated NFH (HP-NFH) epitopes are good candidate biomarkers for early differential diagnosis and characterisation of these diseases. Our objective was to develop a single molecule array (Simoa, Quanterix) assay specific for NP-NFH and HP-NFH epitopes, with the required sensitivity to characterise these epitopes as blood biomarkers of MND and FTD. First, antibody pairs specific for NP-NFH and HP-NFH were tested in sandwich enzyme-linked immunosorbent assays (ELISA), and optimised to a limit of detection of 0.05 µg/ml (R2 = 0.99) and 0.02 µg /ml (R2 = 0.98) of total NFH, respectively. Analysis of serum from the SOD1 G93A mouse model of MND and wild-type C57Bl/6 controls confirmed the ELISA's did not have the sensitivity to measure NP-NFH in blood and the ultrasensitive Simoa platform was required. The ELISA's were then adapted into novel Simoa biomarker assays for NP-NFH, sensitive at 20pg/ml and HP-NFH at 40pg/ml of total NFH. With further optimisation in progress, upcoming experiments will involve the characterisation of NP-NFH in the blood across human cohorts of FTD and MND.

**Laura Grattidge**

Heather Bridgman, Ha Hoang, Belinda Jessup, Carolyn Lethborg, David Lees, Amanda Neil

Evaluation of the Live4Life mental health education and suicide prevention model in rural Tasmania

Background: Young people in rural areas face a complex interplay of personal, social, and environmental factors increasing their risk for suicide. Communities play a key role in suicide prevention. Live4Life is a youth suicide prevention model now implemented in 13 Victorian rural and regional communities. Positive impacts include increased help-seeking/offering behaviour among young people, and increased confidence among adults to provide support for young people experiencing mental health concerns. In 2023, the Live4Life model began implementation in the Break O'Day municipality on the east coast of Tasmania; the first rural community selected to trial the model outside of Victoria. A team from the University of Tasmania have been funded to evaluate the first two and a half years of program implementation, to assess effectiveness, sustainability and transferability, as well as to identify learnings for improvement. Methods: The Live4Life model will be overviewed, as well as the evaluation framework developed by the evaluation team, which is using mixed-methods and Participatory Action Research approaches. Findings: The presentation will outline the opportunities and challenges involved in evaluating Live4Life in Break O'Day, particularly the potential for Participatory Action Research to build local capacity and engagement through collaboration with stakeholders. Conclusion: The Live4Life model, its implementation, and evaluation in Break O'Day, provides a template for coordinated and collaborative community-level action to prevent rural youth suicide in Tasmania.

**Laura Grattidge**

The role of community-based suicide prevention in rural areas

Rates of suicide in rural areas are higher than urban areas, impacted by complex factors associated with social and geographic isolation. As holders of social and situational knowledge, communities are uniquely placed to build local connections and lead prevention efforts for suicide. This presentation provides an overview of PhD research of the presenter including results from a systematic review of the literature, a focus group and interview study with 37 experts in the field from across Australia, and a Delphi study informing the development of 'Best Practice Guidelines for Youth Suicide Prevention in Rural Australian Communities'. Findings show how communities well placed to increase awareness of suicide and its prevention, as local touchpoints, gatekeepers, and sources of connection. Community-based suicide prevention provides this driver of social change; a mechanism for the extension of research where communities work together to prevent suicide, building on local strengths and resources, social capital, and protective factors, accommodating the cultural, historical and community factors impacting program planning and delivery.

**Laura Sutton**

Yoseph Merkeb Alamneh, Emma Watson, Abbey Wiltshire, Saliu Balogun, Dawn Aitken

IMPACT-TAS – Improving osteoarthritis care in Tasmania

Osteoarthritis is a highly prevalent, painful, and costly condition. There is underuse of first-line care such as exercise and overuse of medications and surgery to treat osteoarthritis. Tasmanian has the longest public wait times in the country for joint replacement surgery. Our previous research demonstrated a need for improved access to allied health and affordable programs for knee and hip osteoarthritis. IMPACT-TAS was established in 2021 by A/Prof Aitken, with a focus on improving osteoarthritis care in Tasmania. We partnered with the Tasmanian Health Service (THS) to implement an evidence-based program for osteoarthritis, called GLA:D®, at three public outpatient clinics in Southern Tasmania. For the first time, GLA:D® is available publicly in Tasmania, removing cost as a barrier to first-line care. We are collaborating with THS teams statewide to further expand GLA:D® offering around Tasmania. In collaboration with the Department of Health and Primary Health Tasmania, we have developed a new referral pathway to GLA:D®. This partnership project has strengthened research capacity in allied health within the THS and fostered collaborations between Menzies and THS Hospitals. Importantly, the project has had an impact on health efficiency and patient outcomes, with >110 patients participating in GLA:D® publicly in Tasmania.

**Lily Hayes**

Natalie E. King, Jo-Maree Courtney, Lachlan S. Brown, Laura F. De Paoli, David W. Howells, Anna E. King, Jessica M. Collins, Brad A. Sutherland, Gary P. Morris

Chemical ischemia triggers the release of soluble PDGFRβ from injured human brain pericytes in vitro

Capillary pericytes are important for regulating cerebral microvascular blood flow and maintaining the blood-brain-barrier. During stroke, pericytes contract and impair microvascular blood flow despite treatments. Recent studies demonstrated that injured pericytes shed a soluble form called soluble PDGFRβ (sPDGFRβ). We tested the hypothesis that injuring pericytes in vitro with chemical ischaemia would trigger sPDGFRβ release, which may provide a biomarker of pericyte injury following stroke. We first measured the effect of chemical ischaemia on human brain vascular pericytes (HBVPs) in vitro. Concurrently, we developed an ELISA-based assay to assess sPDGFRβ release from HBVPs after chemical ischaemia exposure. HBVPs were exposed to chemical ischaemia (iodoacetate (IA) and antimycin (AMA)) between 2 and 24 h. HBVPs were assessed for metabolic viability, changes in cell area and death. A N-terminal PDGFRβ antibody was used to detect sPDGFRβ in cell-culture media. Beginning at 4 h, there was a trend toward reduced metabolic viability and increased in cell death in response to 3.75μM IA + 12.5μM AMA. At 24 h, there was decreased cell area ($p=0.0154$, $n=4$) and increased sPDGFRβ release (4.5 fold compared to controls ($p<0.0005$, $n=3$)). In summary, chemical ischaemia changes metabolic viability, cell area and death, and activates the cleavage of PDGFRβ.

**Lynne Chepulis**

Sara Mustafa, Mark Rodrigues, Ryan Paul

Primary care management of diabetes in a New Zealand context - learnings for Australia

Like Australia, New Zealand manages type 2 diabetes (T2D) predominantly in primary care. However, for many, healthcare access and management is sub-optimal, this being particularly common for Māori, minority groups and those in rural areas. Since 2021 we have been reviewing an extensive primary care dataset of more than 55,000 patients with T2D, linked to medication data and hospitalisation outcome. This presentation outlines some of these key findings from this study and discusses how these learnings can inform T2D care in Australia. In particular, we report on the use of SGLT2i/GLP1RA medications and how they influence cardiovascular risk, the impact of rural/urban location on healthcare access, laboratory testing and clinical outcomes, and the importance of culturally-informed programs and resources to support Indigenous and minority groups living with chronic disease.

**Mahsa Pouranayatihosseinabad**

Yihienew Bezabih, Jason Hawrelak, Gregory M. Peterson, Felicity Veal, Corinne Mirkazemi

Review article Antibiotic use and the development of depression: A systematic review

Increasingly, disruption of the gastrointestinal ecosystem is thought to be involved in the pathogenesis of several medical conditions, including depression. Antibiotics can induce substantial changes in the gastrointestinal microbiota and several lines of evidence suggest that antibiotics exposure may increase the risk of developing depression. This systematic review examined this potential association. Four databases and unpublished resources were searched for human studies. Nine studies met the eligibility criteria. All were observational in nature. The studies were conducted in different age groups with various indications for receiving antibiotics. Together, these relatively low-quality studies suggest a potential association between antibiotic exposure and subsequent development of depression symptoms. Specifically, studies from the United Kingdom and Sweden indicate that the risk of depression is increased by at least 20%, with the former (over 1 million participants) reporting an increased risk with the number of courses and agents used, that persists with a slow decline over the ten years following exposure. The inherent limitations associated with the studies' methodologies make a reliable conclusion difficult. While the risk of antimicrobial resistance may prohibit large randomised clinical trials in healthy individuals, future placebo-controlled trials with antibiotics-based protocols (e.g. for acne) should explore their effect on mental health.

**Mahsa Pouranayatihosseinabad**

Maggie Taylor, Jason Hawrelak, Gregory M. Peterson, Felicity Veal, Tristan Ling, Mackenzie Williams, Megan Whatley, Kyan Ahdieh and Corinne Mirkazemi

Maternal antibiotic exposure and the risk of developing antenatal or postpartum depressive symptoms: The maternal experience study protocol

Limited epidemiological evidence suggests a link between antibiotic use and developing depression. This study seeks to investigate this association in depth, using a cohort of pregnant individuals. A national prospective, observational, longitudinal cohort study has been designed to examine these relationships. A sample size of 1500 pregnant individuals has been sought for this study, assuming 10 potential predictor variables (including antibiotic use) in the final multiple logistic regression model and allowing for 30% drop-out rate. The development of depressive symptoms is considered either a diagnosis by a medical doctor and/or a scoring 13 or higher on the Edinburgh Postnatal Depression Scale. Data will be collected during the third trimester and at 6-weeks, 6-months, and 12-months postpartum. These surveys include variables previously identified as associated with antenatal and postpartum depression (e.g., level of social support, experience of intimate partner abuse, and obstetric complications), as well as antibiotic and probiotic use. This study will provide an update on the prevalence of the symptoms of depression during pregnancy and postpartum and its associated risk factors. It will also, for the first time, comprehensively explore the potential association between antibiotic use during pregnancy and up to 12-months postpartum and the development of depressive symptoms.

**Mahsa Pouranayatihossesinabad**

Maggie Taylor, Jason A. Hawrelak, Gregory M. Peterson, Felicity Veal, Tristan Ling, Mackenzie Williams, Megan Whatley, Kyan Ahdieh and Corinne Mirkazemi

Maternal antibiotic exposure and the risk of developing antenatal depressive symptoms

Background: Antenatal depression is common and has significant consequences. The literature suggests that antibiotic exposure may be associated with depression. Many individuals are exposed to antibiotics during pregnancy. Further investigation of the association between antenatal antibiotic use and the development of depression during pregnancy is needed. Methods: A national prospective observational cohort study of pregnant individuals was undertaken using an online survey, completed during the third trimester. Antenatal depressive symptoms (ADSs) were defined as having an Edinburgh Postnatal Depression Scale score of ≥13 and/or receiving a clinical diagnosis of depression. Results: One in six individuals (16.5%, n = 977) experienced ADSs during their pregnancy, of whom 37.9% received a depression diagnosis. There was no relationship between antibiotic use and the development of ADSs. Four factors were identified as significant independent predictors of ADSs: personal history of depression, severe nausea and vomiting causing an inability to eat, emotional abuse from an intimate partner within the prior 12 months, and not having a university degree. Conclusions: Antenatal antibiotic use was not associated with the development of ADSs. Given the high incidence of undiagnosed depression, new strategies and models of care that prioritise individuals with risk factors may be required to optimise antenatal care.

**Malith Kumarasinghe**

Manoja P Herath; Andrew P Hills; Kiran DK Ahuja

Postpartum versus postnatal period: Do the name and duration matter?

Introduction: The aim of this study was to understand the extent of the global use of the terms postpartum and postnatal, along with the schedule of maternal care after delivery. Methods: Postpartum care guidelines and strategies published by international organisations, including the WHO, and by countries in either the OECD or G20 were collated for this scoping review. A pictograph and a summary table were developed to present the evolution of the WHO's definition of the period after delivery and the latest care schedule of the international organisations and countries belonging to either the OECD or the G20. Results: Ten documents from the WHO, one from the European Board, and 15 country-level guidelines from six countries met the inclusion criteria. The interchangeable use of 'postpartum' and 'postnatal' is common. Additionally, the length and schedule of routine maternal care after delivery vary substantially between organisations and countries, spanning from six weeks to one year with two to six healthcare contacts, respectively. Conclusion: Through this review, we make a case for a universal harmonisation of the term postpartum when referring to mothers after delivery and extend the routine maternal care schedule after delivery to support women in this vulnerable period.

**Manuela Rigoli**

Jo Dickinson and Kelsie Raspin

Determining the effects of WNT5A knockdown on gene expression, and the proliferation and migration of metastatic prostate cancer cells

Background: Prostate cancer is the second most common cause of cancer related deaths in Australian men, and this is attributed to a current inability to effectively treat metastatic disease. Epithelial to mesenchymal transition (EMT) allows tumour cells to acquire metastatic capability. It is regulated by the WNT5A signalling pathway, however, how WNT5A modulation influences prostate cancer cell metastatic capability is poorly understood. Methods: Modulation of WNT5A was achieved using targeting short-interfering RNA transfection experiments in the prostate cancer cell line, PC3 (derived from a bone metastasis). The effect of knockdown on expression of WNT5A on genes involved in the WNT5A signalling pathway and EMT (WNT5A, FZD4, RYK, CDH1 and SNAI1) was analysed via RT-qPCR. Cell growth and migration assays assessed metastatic capability. Results: PC3 cells express high levels of constitutive WNT5A mRNA. Short-interfering RNAs targeting WNT5A achieved most efficient knockdown at 48 hours following transfection and were associated with decreased expression of all genes. WNT5A knockdown was also associated with reduced cell confluency and migration. Conclusions: This study provides supportive evidence of the use of short-interfering RNAs to target WNT5A. Knockdown reduced metastatic capabilities, and this evidence may aid the development of therapies targeting prostate cancer metastases in the future.

**Marie-Louise Bird**

The College of Health and Medicine Health Literacy Responsiveness Group

Investigating the ability of health professionals to respond to the health literacy needs of health consumers

The attributes of health literacy responsive health professionals are continuously evolving. This international scoping review aims to understand the extent and ways in which health professionals respond to health care user's health literacy, identifying any existing relevant tools. Four online databases were searched. Using Covidence software and pre-determined inclusion/exclusion criteria, all articles were screened by two authors and data extracted from included articles using a researcher-developed data extraction tool. From 1812 studies located, 845 unique articles were screened, 226 were assessed at full text, and 129 met the inclusion criteria. Nine thematic elements describing thirty-two attributes of health literacy responsiveness were identified; (1) communication ((2) simple, (3) bidirectional and (4) multimodal), (5) digital literacy, (6) andragogy (teaching and checking for understanding), (7) social/relational attributes, (8) responding to diversity and (9) assessing literacy. Forty-four tools were identified that assessed some aspects of health literacy responsiveness. Seventy-eight (78) studies described education or training. This scoping review provides a contemporary list of the key attributes required for health literacy responsive health professionals. This review will inform development of curricula in health professional education and the development of a tool to measure health professional health literacy responsiveness.

**Marlee Wells**

Jane Alty, Mark R. Hinder, Emilia Hawkey, Nenagh Kemp, Rebecca J. St George

A word in the hand is worth two in the push: A comparison of verbal and motor responses to the Directional Stroop task

Cognitive inhibition is important for suppressing automatic learned responses when they are not appropriate for a given task. In the traditional Directional Stroop Task, an incongruent written word (e.g. "LEFT" presented within a right-pointing arrow) slows the verbal response to the arrow direction ("right"), suggesting that reading the word is the more automatic response. However, it is unknown whether motor responses experience the same Stroop interference effect, as there is direct mapping between directional stimulus cues and correct limb selection. This study of 32 healthy adults (18 – 52 years, 68.75% female) investigated how the Stroop interference effect was influenced by response modality (verbal vs. keypress). Response modality and attended component of the stimulus (arrow, word) were manipulated in blocks of trials with varying levels of congruency compared to control blocks (arrow only, word only). Incongruent text slowed the verbal response, but not the keypress response. In contrast, incongruent arrows slowed keypress responses to the text, but did not slow verbal responses. The results suggest that motor decisions are more readily influenced by directional cues within visual stimuli than the meaning of the text.

**Moges Assemie**

Kelcie Miller, Seana Gall, Verity Cleland, Jing Tian

Change in composite scores of modifiable behavioural and clinical factors from childhood to adulthood and cardiometabolic outcomes in adulthood: a systematic review

Objective: To systematically synthesise the literature on the associations between changes in composite scores of modifiable risk factors from childhood to adulthood and adulthood cardiometabolic outcomes. Method: We searched Medline, Embase, and Web of Science databases published until 12 October 2023. Inclusion criteria were population based longitudinal studies, composite scores of modifiable risk factors in both childhood and adulthood, and cardiometabolic outcomes in adulthood. Results: From 4693 articles, 11 articles were included. Composite scores mostly included diet, smoking, physical activity, body mass index, blood glucose, blood pressure, and cholesterol. Increase in continuous composite scores from childhood to adulthood was associated with a lower risk of cardiovascular structure and function, type 2 diabetes, and fatal/nonfatal events. Categorically, the persistently high-risk and worsening groups from childhood to adulthood were associated with a higher risk of cardiometabolic outcomes, while the improved and consistently low risk groups related to a lower risk. There was no association between improvement in composite scores of behavioural factors from childhood to adulthood and adulthood cardiovascular outcomes. Conclusion: The improved and consistently low risk groups from childhood to adulthood were associated with a lower risk of cardiometabolic outcomes. Future studies should include more essential behavioural factors in composite scores.

**Mohammad Shoaib Hamrah**

Larissa Bartlett, Lynette R Goldberg, Aidan Bindoff, James C. Vickers

Associations between hearing loss, social isolation, and depression among individuals aged 50 and above in Tasmania, Australia

Objective: Acquired hearing loss (HL) in adult life is one of the most prevalent health conditions and is associated with several chronic diseases. HL can lead to reduced social activity and perceptions of supportiveness within social networks. This study explored the effects of corrected vs. uncorrected HL on social support, and social isolation, anxiety, and depression.
Methods: A cross-sectional study; an online survey was undertaken by 7,442 Australian residents aged 50 years or over as part of the Island Study Linking Ageing and Neurodegenerative Disease (ISLAND). Respondents were grouped into those with no reported acquired HL, those with corrected HL (managed with hearing aids and other listening devices), and those with uncorrected HL. Results: HL was reported by 1,274 participants (17.1%). There was a higher proportion of females when compared to the No-HL group (25% male, 75% female). Compared with participants with corrected or no-HL, those with HL (n= 548, 7.4%) reported significantly smaller (p=.007) and less supportive social networks (p = .001), higher self-reported anxiety (p<.001) and depression (p<.001) symptoms. For all outcomes, correction of HL mitigated these negative effects. The only significant contrast between participants with HLcorrected and No-HL was on the depression scale (SMD = .10, p = .039). Depression symptoms were more common in those with HLcorrected than No-HL. Conclusions: Uncorrected HL was associated with poor mental health and social isolation, compounding the risk for dementia. Correcting for HL appeared to mitigate these outcomes except for depression. Longitudinal studies are needed to track the effects of HL correction over time. Hearing status needs to be assessed when people present with mental health concerns, so health professionals can make appropriate referrals and provide relevant advice and support.

**Mustafa A. Ahmed**

Phillip E. Melton, Nicholas B. Blackburn, Kathryn P. Burdon, Eric K. Moses

Identification of Rare Genetic Variants Associated with Cardiovascular Disease Risk

The genetic component of common human traits and diseases has long presented a mystery. A gap exists between the observed phenotypic variation and the underlying genotyped variation while accounting for non-additive genetic effect and environmental factors from family and twin studies. Recently, the missing heritability in complex human traits has largely been accounted for by rare genetic variations, yet they remain elusive in many diseases due to the required scale of genotyping data. Alternatively, enrichment in high-risk family genetic studies has been extensively used, however, the approach is limited by expensive and lengthy recruitment. In this work, we developed a scalable graphical method for pedigree(s) prediction in large cohorts. In addition, endophenotypes of cardiovascular disease risk that are closer to the genetic cause are used in association testing to further magnify the effect size. Examining joint family and population-based imputed data has shown signals on both coding and non-coding regions. Most lie within regions previously reported in a large genome-wide association study, such as on Prohibitin 2 (PHB2), suggesting that rare variation is driving the signal and refining the mapping to the gene cause. While others, such as rare variants on Transforming growth factor beta receptor III (TGFBR3), are novel.

**Nagarajan Manickaraj**

Justin J Kavanagh, Leanne M Bisset

Activation of anconeus during isometric gripping in individuals with lateral elbow tendinopathy

Purpose: This study aimed to examine the anconeus activation characteristics during gripping tasks in individuals with chronic tennis elbow (TE). Methods: Case-control design was used to recruit 11 tennis elbow and 11 healthy participants. Surface electromyography was obtained from the anconeus and six forearm muscles during steady-state isometric grip tasks at 15% and 30% of maximal voluntary contraction (MVC). Standard clinical assessments of tennis elbow were obtained. Univariate analysis of variance with post-hoc multiple comparisons and simple linear regression analysis was employed to test the intended hypothesis. Results: TE group had increased relative activation of anconeus to its net activity with the common forearm flexors during 15%, and 30% MVC gripping. TE group had an increased level of anconeus coactivation-ratio to extensor carpi radialis brevis during 15% MVC grip and to all three superficial forearm flexors during 30% MVC gripping. Increased anconeus activation amplitude was associated with greater severity of anconeus muscle tenderness. Conclusion: This study provides preliminary novel evidence on the elbow joint-specific adaptive motor strategy contributing to gripping deficits in individuals with chronic TE. Although further research is required, the findings of this study suggest the need for assessing and managing anconeus dysfunction in chronic TE.

**Nara Jones**

Kathryn Ogden, Bradley Williams, Rohan Church, Kate Macintyre, Lauren Giles, Emily Collins, Renee Harvey, Lizzie Shires, Anthea Dallas.

Evaluation of senior medical students' logbooks for learning activities associated with health advocacy

The health practitioner's role as a 'Health Advocate' for patients, communities and populations is critical to reduce health inequities and improve health outcomes in a sustainable manner. One of the four domains set by the Australian Medical Council (AMC) for medical graduate requirements comprises Graduate Outcomes statements (GOs) pertaining to health advocacy. Providing opportunities for students to develop these GOs, however, is challenging.1,2 The University of Tasmania's medicine program employs a longitudinal portfolio in which students provide evidence of their learning against each of the GOs, reflecting on their experiences and implications for future practice. By analysing student portfolios, we aim to appreciate how students currently view their own development as Health Advocates and inform strategies for educators to maximise opportunities for students to develop and demonstrate competency. Methods: Descriptive statistics will be used to analyse data from over 200 portfolios submitted in 2022-23, to quantify the evidence provided per GO and the relative contribution of formal and informal curricula, as well as extracurricular activities. Student reflections will be thematically analysed. This presentation will discuss the qualitative and quantitative analyses of evidence provided to meet the GOs pertaining to health advocacy.

**Nizam Abdu**

The NHMRC Research Impact Indicators: Unveiling Omissions and Blind Spots

Background: The NHMRC is central to medical research in Australia, funding projects that advance scientific inquiry and evidence-based healthcare. Its logic model emphasizes knowledge generation, health improvements, economy, and society as key impact indicators. However, there is high demand for researchers to engage with Aboriginal and Torres Strait Islander communities and individuals with lived experiences. This paper aims to highlight the narrow conceptualisation of the NHMRC logic model of research impact. Methods: We conducted a content analysis of NHMRC-funded impact case studies to assess their alignment with and consideration of impact as per Australian and international definitions. Findings: 44 impact case studies were identified, with seven addressing Aboriginal and Torres Strait Islander health. The impact statements mainly pertained to health, followed by knowledge, economy, and then society. For the seven Aboriginal and Torres Strait Islander related studies, the focus of the impact statements was mainly health. Three impact case studies considered culture, while one focused on built environment. Lived experience was not mentioned in any impact statement. Conclusion: The NHMRC logic model lacks inclusivity as it embodies a narrow conceptualisation of research impact. Future research should investigate impact across broader context and foster convergence between medical and social research streams.

**Nnamdi John Eseme**

Rachel Climie, R Kelly, Seana Gall, JP Empana, Rosie Nash

Investigating the relationship between health literacy and cardiovascular diseases among Australian Adults and their families

Background: Cardiometabolic disease poses a significant global health concern, aligning with the United Nations' objective of achieving universal health and well-being by 2030. Notably, 60% of Australian adults grapple with low health literacy, potentially hindering informed healthcare decision-making. Aims: We aimed to explore the relationship between health literacy and cardiovascular risk factors among Australian adults and their children. Method: Data from the 2017-2018 National Health Survey will be analyzed, encompassing one adult and one child per sampled dwelling. Utilizing hierarchical adjusted regression models, we aim to investigate the correlation between health literacy and cardiometabolic disease in adults, as well as the impact of adult health literacy on children's risk factors. Results: With 5,790 fully responding adults in 2018 and an expected analysis population of 5000, households are categorized based on family composition. Discussion: This study promises valuable insights into the risk profiles of Australian adults and families, with a focus on identifying specific health literacy domains challenging individuals with cardiometabolic disease. Conclusion: Insights gleaned may shed light on the predisposition to cardiovascular disease and reveal barriers to prevention in Australia, guiding targeted interventions and ultimately reducing the burden of CVD through policies promoting shared decision-making and addressing health literacy challenges.

**Nnamdi John Eseme**

Seana Gall, R Kelly, Rachel Climie, JP Empana, Rosie Nash

Interventions to support individual health literacy related to cardiovascular health in children

Background: Cardiovascular disease is the leading cause of mortality, often linked to modifiable lifestyle behaviours. Recent studies reveal concerning cardiovascular health (CVH) metrics in children, e.g. 90% of Australian children have a poor diet, highlighting the importance of interventions to address health literacy gaps. Aim: To identify previous studies with interventions targeting cardiovascular health in children. Methods: Two reviewers systematically searched Medline, Scopus, CINAHL and Web of Science utilizing the Joanna Briggs Institute (JBI) scoping review framework and pre-set inclusion criteria. We reported on the intervention characteristics, conceptualisation, CVH metrics, pre- and post-intervention effects, and length. Results: From 4551 potential papers we identified 39 studies (5 protocols) to be included in the review. Country of studies includes United States (12), Australia (4), Canada (4), Denmark (4), Netherlands (3), United Kingdom (2), Faroe Islands (2). Germany, Sweden, Spain, Hungary, New Zealand, Brazil, Taiwan and China (1 each). The most measured risk factors were BMI, physical activity, and diet. Encouragingly, interventions showed positive impacts, including improved CVH awareness and lifestyle behaviours among children. Conclusion: This review underscores the potential of sustained health literacy in children to enhance CVH outcomes. Future efforts should embrace comprehensive approaches to address all cardiovascular risk factors effectively.

**Prajna Paramita Taslim**

Alexandra Gruber, Robyn Marsh, Stephen Tristram, Brianna Atto

Feasibility of ST-2023 as a new therapy against nontypeable Haemophilus influenzae

Non-typeable Haemophilus influenzae (NTHi) is a leading cause of middle ear infections in children and lung infections in adults and individuals with chronic respiratory disease. Despite antibiotic treatment, infections caused by NTHi are frequently persistent and recurring, often leading to long-term health complications. This chronicity is linked to the formation of biofilms, which are largely impervious to immune and antibiotic clearance. Thus, new therapies that also target these biofilms is key to reducing the high disease burden associated with NTHi infections. This project aimed to investigate the feasibility of adapting a bacterially-derived antibacterial peptide (ST-2023) as a novel therapy against NTHi by determining it's spectrum of activity and anti-biofilm properties. Our results show that ST-2023 exhibits highly specific activity against members of the Pasteurellaceae family (including NTHi) and is able to inhibit the formation of-, and disrupt existing NTHi biofilms in vitro. Thus, ST-2023 may have utility as a new therapy against NTHi infections which is also active against biofilms and does not cause collateral disruption to the heathy microbiome (as is typical for current antibiotic treatment regimens). However, further work is warranted to elucidate the exact mechanism of action and therapeutic potential of ST-2023, including safety and efficacy in clinically relevant infection models.

**Preetinder Sarwara**

Pathmavathy Namasivayam, Lindsay Smith

Evaluation of how Registered Nurses employed in telehealth services to provide tele-triage across Australia perceive their nurse-client relationship

Tele health is a means of health care delivery to the patients virtually over the phone or internet (video or voice calls). Tele health is classified into various spheres and the main spheres are Tele medicine and Tele nursing. Tele medicine includes patient interaction with their GP or any of their health care specialists over long distance. In a similar way, Tele nursing refers to the interaction of patient and / or their families with their nurse virtually. Tele triage nursing refers to assessment of patients over telephone or video call, providing health information and referring patients to appropriate care depending upon their health concern and situation. The Tele triage Nurse may feel utterly satisfied after providing nursing care to the client and/ or their family or they may have a feeling of despair if they are unsure of the health consult with the patient/family and their health situation. A little is known about the contentment levels of the Tele Triage nurses working in Tele nursing service, their engagement with professional nursing practices and the nurse relationship with clients and client's family. The scope of this study is to measure how the Tele Triage Nurses perceive their nurse – client relationship. The study sample of this research is the Tele triage Nurses working within Australia. This research uses a quantitative design consisting of a cross-sectional survey that includes both closed and open-ended questions. This research study will help to inform the understanding of Tele Triage nursing engagement in professional nursing practices and Tele Triage Nurse-client relationship satisfaction. This research study will be the first Australian study to explore the Tele-Triage Nurse - client relationship using a national cross-sectional cohort design.

**Saranya Viswanathan**

Agnieszka Zbela, John Lin, James Crane

Unraveling the Molecular Mechanisms of Oxytocin and Arginine Vasopressin Release

Neuropeptides are pivotal signaling molecules in the brain that regulate diverse aspects of behaviour, mood, and cognition. Among them, oxytocin (OXT) and arginine vasopressin (AVP) exhibit profound influences on addiction, stress responses, social interaction, and mental health disorders. However, the molecular mechanisms underlying their release of OXT and AVP remains a challenge due to technical constraints. We hypothesize that cAMP, a secondary messenger in the G-protein coupled receptor pathway, can trigger OXT and AVP release independently of action potential firing in the mammalian nervous system. Here we aim to address these gaps by employing optogenetic and fluorescent-protein-based tools to elucidate OXT and AVP release dynamics within the hypothalamus and central amygdala. With pharmacological and optogenetic methods, we can understand the neuropeptide release mechanisms and their impact on fear memory modulation. This study not only promises to advance our understanding of neuropeptide signaling but also holds the potential for uncovering therapeutic targets for conditions such as autism spectrum disorder, anxiety, depression, and post-traumatic stress disorder.

**Shandell Elmer**

Rosie Nash, Damhnat McCann, Nick Arnott, Aitor Baonza, Melanie Eslick, Diana Guzys, Melissa Kirschbaum

Is this 'The Right Place'?

Improving individual and systems-level health literacy is key to mitigating the impact of social determinants of health, social isolation and complex healthcare and services. 'The Right Place' was initiated in 2015 in the Huon Valley, to improve individual's access to health and community services by fostering a culture of connectivity and ensuring there is 'no wrong door' to seek assistance. An evaluation of 'The Right Place' in 2023 focused on the implementation process, mechanisms through which the initiative produces change, and external factors that could act as either barriers or facilitators. The evaluation aimed to understand the impact of 'The Right Place' on community health literacy and the commitment of organisations and local community members to create an environment that supports and enables health literacy development. Data collection involved 26 stakeholders through group and individual interviews and workshops. The data analysis resulted in recommendations for 9 areas: funding and oversight; community preparedness; operationalising 'The Right Place' principles; champions; mentorship; mental health training; service directories; digital inclusion; ongoing evaluation. These recommendations will support the continued evolution of 'The Right Place' from focusing on replicating resources towards the adoption of a set of locally informed practices and principles that underpin its success.

**Sharad Karki**

Shandell Elmer

Exploring how Tasmanian Nepali-speaking Bhutanese former refugees access health information and services

Access barriers to healthcare services exist in all populations, even more so for former refugees who experience additional disadvantages. Access to services and health literacy are interrelated and bi-directional. Both health literacy and access have been conceptualised predominantly at an individual level, with a focus on personal abilities. More recent concepts of health literacy include abilities to navigate the healthcare system, communicate with healthcare professionals and actively manage health. These abilities and skills can be dispersed among a group where the combined effort can lead to an improvement of health literacy skills for a whole group. This study explores the experiences of Nepali-speaking Bhutanese former refugees to identify health literacy strengths and challenges and determine how their interconnections support them to access services.This research is being conducted in two phases. During the first phase, Nepali-speaking Bhutanese former refugees will be interviewed about their perceptions of healthcare. In the second phase workshops will be held to share findings with Nepali-speaking Bhutanese former refugees, Nepalese community members and service providers. This research will help to identify ways to address the identified issues and set priorities for future development.

**Simon Weber**

Sauro Salomoni, Rebecca St George

Assessing inhibitory ability across the lifespan: optimising task design and interpreting ambiguous measures

The ability to halt or modify actions in response to changing environmental demands is a vital component of human motor control. Inhibitory control degrades as we age, potentially impacting quality of life and impeding our ability to navigate the modern world. Despite this, the behavioural paradigms used to assess action cancellation capture a poorly understood combination of processes and are highly sensitive to methodological differences. The research I (and other members of our lab group) have conducted over the course of my PhD has used behavioural and physiological (electromyography; EMG) measures to provide insights into how complex stopping abilities change with age. Along with this, we implemented novel designs to highlight a number of limitations with commonly used behavioural paradigms. For instance, we show that the "gold standard" task (the stop signal task) captures not only voluntary cancellation of movement, but an involuntary inhibitory response that occurs in response to infrequent cues. We also demonstrate that the modality of the stimuli used in these tasks (i.e., visual stimuli vs auditory stimuli) interact with stopping speed in unexpected ways, raising a number of questions regarding optimal experimental design in the field.

**Simone Page**

Giles Barrington, Maria Unwin, Amanda Neil, Sarah Prior, Emma Tavender, Janette Radford, James Sharman, Graeme Zosky, Viet Tran

IMplementing clinical Pathways for Acute Care in Tasmania (IMPACT)

Clinical pathways are evidence-based standardised care plans that enhance evidence-based practice whilst reducing variation. Tasmania's four existing statewide clinical pathways (chest pain, stroke, fractured neck of femur and sepsis) have been developed to address local concerns relating to quality and safety of acute care. However, there is little data to determine the ongoing variation in practice for these specific conditions, making it difficult to target improvement efforts. IMPACT aims to enhance the incorporation of clinical pathways into contemporary, patient-centred models of care across Tasmanian emergency departments (EDs) and improve service delivery, outcomes, and reduce inefficiencies using an implementation science approach. We will describe our phased approach to understanding compliance and patient outcomes of current pathway utilisation, exploration of barriers to compliance, and development and implementation of solutions using a Learning Health System.

**Stan Drummen**

J Runhaar, SM Bierma-Zeinstra, D Aitken, G Jones, DT Grønne, EM Roos, ST Skou

Early-stage vs established knee osteoarthritis: A comparative study on changes in pain, function and quality of life after supervised exercise and education among 10,365 patients

Objective: To compare changes in pain, function, and quality of life among patients undertaking supervised exercise and education stratified into early-stage and established knee osteoarthritis (KOA). Methods: Knee patients undertaking the GLA:D® program were stratified into established KOA (EULAR/ACR criteria), early-stage KOA (diagnostic model outcome ≥70%) or potential early-stage KOA (>30%). Adjusted mixed-models and proportions of patients achieving minimal clinically important improvements (MCIIs) were used to investigate changes in VAS pain intensity (0-100 mm), KOOS QoL (0-100 points), 40m Walk test and 30-s chair-stand test. Results: At baseline, 61% of patients had established KOA. Compared to those with early-stage KOA (27%), these patients had similar mean (SE) VAS knee pain at baseline (51 (0.3) vs 45 (0.4)) and similar improvement in pain (-15 (0.4) vs -14 (0.6), ≥MCII: 54% vs 53%) and KOOS QoL (11 (0.3) vs 11 (0.4) points, ≥MCII: 49% vs 49%) at 12 months, and in walking speed (≥MCII: 56% vs 52%) and chair-stands (≥MCII: 59% vs 55%) at 3 months. Conclusion: Early-stage KOA patients achieved similar clinically-relevant improvements at 3 and 12 months to those with established KOA, supporting supervised exercise and education as a viable management strategy also for early-stage KOA.

**Tadeg Jemere Amare**

Ingrid van der Mei, Cynthia Honan, Bruce Taylor, Julie Campbell, and Laura Laslett

Use of treatment strategies to improve sleep and their effect on sleep quality and daytime sleepiness amongst people with Multiple Sclerosis

Objective: to assess self-reported sleep treatment strategies and the impact of prescription medications with potential sleep-related effects on sleep quality and daytime sleepiness in people with MS. Methods: Self-reported treatment strategies used for sleep were assessed by questionnaire. Prescription medication use was obtained from Australian Pharmaceuticals Benefit Scheme data. Sleep outcomes were assessed using the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS). Independent T-test and Chi-square test were used to compare continuous and categorical variables between good and poor sleepers. Result: Most (72%) people living with MS used treatments to improve sleep. Poor sleepers were more likely to utilise sleep treatment strategies and employ multiple treatment strategies compared to good sleepers. Nearly half (45%) of participants used prescription medications likely to impact sleep, primarily antidepressants (28%), baclofen (18%), and benzodiazepines (8%). Those using any such medications had higher Mean PSQI and ESS scores (PSQI: 7.5±3.4 vs. 6.5±3.3; ESS: 7.5±4.8 vs. 6.4±4.4), $p<0.001$). Benzodiazepine and sedating antidepressant users had worse mean PSQI and ESS scores. Conclusion: Most people with MS used treatment strategies to improve sleep, and poor sleepers were more likely to use any strategy for improving sleep. Benzodiazepines and sedating antidepressants have the greatest impact.

**Tanya Linden**

Reablement - Amplifying the Voice of Lived Experience

In June 2020, there were an estimated 4.2 million Australians aged 65 and over comprising 16% of the total Australian population (ABS 2020b). By the year 2066, it is expected that older people in Australia will make up between 21% and 23% of the total population (ABS 2018). As a response to this demographic shift we have been seeing the development of new models of care which balance increasing costs against reducing public spending. This is the driving force behind recent movements towards modes of care that resource and empower people to age in place. Reablement presents a model of care designed to contend with the escalating economic impacts of our ageing population and support ageing in place. This presentation will summarise key areas of my reablement focused PhD project including aims and objectives, research phases, expected outcomes and impacts.

**Veronica Martin-Gall**

Kate Chappell, Seana Gall, Mark GK Veitch

Where are legal smoking products sold in Tasmania?

Background: The Tasmanian smoking product licensing scheme requires retailers to hold a licence to sell smoking products and retailers must report the volume of products sold during June each year. Volume sales data aims to inform local preventative health planning by complementing estimates of smoking prevalence, inform licensing and retail availability policy, and target smoking cessation services or interventions. We describe the findings of the first year of collection in June 2021. Methods: Retailers submit their sales via a text (csv) file or manual list of products and quantities through an online renewal and application system. Validated data of the name, product type and number of smoking products were analysed in R statistical package. Results: 603 (87%) of outlets reported the volume of smoking products they sold in June 2021. Supermarkets sold most retail cigarettes (87%) then mixed businesses (6%), newsagencies (4%), and service stations (3%). The remaining points of sale, bottle shops, take aways, bars, pubs or clubs sold less than 1% of all cigarettes sold. Loose tobacco (RYO) was purchased mainly in supermarkets (83%) then independent supermarkets (13%). Disposable e-cigarettes were mostly sold from mixed businesses (99%). The largest volume of e-liquid was sold in vape shops (63%) then by mixed businesses (37%). Discussion / Conclusion:In Tasmania, supermarkets are responsible for most tobacco product retail sales. These products cause great health and social costs. It is time to promote the prospect of voluntarily stopping selling tobacco as part of corporate social responsibility.

**Wardah Hussain Malick**

Metabolic and Inflammatory Factors Associated with Chronic Plantar Heel Pain

Background: Chronic plantar heel pain (CPHP) is a painful foot condition that affects up to 10% of adults in their lifetime. It is associated with significant functional disability and poor foot-related quality of life. It is a heterogeneous condition with many important sub-groups or phenotypes. However, systemic characteristic factors are under-recognized contributors to CPHP risk and prognosis. Methodology: A scoping review is being conducted to document what is known and the evidence gaps in our understanding of the metabolic and inflammatory factors associated with CPHP. Furthermore, the blood samples of individuals with CPHP will be analyzed for metabolic and inflammatory biomarkers. Conditional logistic regression models will be used for case-control analyses to measure the association of the biomarkers with having PHP. Linear mixed effects models will be used to analyze the longitudinal association of baseline biomarker levels and change in foot pain, foot-related physical function, and quality of life. Importance of this project: This project will create a world-first understanding of systemic associations with CPHP. It will describe and define metabolic and inflammatory phenotypes of CPHP. Currently, treatments are applied in 'stepped' fashion based on failure of the preceding intervention. This research seeks to shift this approach to one of targeted care.

**Yoseph Merkeb Alamneh**

Laura Sutton, Saliu Balogun, Katherine Lawler, Marina Djekanovic, Lisa O'Brien, Christian Barton, Paula Hyland, Paul Harvie, Gregory Peterson, Natalie Collins, Barbara de Graaff, Pieter Van Dam, Graeme Jones, Dawn Aitken

Evaluating the feasibility of the GLA: D® Australia Program within a Tasmanian public healthcare setting

Background: The Good Life with OsteoArthritis: Denmark (GLA:D®) program is an evidence-based education and exercise program for hip and knee osteoarthritis. This study evaluated the feasibility of the GLA:D® program in Tasmanian public healthcare settings. Methods: We partnered with the Tasmanian Health Service (THS) to implement the GLA:D® program at three public outpatient clinics in Southern Tasmania. We conducted semi-structured qualitative interviews with health professionals and patients who were involved in the implementation or participated in the program. Interviews were audio recorded, transcribed verbatim, and anonymised for thematic analysis. Results: Nine physiotherapists, two allied health assistants, three administrative staff and 13 patients were interviewed. The main themes identified were (1) acceptability of GLA:D®; (2) patient experience and accessibility; (3) implementation considerations; and (4) sustainability within the THS. Most participants reported the program was effective to manage their symptoms and were satisfied with the education and group-based exercise components. Implementation and sustainability considerations included: staffing, physical space, scheduling logistics and accessibility of the program. Conclusions: GLA:D® is feasible, safe, and acceptable to Tasmanian public patients with knee and/or hip osteoarthritis. Operational and administrative considerations to implementation have been identified and will help to inform the upscaling of GLA:D® more broadly across Tasmania.

**Zane Farnum**

Duncan Sinclair

Unravelling stress-related pathways related to Alzheimer's disease pathogenesis

We all experience stress in our daily lives, and research in both human and animal studies have suggested that stressful life experiences may be risk factors for dementia. Stress may exert its effect on dementia risk directly via stress hormone effects in the brain, or indirectly by impacting other dementia risk factors such as depression. Investigating the role of stress hormones in dementia pathogenesis is crucial for unravelling the complexities of this interplay. In this study, we aim to explore how stress hormones interact with AD pathological proteins/peptides in olfactory neuroepithelial cells and isogenic induced pluripotent stem cells with familial AD mutations. We have utilized protein mass spectrometry to elucidate specific protein pathways which are co-regulated by stress hormones and amyloid beta peptides, or whose regulation by stress hormones is altered by amyloid beta peptides. This will help determine whether stress acts as a contributor or cause of AD, or if heightened stress signalling is a consequence of AD pathology. Our findings may pave the way for therapeutic interventions targeting stress-related pathways.

**Zemene Demelash Kifle**

Jing Tian, Dawn Aitken, Phillip E. Melton, Flavia Cicuttini, Graeme Jones, Feng Pan

MRI-derived abdominal adipose tissue is associated with multisite and widespread chronic pain

Objective: Musculoskeletal pain typically occurs in multiple sites; however, no study has examined whether excessive visceral and subcutaneous adipose tissue are associated with musculoskeletal pain. This study, therefore, aimed to describe the associations between MRI-derived abdominal adipose tissue and chronic musculoskeletal pain. Methods: Data from the UK Biobank, a large prospective, population-based cohort study, were used (n=32,409; mean [SD] age, 55.0 [7.4] years; women [50.8%]). Abdominal MRI scans were performed at two imaging visits to quantify visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT). Pain in the neck/shoulder, back, hip, knee, or 'all over the body' was assessed at the corresponding visits. A mixed-effects multinomial logistic regression model was used for the analyses. Results: In multivariable analyses, there was a dose-response association of VAT, SAT, and their ratio with number of chronic pain sites in both women [VAT: relative risk ratio (RRR)=1.55 per SD, 95% CI(1.47, 1.62); SAT: 1.33(1.29, 1.37); VAT/SAT ratio: 1.33(1.21, 1.46)] and men [VAT: 1.20(1.16, 1.24); SAT: 1.22(1.17, 1.28); VAT/SAT ratio: 1.08(1.04, 1.13)]. The effect estimates of these adipose measures were relatively larger in women than in men. Conclusion. Abdominal adipose tissue was associated with number of chronic musculoskeletal pain sites, suggesting that excessive and ectopic fat depositions are involved in the pathogenesis of multisite and widespread chronic musculoskeletal pain.

**Ziyuan Shen**

Canchen Ma, Jing Tian, Yvette L. Schooneveldt, Corey Giles, Flavia Cicuttini, Graeme Jones, Peter J. Meikle, Feng Pan

Identification and validation of novel lipids linked to bone mineral density change and fracture risk

Objectives: This study aimed to identify and validate lipid metabolites associated with changes in bone mineral density (BMD) and fracture risk by integrating evidence from mendelian randomisation (MR) and observational analyses. Methods: Two-sample MR analysis was performed to uncover potential causal relationships between 32 lipid classes and 576 lipid species and BMD and fractures. Identified signatures were subsequently validated in an independent cohort. The false discovery rate method was employed to control multiple testing. Linear and log binomial mixed-effects models were used to analyze lipid associations with hip BMD and fracture risk, respectively. Results: Two-sample MR revealed seven lipid classes causally associated with BMD and/or fractures, including acylcarnitine, cholesteryl ester (CE), sphingomyelin (SM), phosphatidylinositol, GM3 ganglioside, alkylphosphatidylcholine, and triacylglycerol. Causal associations were found between eighteen lipid species across these classes and BMD, and ten lipid species were associated with fractures. Validation in an independent longitudinal cohort confirmed associations for SM, SM(d18:1/16:0, d18:2/24:0), and CE(18:3) with hip BMD change, and SM, GM3, and SM(d18:2/18:1, d18:2/22:0, d18:2/17:0) with increased fracture risks over 8-year. Conclusions: Our findings suggest alteration in lipid metabolism implicated in bone remodeling and fracture risk, highlighting identifying lipid signatures may enable early detection and intervention in preventing osteoporotic fractures.

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