Oral Abstracts

Food and Substances

10:30AM – 12:30PM, Wadawurrung 1

Household purchases of price promoted foods and beverages: Evidence from New Zealand panel data

Christina Zorbas

Background: To improve population diets and reduce the global burden of obesity, public health groups are increasingly endorsing recommendations to restrict price promotions on unhealthy foods and beverages. However, there is limited evidence explicating how price promotions are purchased across different food categories and income levels.

Purpose/aims: This study aimed to estimate the extent to which consumers purchase price promotions (overall and across food/beverage categories), and differences by income level.

Methods: Cross-sectional analyses of over 1.8 million purchases made by a nationally representative panel of 1,672 New Zealand households were conducted. Mixed linear regressions were used to estimate the proportion of purchases made on promotion (overall and across food categories) and the uplift in the volume of purchases made on promotion compared to off promotion. An interaction term was included to explore whether income modified the estimates across food categories.

Results: Results indicated that 49% of all purchases made by New Zealand households between 2016-2017 were price promoted. Estimates were high for less healthy processed and ultra-processed foods, at 59 and 55% respectively. The uplift in the volume of foods and beverages purchased on promotion was also highest for the ultra-processed category (an additional 26kg and 48L per household per year). Sub-group analyses revealed that there was no significant difference in the extent to which unhealthy ultra-processed foods and beverages are purchased by income level.

Conclusions: This study has for the first time demonstrated that consumers purchase price promotions to a greater extent among less healthy compared to healthier foods and beverages. Price promotions are also likely to be pertinent to consumers across all income levels.

What's next? Given how prevalent price promotions are among unhealthy purchases, these results build the evidence-base of an emerging public health policy recommendation to restrict price promotions on unhealthy foods and beverages.

Parenting styles and the dietary intake of pre-school children: A systematic review

Alissa Burnett

Background: The prevalence of childhood overweight and obesity has been increasing globally, with poor diet a key contributor. Eating patterns established early in life track into later years, with parents playing an influential role in the food intake of younger children. The associations of parenting styles (authoritative, authoritarian, permissive and disengaged) and parenting dimensions (warmth and control) with pre-school children's dietary intake are unclear at present.

Purpose/aims: This systematic review examines these relationships.

Methods: A search of six electronic databases was conducted. Inclusion criteria included articles published in English including children aged between 2 and 5 years, measured and reported associations between parenting styles or dimensions and food intake.

Results: Seven articles met the inclusion criteria. Three articles focussed on parenting styles and four articles focussed on parenting dimensions. An authoritative parenting style was positively associated with fruit and vegetable intake (n = 2). High levels of warmth were associated with an increased intake of healthy foods (n = 2) and a lower intake of unhealthy foods (n = 1), whereas low levels of parental warmth were associated with a lower intake of fruit and vegetables (n = 1) and a higher intake of unhealthy foods (n = 1). However, several different measurement tools were used to identify the parenting styles (n = 3) and dietary intake (n = 6), with reliability and validity and reported in varying ways.

Conclusions: This review suggests that an authoritative parenting style or higher levels of warmth are associated with a healthier dietary intakes of pre-school children. Future research would benefit from using consistent measures of parenting styles and dietary intake.

What's next? There is potential for future studies to explore the ways parenting styles may be modified through interventions to promote an authoritative parenting style, which may improve the dietary intake of pre-school children.

Predictors of exclusive breastfeeding in Chinese mothers in Australia

Konsita Kuswara

Background: Chinese immigrants are the largest ethnic group in Australia. Preliminary evidence indicates that infants from Chinese mothers may be at increased risks of overweight and obesity due to suboptimal infant feeding practices. Breastfeeding is associated with healthy weight gain while the replacement of breastmilk with other milks or foods is associated with rapid weight gain, a strong risk factor for obesity in later childhood.

Purpose/aims: This study aims to describe breastfeeding practices and its key predictors in Chinese Australian mothers.

Methods: An online survey was developed based on the Australian Infant Feeding Survey and modified to be culturally appropriate. Chinese immigrant mothers who have a child aged 1-3 years born in Australia were eligible to participate. Infant feeding practices were analysed using descriptive statistics and key predictors were analysed using Poisson regression.

Results: A total of 265 Chinese mothers completed the survey. Almost all (91.4%) initiated exclusive breastfeeding (EBF), however by two weeks, only 50% of mothers were breastfeeding exclusively. The EBF rate at four months was 39% and 5% at six months. The sharp drop in EBF rate in the first six months was due to the introduction of formula, with 38% of mothers reporting that from birth, they intended to mix feed by using formula to top up breastmilk. Intention to EBF, awareness of recommendations to introduce solids at around 6 months and greater breastfeeding confidence predicted longer EBF duration.

Conclusions: The first few weeks postpartum is a critical period to support Chinese mothers in continuing EBF. Antenatal education should aim to address mothers' ambivalence regarding EBF and formula use and provide clear education to delay the introduction of solids to around 6 months.

What's next? Improving EBF rates is likely to promote optimal infant growth and reduce the risks of obesity in later life.

Development, optimisation and feasibility of an online dietary intervention targeting gut health for improvement of depressive symptoms: The My Food and Mood Project

Claire Young

Background: 'Nutritional Psychiatry' is an emerging field in mental health research examining the role of diet in mental health and disease. There is a rapidly growing body of evidence from this field supporting dietary improvement as a means of preventing and treating depression. We hypothesise that an online dietary intervention designed to engage participants with depression can overcome the barriers to seeking treatment some individuals with depression face and achieve high intervention adherence; this may then improve depressive symptoms.

Purpose/aims: The primary aim is to develop and optimise an online intervention promoting dietary improvement for individuals with depression. The secondary aims are to (1) assess the feasibility (acceptability, uptake and engagement) of the program for individuals with depression and (2) assess and quantify the correlation between engagement time and changes to both (i) diet quality and (ii) mood scores.

Methods: The dietary intervention will comprise a modularised educational program and accompanying smartphone monitoring application focused on dietary improvement for gut health, developed and optimized through phased iterations during the course of the study. Three separate cohorts will be enrolled to use the program and smartphone application for eight weeks. The feedback from each cohort will inform development of the program for the subsequent iteration. The primary aim will be measured through user feedback and program use measures. The feasibility of the intervention will be assessed through participation and completion measures, dietary adherence assessed with dietary questionnaires, and gut microbial diversity in a subset of participants.

What's next? The results of this study will support the development of online dietary interventions for depression that are widely accessible, engaging, and effective in improving both diet and depressive symptoms. The results from the first cohort will be presented at the conference.

Is dairy consumption associated with depressive and anxiety symptoms in adults? A systematic literature review of observational studies

Meghan Hockey

Background: Diet is an important modifiable risk factor for depression. Consumption of numerous food groups (e.g., vegetables, fruit and meat) have been associated with depression. However, the association between dairy consumption and depression is unclear.

Purpose/aims: This systematic literature review aimed to synthesise evidence on the association between dairy consumption and depressive and anxiety symptoms in adults.

Methods: A systematic search of CINAHL, Cochrane, MEDLINE complete, EMBASE, Scopus and PsycINFO databases was conducted from database inception to February 2018. Case-control, cohort or cross-sectional studies that reported on the association between dairy consumption (total dairy, milk, yoghurt and cheese) and depression or anxiety in adults were included.

Results: 13 studies (n=7 prospective, n=6 cross-sectional) including a total of 58,220 participants were identified; 38% reported no association. Statistically significant inverse associations were reported between intakes of low-fat dairy, milk, yoghurt, and whole-fat yoghurt and depression (n=4). Conversely, positive associations were reported between intakes of total dairy, milk, yoghurt, low-fat yoghurt and cheese and depression (n=5). Gender was identified as a potential effect modifier of this association. No studies reported on dairy consumption and anxiety.

Conclusions: This is the first review to examine the association between dairy consumption and depressive and anxiety symptoms. Conflicting and inconsistent results limited the ability to draw firm conclusions on this association; however, results suggest an association may be present between dairy consumption and depression.

What's next? Future longitudinal and intervention studies are required to confirm and ascertain the direction of this association.

Diet quality, dietary inflammatory index and BMI as predictors of response to adjunctive N-acetylcysteine and mitochondrial agents in adults with bipolar disorder

Melanie Ashton

Background: Bipolar depression is the most difficult phase to treat in bipolar disorder (BD). Underlying the depressive symptoms are disturbances in neuroinflammation, oxidative stress, mitochondrial activity and neurotransmitter function. These processes could be modulated by diet which is often poor in people with BD and may have an impact on treatment outcomes.

Purpose/aims: The current study aimed to assess if diet quality, Dietary Inflammatory Index (DII®) scores, and body mass index (BMI) predicts response to nutraceutical treatment in a clinical trial.

Methods: Participants with bipolar depression (n=181) were randomised to a 16-week adjunctive trial, to receive either a combination treatment of mitochondrial enhancing nutraceutical agents including N-acetylcysteine (NAC), or NAC alone, or placebo. Participants were assessed every four weeks including a post-study visit at week 20. Food Frequency Questionnaire (Dietary Questionnaire for Epidemiological Studies, Version 2; DQES) was converted into both an Australian Recommended Food Score (ARFS) and DII score. Body Mass Index (BMI) was measured at baseline. In this secondary analysis of data, post-baseline and dietary intake data (n=133) were included in separate Independent Linear Mixed Models to assess if diet quality, DII score or BMI predicted response to the significant outcomes of the study including depression symptoms, clinician-rated improvement and functioning.

Results: When compared to participants on placebo, participants with lower BMI and in the combination treatment arm showed greater clinician-rated improvement. Higher ARFS was a predictor of clinician-rated improvement and depression symptomology. The DII predicted was a predictor of functioning scores.

Conclusions: There may be an interaction between Dietary intake and BMI for participants with BD which may predict some symptom and functioning responses to nutraceutical treatment.

What's next? Further research is required for a more comprehensive assessment of diet quality and associated mechanisms and other bipolar disorder treatments.

The associations between personal self-control, dieting intent, body dissatisfaction, and dieting success perceptions

Ayoub Bouguettaya

Background: Dietary restraint is associated with a number of health risks, especially in young women. Research has shown that dispositional self-control negatively predicts dieting behaviour. However, it is possible that empirical findings regarding this relationship have been confounded by a number of related variables, such as dieting success, body dissatisfaction, and body weight.

Purpose/aims: This study aimed to clarify the relationship between self-control and dieting intent by controlling for these pertinent variables. We also investigated how individuals' self-control might relate to expectations of dieting success.

Methods: An online sample of female dieters from the USA and the UK (N = 150, Mage = 28.71 years, SD = 5.67) completed self-report measures of these constructs.

Results: Self-control negatively correlated with dieting intent, and both positively correlated with dieting success perceptions. Even when controlling for all forms of body dissatisfaction, dieting success, and body weight, self-control related to dieting intentions.

Conclusions: These findings provide further evidence that self-control is a key variable that predicts dieting intent, regardless of body dissatisfaction, dieting success beliefs, and body weight.

What's next? Future research should address whether these relationships are as robust in non-dieting individuals, and how other health behaviours may affect this relationship.

Mediators of Inhibitory Control Training for smoking cessation

Laura Hughes

Background: A range of effective treatment options exist to assist smokers to quit, yet 34.5% of heavy smokers and 27.1% of other smokers report being unsuccessful in quitting for one month. Some make at least thirty attempts before being successful. Smokers are often deterred from treatment engagement due to their associated costs and potential side-effects. Cognitive neuroscience research suggests that smokers may experience difficulties with inhibitory control, where targeting this may provide a cheaper option with minimal side-effects. Inhibitory control training (ICT) targeting other health behaviours have shown promise for improving health-related outcomes. Significantly, Lawrence and colleagues found that those who completed four sessions of food-specific ICT via the internet showed significant weight loss 6-months later. Only one study has investigated ICT with smokers, consisting of one session in a laboratory setting.

Purpose/aims: We investigated whether smoking-specific ICT known as INST may assist nicotine-dependent individuals with smoking cessation. It was also investigated whether any changes in smoking behaviour are due to a change in inhibitory control or devaluation of smoking-related stimuli.

Methods: Nicotine-dependent individuals (n = 109) participated in a double-blind randomised controlled trial comparing the efficacy of INST intervention compared to control training, adapted from the training programs previously used by Lawrence and colleagues. Participants completed one training session per day for fourteen days, and were followed-up up to 3-months later.

Results: Data analyses will involve mixed multiple linear regression models to investigate the effects of INST on smoking cessation, as well whether changes in response inhibition mediate changes in smoking behaviour. Findings (not available at abstract submission) will be presented.

Conclusions: What the findings mean in the context of cognitive interventions for smoking cessation will be discussed.

What's next? A second study aims to investigate the real-world usability of INST as an intervention for assisting with smoking cessation.

Psychology and Brain

10:30AM – 12:30PM, Wadawurrung 2

Interviewing victims of child sexual abuse in languages other than English: A case study on the adaptation of the SIM Protocol to Spanish and Chilean context

Carolina Navarro

Background: Adequate interviewing of alleged victims of child sexual abuse is critical for the investigation and for preserving the welfare of the child. Eyewitness research from a cultural perspective shows that an applicable and useful investigative interview protocols for children (IIPCs) must be culturally sensitive and appropriately worded. Thus, addressing cultural feasibility is necessary when translating IIPCs to a different language. The adaptation process of the Standard Interview Method (SIM) to Spanish conducted in Chile was the first in using a systematic method for culturally adapting an IIPC. This case study offers an in-depth analysis of such novel experience.

Purpose/aims: The study sought to understand the challenges that arise when translating an IIIPC to another language and culture. Specifically, it aimed to identify translation issues that emerged during the adaptation and the contribution of the different components of the process to the final version of the protocol in Spanish.

Methods: An interpretive description approach was used. First, the case was described in terms of stages and outcomes, followed by a quantitative description of the improvements introduced to the translated protocol across the adaptation process. A content analysis narrowed the focus to the nature of the adaptation challenges encountered, which were sorted into categories.

Results: Issues were identified regarding conceptual, contextual and cultural adequacy.

Conclusions: The findings bring valuable insight for researchers and practitioners on potentially problematic areas affecting the use of translated IIPCs. Practical recommendations on procedures to translate and culturally adapt IIIPCs to other languages and cultural settings are offered.

What's next? This work highlights the need for acknowledging differences across languages and cultures in the field of cross-language research on IIPCs. This is especially relevant in non-English speaking developing countries where the introduction of evidence-based procedures for interviewing children is urgent.

Low quality of life among Australian women with comorbid personality and mental state disorders

Bianca Kavanagh

Background: Personality disorder (PD) is highly comorbid with mental state disorders (MSDs). This comorbidity represents potential additive risk for adversity in quality of life, though literature in this area is limited.

Purpose/aims: We aimed to determine the relationship between PD, MSD, and quality of life in women.

Methods: Data from the Geelong Osteoporosis Study, an age-stratified, population-based sample were examined (n=724). Lifetime MSDs and PD were measured using structured clinical interviews (SCID-I/NP and -II). Quality of life was examined using the World Health Organisation Quality of Life scale (WHOQoL-BREF). Lifestyle and demographic factors were documented. Odds ratios (OR, with 95% confidence intervals, CI) were determined using logistic regression to examine the association between three groups (MSD only, MSD with PD, controls) and the WHOQoL-BREF domains (physical, psychological, social and environmental), after adjusting for age.

Results: Two hundred and thirty-eight (32.9%) women met criteria for MSD, 115 (15.9%) met criteria for comorbid MSD and PD, while 371 (51.2%) did not meet criteria for any psychiatric disorder. MSDs were associated with increased likelihood of poor quality of life in physical [OR 0.36 (95%CI 0.25-0.53), p<0.001], psychological [0.50 (0.36-0.71), p<0.001], social [0.58 (0.40-0.82), p<0.01], but not environmental [0.89 (0.63-1.24), p=0.48] domains, compared to controls. This risk was increased in individuals with comorbid MSD and PD in physical [0.11 (0.07-0.18), p<0.001], psychological [0.09 (0.05-0.17), p<0.001], social [0.16 (0.10-0.26), p<0.001], and environmental [0.35 (0.22-0.55), p<0.001] domains.

Conclusions: Comorbid MSD and PD was associated with poorer quality of life in all health domains. These data suggest that PD is an additive risk for poorer outcomes among women with MSDs.

What's next? These results highlight the urgency to include PD in policy and research initiatives and provides information pertinent to potential areas of intervention.

Possessions as reflections of self-concept and the identities of others in hoarding disorder: Development of a self-report measure

Chris Kings

Background: Hoarding disorder is a disabling condition, characterized by the acquisition and retention of possessions to the point where it negatively impacts the individual's life. One aspect of hoarding disorder that has not received specific theoretical emphasis is the link between possessions and the self-concept, reflecting notions dating back to William James that what we own can come to define who we are.

Purpose/aims: The purpose of the present study was to develop and validate a multi-dimensional measure of possessions as extensions of self-concept and significant others in HD.

Methods: We developed the Possessions as Others and Self Inventory (POSI) based on the qualitative themes identified by prior qualitative research. Firstly, we conducted an exploratory factor analysis (EFA) on a large pool of items completed by our initial sample. We then recruited a second sample, and utilised confirmatory factor analysis (CFA) to examine the stability of the condensed factor structure uncovered by the EFA. Associations between the POSI and measures of hoarding symptomatology were also examined.

Results: The POSI achieved simple structure in the EFA and reflected many of the themes present in past qualitative research. The CFA also supported the consistency of this factor structure in a separate sample. The various subscales of the POSI were found to be significantly associated with hoarding symptomatology and beliefs in the EFA and CFA samples.

Conclusions: Preliminary investigation suggests that the POSI is a valid and reliable measure of possessions' links to self and the identities of others in hoarding disorder. The results also suggest that these beliefs are strongly associated with hoarding behaviour.

What's next? Further replication of the findings is required using clinical samples. The measure could also be used to assist the development of targeted treatment interventions.

Parents' perceptions of participating in a family prevention intervention: A qualitative analysis

Michele Burn

Background: The Strengthening Families Programme (SFP) is an internationally recognised family-based prevention intervention that has been found to be effective in improving child mental health.

Purpose/aims: This paper reports a qualitative study of parent experiences as participants in an Australian adapted trial of the SFP. The evaluation explored how the Australian adapted program affected parent, child and family functioning.

Methods: Fifteen parents who had taken part in the program 2015 were interviewed. Thematic analysis was undertaken using a general inductive approach.

Results: Parent reports described benefits experienced through the program based around eight major themes: (1) making a connection; (2) a shift towards positive dialogue within the family; (3) greater understanding in parent and child; (4) "haven't been that angry person"; (5) "the clouds lifted a little bit"; (6) engagement in school; (7) "she's really good now"; and (8) perceived ability to manage.

Conclusions: Overall, themes were supportive of the Australian adaptation reflecting on factors that were emphasised in the program curricula that have been found to be protective of child psychosocial health in socioeconomically disadvantaged families.

What's next? These findings are a key component of the Australian adapted trial support the fidelity and a future randomised controlled dissemination study.

Associations between parenting stress, parent mental health and child sleep problems for children with neurodevelopmental disorders: Systematic review

Christina Martin

Background: Children with neurodevelopment disorders, such as attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) experience sleep problems at a much higher rate than other children. In addition, their parents experience higher levels of parenting stress and more mental health difficulties than other parents.

Purpose/aims: This systematic review aimed to examine the relationship between child sleep problems and parenting stress; and child sleep problems and parent mental health, when the child has ADHD or ASD.

Methods: Electronic databases were searched (MEDLINE, EMBASE, PsycINFO and CINAHL) and risk of bias was assessed using Standard Quality Assessment Criteria for Evaluating Primary Research Papers. For inclusion, the study required children aged 5-18 with ADHD or ASD and their caregivers. In addition, a measure of child sleep and parenting stress or parent mental health was required. The study also needed to be in English and be published in a peer-reviewed journal. Exclusion criteria included case studies, qualitative studies and interventions without pre-intervention data.

Results: Thirteen cross-sectional studies were identified, 5 involving children with ADHD and 8 involving children with ASD. No longitudinal studies were identified. Of the 7 studies examining parent mental health, 6 (86%) found a relationship with child sleep problems. Of the 6 studies examining parenting stress, 4 (67%) found a relationship with child sleep problems. The study sample sizes ranged from 34-239.

Conclusions: Evidence from cross-sectional studies demonstrate child sleep problems are associated with poorer family functioning, specifically poorer parent mental health and higher parenting stress.

What's next? Future research is needed to untangle the bidirectional relationships between child sleep problems and family functioning. Such knowledge is key in optimising child sleep interventions, enabling maximum impact in improving the lives of children with neurodevelopmental disorders and their parents.

An examination of relationship between anxiety and social functioning in children with ADHD

Caitlin Bishop

Background: The relationship between anxiety and social functioning (SF) in children with ADHD is complex. Some studies have shown that children with ADHD and anxiety can experience more deficits in SF however, other studies do not find evidence of an effect. These relationships have been shown to be vary depending on the type of anxiety examined, the reporter (parent, teacher, and child) and the presence of other comorbid conditions.

Purpose/aims: This study aimed to examine the relationship between different anxiety symptoms and SF across parent and child reports.

Methods: Participants were recruited as part of the Calm Kids study, which included 136 children aged 8-13 who met diagnostic criteria for ADHD and an anxiety disorder (separation, social or generalised anxiety). Parents and children rated anxiety symptoms using the Spence Children's Anxiety Scale and the Children's Anxiety Life Interference Scale. SF was assessed using the Strengths and Difficulties Questionnaire, peer problems subscale.

Results: Results from preliminary data analysis have demonstrated relationships between many facets of anxiety and peer problems in unadjusted regression models according to both PR and CR ($p < .05$). Interestingly, adjusted analyses which controlled for well-established confounding variables highlighted that these relationships held for CR ($p < .01$) but a relationship was only observed between social anxiety and peer problems according to PR ($p < .01$).

Conclusions: Relationships have been shown to exist between many facets of anxiety and social functioning in a large sample of youth with ADHD. The importance of adopting a multi-informant approach and examining specific facets of anxiety emerged as key findings.

What's next? Findings have implications for the management of social dysfunction in ADHD. Understanding how anxiety specifically aligns with social functioning capabilities in children with ADHD has implications for better understanding the impairment experienced by this comorbid group and may assist with prevention and intervention efforts.

Brain volume in Autism Spectrum Disorder

Joel Crucitti

Background: Brain volume, in particular total brain volume (TBV) and intracranial brain volume (ICV), has been extensively researched in individuals with Autism Spectrum Disorder (ASD). Though, findings are often inconsistent and are often based on small to moderate sample sizes.

Purpose/aims: We gathered brain volume data from studies examining autistic and typically developing (TD) participants. Brain volume trends in light of age were compared between these two groups.

Methods: Following a systematic search, 34 and 30 studies measuring TBV and ICV, respectively, were included. Raw data, or the means and standard deviations of brain volume and age, were obtained from 3,316 autistic participants and 2,744 TD participants. ANCOVA's, controlling for age, compared raw data of autistic participants to TD individuals for males and females separately across a number of age groups.

Results: Findings revealed no significant differences in brain volume between autistic and TD individuals for most age groups investigated. Although ICV was greater in autistic males than TD males aged five to eight years, age significantly interacted the relationship between ASD diagnosis and ICV.

Conclusions: In general, few differences were found between the brain volume of autistic and TD individuals. Furthermore, a large amount of variance in the data could not be explained by ASD diagnosis or gender. This highlights the need to account for other confounding variables. The inclusion of more brain volume data, particularly of females and older adults, will help address this issue.

What's next? As this project develops, we hope to clarify whether brain volume is an indicator of the aetiology of autism. Brain volume abnormalities relating to ASD diagnosis will encourage future research to investigate possible causes or outcomes of such observations.

Investigation of the association between microbial exposures and neurocognition and behaviour at 2 years of age

Elizabeth Senn

Background: There is intense interest in the influence of gut microbiome on early neurodevelopment. The infant gut microbiome is influenced exposure to microbial factors such as mode of delivery, mode of feeding, antibiotic use and pet ownership. However, the relationship between these environmental exposures and neurocognition and behaviour has not been characterised.

Purpose/aims: To determine whether established microbial-related factors are associated with neurocognitive development and behaviour. We selected a range of microbial-related factors that have been associated with either gut microbiome or allergic disease.

Methods: The Barwon Infant Study is prospective population-derived birth cohort (n=1074) in Victoria, Australia. Comprehensive questionnaire, clinical and biological measures were collected antenatally and at birth 1m, 3m, 6m, 9m, 12m, 18m and 2-year time-points. The Bayley Scales of Infant and Toddler Development (BAYLEY-III) was administered to offspring and the Child Behaviour Checklist (CBCL) was completed by carers at the 2-year time-point (n=756). Multiple linear regression was used to evaluate associations between 56 microbial exposures (28 of which had been previously associated with gut microbial compositional changes) and three neurodevelopmental outcomes, cognition, internalising and externalising behaviour. Multivariable linear regression was used for all analyses.

Results: Antibiotic use in the first trimester was associated with lower externalising behaviour scores. Infant antibiotic use at 3 months was associated with lower internalising scores. Dummy use at 4 weeks, 6 and 12 months was associated with lower cognitive scores. There was also weak positive association between delivery by emergency C-section and higher internalising scores. Larger sibling numbers were associated with both lower cognitive scores and also internalising scores.

Conclusions: Despite scattered associations with single outcomes, there is no consistent clear patterning linking microbial factors with neurocognitive or behavioural outcomes.

What's next? Further work investigating the association between microbial factors and changes to gut microbiome composition and its relationship with neurodevelopment is required.

Physical Activity, Fitness and Body

10:30AM – 12:30PM, Gunditjmara 1

Adoption, implementation and sustainability of school-based physical activity and sedentary behaviour interventions in real-world settings: A systematic review

Samuel Cassar

Background: Worldwide, children's lifestyles mean many fail to meet standards set out in guidelines regarding physical activity and sedentary behaviour. Increasing children's physical activity and reducing sedentary behaviour is strongly linked to various positive biopsychosocial health outcomes. Schools are an ideal setting to intervene, yet despite a plethora of studies on the issue, there is far less research describing how interventions are adopted, implemented and sustained under real-world conditions in schools. This knowledge is essential to achieving sustained, population-wide intervention impact.

Purpose/aims: To identify factors associated with the adoption, implementation and sustainability of school-based physical activity and sedentary behaviour interventions in real-world settings.

Methods: The review follows PRISMA guidelines and included a systematic search of seven databases from January 1st, 2000: MEDLINE, EMBASE, CINAHL, SPORTDiscus, PsycINFO, CENTRAL, and ERIC. One author screened titles and two authors will independently screen abstracts and full-texts with consensus agreement by five authors. Inclusion criteria: Studies including school-aged children or adolescents; involving interventions delivered in schools with a primary outcome to increase physical activity and/or decrease sedentary behaviour; apply implementation models to plan, or interpret study results; and conducted under real-world conditions. Exclusion criteria: Studies testing efficacy; or conducted with pre-school aged children.

Results: Systematic searches uncovered 49,403 papers. To date, after removing duplicates, title screening of 33,443 articles lead to screening 643 papers at the abstract level. Full results will be presented.

Conclusions: This review informs school-based physical activity and sedentary behaviour implementation research by describing factors relevant for intervention adoption, implementation, and sustainability under real-world conditions.

What's next? Understanding this increasingly important field of research highlights key research gaps and offers fresh concepts for future intervention development and delivery.

Associations between activity patterns and cardio-metabolic risk factors in youth

Simone Verswijveren

Background: Patterns of activity accumulation (e.g., bouts and breaks) across the activity spectrum may be important for health. Studies to date have mainly focused on investigating the associations between patterns of sedentary time (SED) or moderate and vigorous physical activity with adiposity outcomes.

Purpose/aims: To examine associations of total daily volumes and activity patterns across the activity spectrum with cardio-metabolic risk factors in youth aged 7-15 years.

Methods: Accelerometer and health data from 1,288 youth were pooled. Time accumulated in ≥5-min and ≥10-min sedentary (SED) bouts, and ≥1-min, ≥5-min, and ≥10-min light (LPA), moderate (MPA), and vigorous (VPA) physical activity bouts, was calculated. Additionally, total daily volume and median bout lengths of all intensities, and breaks in SED time were calculated. Health outcomes included body size, lipids, blood pressure and a cardio-metabolic risk score (CMR-score). Data were analysed using linear regression models, adjusting for potential confounding variables.

Results: Total daily MPA and VPA were beneficially associated with most cardio-metabolic risk factors. Total time spent in ≥1-min VPA bouts was beneficially associated with cardio-metabolic risk factors; however, this association disappeared after adjustment for total daily volume of VPA. Despite no significant association between total daily volume of LPA and cardio-metabolic risk factors, there was evidence of detrimental associations between ≥1-min and ≥5-min LPA bouts and cardio-metabolic risk that remained after adjusting for total time spent in LPA. No other significant associations were found.

Conclusions: Total daily volume and the way in which activities are accumulated may have important implications for cardio-metabolic health. Whilst high-intensity total volumes were beneficially associated with some health outcomes, LPA bouts were surprisingly detrimentally associated with cardio-metabolic risk.

What's next? This highlights the need for research to focus on increasing understanding of the impact of patterns on cardio-metabolic health.

The moderation effect of light-intensity physical activity in the relationship between sitting time and adiposity markers in adolescents

Ana Maria Contardo Ayala

Background: Evidence suggests that the relationship between sedentary time and adiposity may be independent of moderate-to-vigorous intensity physical activity (MVPA) among adolescents. Little is known about the role of light-intensity physical activity (LIPA) in this relationship.

Purpose/aims: The aim of this cross-sectional study is to examine whether low-LIPA (LLPA), high-LIPA (HLPA) and MVPA moderate associations between sitting time and adiposity markers (i.e. waist circumference [WC] and body mass index [BMI]) among adolescents.

Methods: This study is based on data obtained from 219 adolescents (age 14.9±1.6) from The Neighbourhood Activity in Youth Project in Melbourne. ActiGraph accelerometers were used to obtained time spent on LIPA (LLPA, HLPA) and MVPA using the Freedson age-specific equation. Time spent sitting was obtained from activPAL inclinometers. Two sitting groups were created using median sitting time (650.7 min/day) as a cut-off point: 'low-sitting time group' (low-SIT) and 'high-sitting time group' (high-SIT). Anthropometric measures were assessed by trained staff. Moderation impact of LIPA (LLPA, HLPA) and MVPA were examined adding interaction terms to the simple regression model. Significant interaction effects were probed by computing intensity-specific associations (at average, one standard deviation [SD] below and above values of LIPA [LLPA, HLPA] or MVPA).

Results: LLPA but not HLPA nor MVPA significantly moderated the relationship between sitting and WC and BMI after adjusting for age, sex and MVPA. Specifically, at low level of LLPA (-1SD), adolescents in the high-SIT group had significantly higher BMI and BMI compared to the participants in the low-SIT group.

Conclusions: Time spent in LLPA moderated the relationship between sitting and adiposity especially among adolescents who sit more compared with those that sit less. Results suggest that decreasing the time spent sitting by increasing LLPA may provide protection from deleterious effects of sitting on adiposity markers among adolescents.

What's next? Experimental evidence is needed to support these conclusions.

Emergency nurses' physical activity levels and sedentary time across early, late and night shifts

Stephanie Chappel

Background: It has been suggested that nurses need to increase their physical activity (PA) levels, yet studies often fail to assess their occupational activity.

Purpose/aims: This study aims to explore emergency nurses' PA during early, late and night shifts, and how their occupational PA contributes to meeting PA guidelines.

Methods: Data are drawn from emergency nurses (n=48; 90% female; 3 hospitals) participating in the Physical Activity in Emergency Departments (PACED) Study. Participants wore an ActiGraph accelerometer and completed a work diary for two weeks. Time spent sedentary and in different PA intensities during and within hourly periods of early, late, and night shifts were calculated. Differences between activity levels by age and emergency nursing experience were assessed using independent t-tests.

Results: On average, nurses spent the majority of their shifts sedentary (67.3%). Moderate-intensity PA accounted for 5.2% (24 minutes) of a shift, which equated to 80% of the recommended daily 30-minute guideline. Sedentary time peaked at the beginning of a shift and decreased towards the end. Moderate-intensity PA levels were consistent across early and late shifts but tended to fluctuate during night shifts. Older nurses (>40 years) were significantly more sedentary than younger nurses, while more experienced nurses (>10 years) engaged in more light-intensity PA than less experienced colleagues.

Conclusions: Whilst the majority of an emergency nurses' shift is spent sedentary, up to 80% of daily moderate-intensity PA is accumulated in one shift. Fluctuations in activity levels during night shifts compared to early and late shifts may be reflective of the different tasks performed. Future research needs to explore why differences in older and more experienced emergency nurses occurred for sedentary time and light-intensity PA, respectively.

What's next? Contrasting suggestions, nurses are active at work. Future interventions targeting nurses PA levels need to consider occupational activity, nurses' age and experience levels.

Talent development environment of world-class Caribbean track and field athletes: A qualitative investigation

Candice Thomas

Background: Many athletes within the English-speaking Caribbean region have experienced a great degree of success in track and field at the highest sporting levels, however no research has examined the influence of environmental factors on these successes.

Purpose/aims: This qualitative investigation sought to explore through a socio-cultural lens the youth training and competition environment of world-class Caribbean track and field athletes and the influence of psychosocial factors on their decision to invest in high-performance sport. Design: The study was underpinned by the developmental model of sport participation and informed by ontological relativist and epistemological constructionist perspectives.

Methods: Sixteen world-class track and field athletes (8 males and 8 females; M age = 29, SD = 5 years) from 6 English-speaking Caribbean islands took part in semi-structured interviews. An inductive thematic analysis was performed on the transcribed data.

Results: Three superordinate themes were identified: (1) support network, (2) sporting culture and (3) reasons for success. Findings revealed that world-class Caribbean athletes perceived themselves to be significantly influenced by the motivationally-relevant behaviours of the extended family, coaches and peers at the sampling, specializing and investment stages of development.

Conclusions: This study showed that the complex, interactive and multifaceted motivational atmosphere and support experienced at the youth stage encouraged participants to remain engaged in track and field and progress to international success. Additionally, world-class athletes possessed specific intrinsic qualities that allowed them to overcome challenges and pursue success within a highly demanding sport.

What's next? The findings of this study may be used to inform key policy makers and sporting administrators within the Caribbean Region of the influential factors that can affect youth athletes' engagement and progression through the different stages of their young athletic careers.

Induced alkalosis, gastrointestinal symptoms and palatability of sodium citrate ingestion: The implications of ingestion mode

Charles Urwin

Background: Supplementation with sodium citrate has, as reported in some previous studies, induced blood alkalosis and improved performance in high-intensity exercise. Potentially, changes in the ingestion mode (e.g. capsules or solution) of sodium citrate supplementation could affect the magnitude of induced alkalosis, and factors such as gastrointestinal (GI) symptoms and palatability.

Purpose/aims: The aim of this study was to examine the effect of 500 mg.kg-1 sodium citrate ingested as a solution or in capsules on alkalosis (increased blood bicarbonate concentration ([HCO3-]) (mmol.L-1)), GI symptoms (rating) and palatability (score).

Methods: Twenty-four healthy participants completed two experimental testing sessions, with sodium citrate ingested as either capsules or solution, in a randomised, crossover design. Alkalosis and GI symptoms were assessed every 30 min for 240 min following ingestion; palatability was assessed immediately after ingestion. Paired t-tests were used to compare the two conditions; statistical significance was accepted at a level of $p < 0.05$.

Results: [HCO3-] was significantly higher following sodium citrate capsule ingestion compared to solution ($p < 0.0001$), peaking at 30.6 ± 2.1 after capsule ingestion and 28.9 ± 2.4 mmol.L-1 after solution ingestion. Alkalosis ([HCO3-]) peaked 205.0 ± 35.0 min after capsule ingestion, significantly later than the 162.5 ± 46.7 min after solution ingestion ($p < 0.05$). Ingestion mode did not affect differences in GI symptoms ($p >; 0.05$), while palatability was significantly greater in the capsule treatment ($p < 0.0001$).

Conclusions: It is recommended that 500 mg.kg-1 sodium citrate be ingested in capsules rather than solution, to achieve greater alkalosis and minimise GI symptoms, while also being more palatable.

What's next? The present findings suggest that sodium citrate supplementation should be implemented using capsules instead of a solution prior to exercise.

Adhesive capsulitis – investigating transcriptome-wide alterations in gene expression of the joint capsule

Nima Kamal

Background: Adhesive capsulitis (AC) is a disabling and poorly understood pathological condition of the shoulder joint that takes one to three years to fully resolve.

Purpose/aims: The current study aims to increase our understanding of the pathogenesis of AC by investigating transcriptome-wide alterations in gene expression of the glenohumeral joint capsule in people with AC compared to people with shoulder instability (non-inflammatory controls).

Methods: Tissue samples collected from the anterior glenohumeral joint capsule during surgery of patients, with AC and the control group, underwent RNA-seq to identify differentially expressed genes between the study groups. Gene Set Enrichment Analysis was used to further understand mechanisms of disease pathogenesis. Identified candidate genes will be confirmed by quantitative polymerase chain reaction (q-PCR) and undergo statistical analysis to calculate significance.

Results: In preliminary results, 5 genes that had increased expression in the glenohumeral joint of AC compared to controls were identified by RNA-seq and confirmed using qPCR. These included Cyclooxygenase (COX), metalloproteinase (MMP), MMP9, Inter-Leukin (IL)-6 and Tumor Necrosis Factor (TNF)-Î±.

Conclusions: Preliminary results obtained were similar to studies by Lho et al (2013) on inflammatory cytokines. However, according to Cui et al. (2017), Vastamaki et al (2012) and Woods (2014), inflammation and pain are only some of the pathogenic factors involved in Adhesive Capsulitis. Further studies on sequencing analysis of specific markers involved in fibrosis of the condition may also provide new insights. Identified markers and genes will be used to target, measure and potentially treat the condition.

What's next? This study will further look at potential biomarkers involved in the fibrosis process of the two shoulder conditions. It will also be evaluated if any novel biomarkers can be identified in urine or blood samples to better identify how far patients are along the timeline.

Bipolar disorder and bone health: A systematic review

Vinoomika (Veena) Chandrasekaran

Background: Bipolar disorder is a chronic, episodic mental illness, affecting around 2.4% of the population worldwide. Psychological and/or physiological comorbidities are a common consequence, and osteoporosis is one such possible comorbidity.

Purpose/aims: This systematic review aimed to collate, evaluate, and discuss the literature examining the link between bipolar disorder and bone health.

Methods: We conducted an e-search of PubMed, PsychINFO and CINAHL to identify studies that investigated associations between bipolar disorder and bone in adults aged ≥18. Two reviewers determined eligibility according to pre-determined criteria, and methodological quality was assessed using a previously published methodological scoring system. Due to heterogeneity, a best-evidence synthesis was performed.

Results: Our search yielded 1,409 articles, of which three (all cohort studies) met predetermined criteria. The studies from Taiwan and the United States of America analysed administrative data, albeit spanning different years, and comprised a total of 344,497 participants. No studies investigating bone quantity or quality were identified. Bipolar disorder was associated with an increased risk of fracture (range 20-80%); and fracture-free survival time for those with bipolar disorder decreased substantially with advancing age, and for women (10-30% shorter than men). Fracture incidence per 1,000 person years was 21.4 and 10.8 in those with and without bipolar disorder, respectively.

Conclusions: Increased fracture risk was observed in individuals with bipolar disorder, independent of older age, sex, comorbidities and medication use.

What's next? The operative mechanisms, risk and treatment factors warrant further enquiry.

Viruses, Diseases and Clinical Care

10:30AM – 12:30PM, Gunditjmara 2

Characterisation of canine astrovirus in puppies with diarrhoea

Tarka Raj Bhatta

Background: Astroviruses (AstVs) are causative agents of gastroenteritis in humans and animals, including dogs. Though zoonotic transmission of animal AstVs to humans has not been documented, some scientific reports suggest cross-species transmission and hence a possible zoonotic potential.

Purpose/aims: Determine the applicability of next generation sequencing as a diagnostic tool to determine the cause of diarrhoea in puppies. Characterize pathogen(s) detected in the puppies' faecal samples.

Methods: Faecal samples from two 7-week-old puppies that had severe diarrhoea two weeks prior were collected from a Kennel in Victoria. Samples were pooled and virus particles were then enriched by filtration and ultracentrifugation, viral nucleic acids extracted and subjected to next-generation sequencing (NGS).

Results: The near full-length sequence of canine AstV was obtained from the sample. Phylogenetic analysis showed that this virus was most similar (94.6%) to a canine AstV detected in the United Kingdom in 2012.

Conclusions: Canine AstV was characterised from faecal samples from puppies with gastroenteritis. The fact that this virus was more similar to a UK canine AstV compared to Australian canine AstV, suggests that there has been movement of these viruses between these two countries presumably through dog or semen importation. It is therefore possible other pathogens which are not tested for in current dog importation requirements could similarly move between countries. Differences in the virus capsid may have arisen through recombination and this virus may be serotypically different to other canine astroviruses circulating in Australia.

What's next? Further studies are required with more samples from different species to possibly detect interspecies transmission and disease prevalence in Australia.

Australian wild birds carry viruses that may possibly cross into other species

Jessy Vibin

Background: Birds can be infected or act as carriers for pathogens that can be transmitted to other species including humans.

Purpose/aims: Our research project aims to detect and characterise the avian virome with a focus on avian viruses that may spillover to other hosts using a combination of novel techniques.

Methods: Fresh faecal samples were collected from juvenile Pacific black ducks in Victoria. Samples were processed using different biophysical methods for virus enrichment followed by preparation of sequencing libraries and NGS. A BLASTN and TBLASTX query were performed against virus databases with an e-value cut-off 1×10^{-10}. Phylogenetic trees were generated and the robustness of the nodes assessed by bootstrap analysis of 500-1000 replicates.

Results: Among the 12 viruses characterised, 9 were avian host-associated and included, for example, avian paramyxovirus 6 (APMV6) as well as both a gamma- and a deltacoronavirus, with potential for cross-species transmissibility. The APMV6 is 97% identical to a virus detected in red-necked stint in Japan in 2008 and more closely related to a recent APMV6 from Korea. Red-necked stints migrate to Australia during the non-breeding season. Furthermore, the fusion protein sequence of APMV6 has an additional basic amino acid around the fusion protein cleavage site, and hence any further changes at this site could make it highly virulent. The deltacoronavirus is among the first wild bird coronaviruses from Australia to have the spike gene sequenced, and further studies may elucidate whether this particular virus may have the potential for spillover to other hosts.

Conclusions: Our optimized method detects and characterizes all virus types from biological samples. The study suggests that birds may transmit viruses to other species along migratory pathways.

What's next? In the future, this study will allow us to better understand the diversity of viruses in Australian birds and its potential health implications.

Factors associated with risky sexual behaviour in female youth in Cambodia

Farwa Rizvi

Background: There is an increase in risky sexual behaviour in female youth in Cambodia, which negatively affects their reproductive health by increasing the risk of contracting sexually transmitted infections and experiencing unintended pregnancies.

Purpose/aims: A systematic review of quantitative research conducted in Cambodia was undertaken, to determine the factors associated with risky sexual behaviour in adolescent girls and young women aged 15 to 24 years.

Methods: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used to search EBSCOHost databases consisting of Medline Complete, PsycINFO, CINAHL Complete, Academic Search Complete, Global Health, and Social Work Abstracts. Additional manual searches were conducted in Science Direct and Google Scholar. A theoretical framework of the Social Ecological Model was used to identify the personal, social and cultural factors associated with risky sexual behaviour. A tool designed to assess the risk of bias in population-based cross-section studies was used to assess the included studies.

Results: Initially, 300 studies were identified using keywords and finally, four quantitative studies were selected based on the inclusion criteria. Drawing on the Social Ecological Model, risky sexual behaviour was associated with individual-level factors including young age at sexual debut, low education, unsafe sex under the influence of alcohol, multiple sexual partners or transactional sex. Family level factors included living away from parents, orphan status and low levels of family support. Peer and partner level factors included peer delinquency and lack of condom use. Low socioeconomic status at the society level was also associated with risky sexual behaviour.

Conclusions: There is scant research on sexual and reproductive health of female youth in Cambodia. Individual, family and social factors were significantly associated with risky sexual behaviour.

What's next? More research is required to inform potential preventive strategies and policies that address young women's sexual and reproductive health.

Mood disorders and cancer onset in men and women: A nested case control study

Stephanie Cowdery

Background: The role of mood disorders in cancer onset and progression is unclear, with the mechanism being actively explored across sex, time-frames and cancer types.

Purpose/aims: The aim of this study was to investigate associations between mood disorders and cancer incidence among men and women.

Methods: Data were derived from 1638 (52.3% men; aged 24-98 years) men and women participants of the Geelong Osteoporosis Study (GOS). Mood disorders were identified utilising the Structured Clinical Interview for DSM-IV-TR non-patient edition (SCID-I/NP). Information on cancer diagnoses were obtained through data linkage with the Victorian Cancer Registry (VCR). Demographic and lifestyle factors were documented via self-report and socioeconomic status (SES) determined. Logistic regression was used to test associations between mood disorders and cancer, adjusting for covariates.

Results: Cancer was recorded in 149 (66.4% men) participants. Mood disorders (prior to cancer onset) were recorded in 451 (33.7% men) participants; 21 (4.7%) diagnosed with cancer, and 430 (95.3%) controls (p=<0.001). Following adjustment for age, BMI, smoking, physical activity and SES, mood disorder was associated with an overall lower risk of cancer onset (OR 0.61, 95%CI 0.37-1.01, p=0.054). Mood disorder onset more than 10 years before cancer onset was associated with a 56% reduced likelihood of cancer (OR 0.44, 95%CI 0.25-0.78, p=0.005); this risk was further reduced for those diagnosed with a mood disorder within 10 years of a cancer diagnosis (OR 0.18, 95%CI 0.08-0.41, p<0.001).

Conclusions: Results suggest mood disorders are associated with lower odds of cancer onset in men and women independent of age, BMI, smoking, physical activity and SES. This association appeared stronger for those having met criteria for a mood disorder within 10 years of cancer onset.

What's next? We propose that increased immune surveillance predicated on inflammatory processes and elevated immune regulatory set-point may play a role and requires further investigation.

Cardiopulmonary fitness and cardiac reserve 12-months following completion of anthracycline-based chemotherapy with or without concurrent exercise training

Stephen Foulkes

Background: Anthracycline chemotherapy (AC) is a common breast cancer treatment that is associated with increased long-term heart failure risk. Assessment of the heart's response to exercise may represent a useful tool for early detection of AC-induced cardiac impairment. We have previously shown that AC is associated with reductions in cardiopulmonary fitness (VO2peak) and subtle cardiac impairment during exercise.

Purpose/aims: This study aims to assess the residual effects 12-months following AC completion.

Methods: 17/28 women with breast cancer who underwent 12-weeks of exercise training (ET; n=9) or usual care (UC; n=8) during AC returned 12-months following AC for assessment of: VO2peak measured from a cardiopulmonary exercise test; stroke volume (SV), heart rate (HR) and cardiac output (CO) measured at rest, and during high-intensity cycling using exercise cardiac magnetic resonance imaging (exCMR); and resting left-ventricular ejection fraction (LVEF) and global longitudinal strain (GLS) measured via echocardiography.

Results: AC was associated with persistent reductions in VO2peak at 12-months following both UC and ET during AC (-16% vs. -8% from pre-AC, P<0.01; group x time interaction P=0.42). Reductions in VO2peak corresponded with a blunted augmentation of CO from rest to peak exercise (time x exercise-response P<0.01) resulting in a 13% reduction in COpeak from pre-AC values (14.0±2.5 vs 12.2±2.6L/min, P<0.01). This was due largely to a reduction in SVpeak (-14%, P<0.01) as there was no change in HRpeak from pre-AC to 12-months (P=0.70). Resting echocardiography revealed small reductions in LVEF (64.3±4.8% to 59.2±6.8%, P<0.01) and GLS (-19.8±1.6 to -18.4±1.4, P<0.01).

Conclusions: Substantial reductions in VO2peak seen after AC do not recover 12-months following treatment, and this coincides with an evolving impairment in cardiac function during exercise.

What's next? These measures may identify patients at greatest risk of heart failure during survivorship, and highlight the need for ongoing surveillance of cardiac and exercise capacity.

FRAX as a screening tool for frailty?

Monica Tembo

Background: Frailty is characterised by age-related decline in physical, psychological and social functioning. Many of the features of frailty overlap with underlying risk factors for fragility fractures. FRAXÂ® is an internationally used tool estimating 10-year fracture probabilities, it is easy to administer and utilises information routinely collected in clinical settings.

Purpose/aims: This study aimed to investigate whether FRAXÂ® could be used as a screening tool to identify frail individuals.

Methods: This longitudinal study included 303 women aged 60-90 years enrolled in the population based Geelong Osteoporosis Study. FRAX (Australia) 10- year probabilities of major osteoporotic fracture (MOF) and hip fracture were calculated with and without BMD at baseline. Frailty was determined at the 15-year follow-up using a modified Fried frailty phenotype index, a five-item tool that groups individuals into frail (3 ≥ items), pre-frail (1-2 items) and robust (zero items). For this analysis, frailty was dichotomised, defining it as having three or more items and non-frail defined as having less than three items (pre-frail and robust pooled). We used Receiver Operating Characteristic (ROC) curves and diagnostic characteristics tests to investigate the discriminatory ability of the FRAX tool to predict frailty.

Results: Of 303 women (mean age of 70.9±7.3 years), 51 (16.8%) were considered frail at follow-up. In descending order, the areas under the ROC curve were MOF-FRAXnoBMD 0.730, hip-FRAXnoBMD 0.712, MOF-FRAXBMD 0.725, hip-FRAXBMD 0.700 and BMD alone 0.627 (all p-values < 0.05). The optimal threshold for identifying frailty was < 2.6% 10-year fracture probability for MOF-FRAXnoBMD (sensitivity 70.6%, specificity 66.2%).

Conclusions: MOF-FRAXnoBMD was identified as the best model for predicting frailty displaying acceptable sensitivity and specificity for a screening tool.

What's next? Trial FRAXÂ® tool in a clinical setting to identify and promote prompt intervention in frail individuals.

Culturally sensitive communication at the end of life in the ICU: A systematic review

Laura Brooks

Background: Intensive care unit (ICU) clinicians are often ill-prepared to provide supportive care to dying patients and their families, especially when cultural and language differences impact communication.

Purpose/aims: To (i) describe whether culturally sensitive communication is used by ICU clinicians when communicating with patients and families at the end of life; and (ii) evaluate the impact of culturally sensitive communication at the end of life. The systematic review question was: how is culturally sensitive communication used by ICU clinicians when communicating with patients and families at the end of life?

Methods: A search of CINAHL, MEDLINE, Embase and PsycINFO databases identified all peer-reviewed research evidence published in English between January, 1994 and November, 2017. Two authors independently assessed papers for inclusion. From the 124 papers identified, nine were included in this systematic review. Papers were independently assessed for quality by two authors and study data were analysed using narrative synthesis.

Results: Two major themes emerged: communication barriers, and cultural and personal influences on culturally sensitive communication. Communication barriers influenced the timing and quality of culturally sensitive communication at the end of life. Cultural and personal characteristics included cultural influences on communication, clinicians' personal and socio-cultural characteristics, and the ethnic, cultural and religious background of patients and families.

Conclusions: Culturally sensitive communication is not well defined or evident in clinical practice. It is dependent on the values and beliefs of individual clinicians and complex contributing factors. Findings emphasise knowledge deficits of clinicians in demonstrating culturally sensitive communication and the need for further education.

What's next? Recommendations for practice include increasing the capability and capacity of clinicians to engage in culturally sensitive communication and implementing appropriate healthcare organisational policies and processes to support opportunities for education focusing on culturally sensitive communication.

Nurse decision-making on the management of vasoactive medications in the intensive care unit: A systematic review of the literature

Stephanie Hunter

Background: Intensive care nurses prepare, initiate, administer, titrate and wean vasoactive medications for patients who are haemodynamically unstable. Despite this being a key intervention undertaken by intensive care nurses little is known about how they make decisions when managing these potent medications.

Purpose/aims: To systematically review the literature on how intensive care nurses make decisions when managing vasoactive medications.

Methods: Databases used included CINAHL Complete, Medline Complete and EMBASE with manual searches also conducted for the period from 1965 to 2017. Studies were included if they examined intensive care nurses' decision making in managing vasoactive medications. Studies were assessed for quality and bias and a modified narrative synthesis was used to extract data, investigate findings and explore relationships within and between studies.

Results: The review identified 13 studies from eight countries focusing on intensive care nurses' decision-making related to vasoactive medications. Four studies on preparing and initiating vasoactive medications described a lack of standardisation in infusion preparation and identified deficits in nursing knowledge and clinical skills. Seven studies on vasoactive medication administration examined different methods of syringe changeovers in an attempt to reduce patient haemodynamic compromise. The titration of vasoactive medications was reported to cause anxiety in many nurses due to unpredictable patient responses and the implementation of a titration algorithm demonstrated a reduction in the total doses of noradrenaline.

Conclusions: Decision-making was reported to be positively influenced by access to specialist education and mentoring but nursing practice was driven by prevailing workplace culture and grounded in personal preference, history and habit. Identified practice variation increased risk for preparation and administration errors and increased the risk of patients receiving vasoactive boluses and experiencing haemodynamic instability.

What's next? Future research will focus on developing an evidence-base to provide standardisation of care and support nurse decision-making in managing vasoactive medications.

Poster Abstracts

#1. Development of a novel gene expression-based high throughput screening approach for the identification of β-cell protective drugs

Bhavisha Patel

Background: Type 2 Diabetes (T2D) is a chronic condition of high blood glucose levels due to inadequate amounts of the glucose-lowering hormone, insulin. Current drugs for T2D assist with management of symptoms but do not protect and prevent further damage to the β-cells. The major contributor to the disease, β-cell dysfunction, has complex pathology and is still incompletely understood. Previous drug discovery methods have focused on a single target which has proven to be ineffective due to the complexity of β-cell dysfunction. An unbiased approach named gene expression signatures (GES) has previously been successful in other complex diseases by providing a genetic fingerprint that is representative of the function and phenotype of the cell.

Purpose/aims: To develop a GES to identify drugs that have a protective effect on β-cells.

Methods: A model of β-cell dysfunction and reversal of dysfunction was previously developed using INS-1E cells, a rat β-cell line. Using this model, RNA was extracted and gene expression profiling conducted. Differentially expressed genes were validated using qPCR in two independent sets of samples. Genes that passed these two rounds of validation were used to generate our β-cell GES. This GES was then used to screen a publically available database of compounds (Connectivity Map) and the top eight were tested in vitro. Cells were cultured with 10μM of each compound and insulin secretion and apoptosis (caspase-3/7 activity) were measured (n=6). Results were compared using two-way ANOVA with LDS post-hoc analysis with $p<0.05$ considered significant.

Results: Of the eight compounds, five improved insulin secretion and two reduced apoptosis.

Conclusions: Our GES was capable of identifying compounds that have a protective effect on β-cells and may prove to be powerful T2D treatment options.

What's next? GES technology can have an abundance of uses, namely categorising patients in risk factor subtypes or personalised medicine.

#2. The effect of team injury burden on whole-of-season performance in Australian football

Daniel Hoffman

Background: A negative association between injury burden and team whole-of-season performance has been demonstrated in basketball, rugby union and soccer, however, the nature of this association in elite Australian football is currently unclear.

Purpose/aims: To determine how much of a team's whole-of-season performance is affected by specific injury burden variables in the Australian Football League.

Methods: 15,289 injuries that caused 51,331 missed matches from 1997 to 2016 were aggregated to a team-level. The effect that injury burden measures, categorised as incidence, severity, prevalence, player match availability and percentage of list injured, had on ladder position and finalists/non-finalists was analysed. Weighting factors were used to account for the injury burden of key players.

Results: Injury burden variables that account for player value provide a stronger effect for team performance than those that did not, the best method being best and fairest rankings. A measure of injury prevalence exhibited a negative medium effect ($d = -0.58$) and explained 12% of the variance for finalists/non-finalists and the ladder position of teams respectively. A measure of player match availability showed a positive small-medium effect ($d = 0.39$) and explained 7% of the variance for finalists/non-finalists and the ladder positions of teams respectively.

Conclusions: An association exists between a team's injury burden and their whole-of-season performance in the Australian Football League. The injury burden measures of injury prevalence and player match availability demonstrated this association with stronger associations evident when accounting for the injury burden of key players. The impact of injury burden in explaining up to 12% of the variance in final ladder position is considerable due to the large number of other factors associated with a team's whole-of-season performance.

What's next? Combining injury burden variables and/or measuring the relative change in injury burden and season-to-season performance may provide stronger associations.

#3. Breaking up classroom sitting with cognitively challenging active breaks to improve children's cognition

Emiliano Mazzoli

Background: Classroom-based active breaks (AB) reduce children's school sitting time and promote physical activity. Such breaks may boost children's cognitive functions. Physical activity enhances cognition (i.e., executive functions), which may be due to the intrinsic cognitive demand of the physical task.

Purpose/aims: We aimed to investigate whether cognitively challenging AB could reduce sitting and improve cognitive functions in primary school children.

Methods: Classrooms from two schools were randomly allocated to the cognitively challenging AB (intervention) or the simple AB (active control). Another school continued with the normal school practice (passive control). Teachers were asked to implement AB twice a day for five-six weeks. In total, 145 children aged around 7 years participated. Measures included: sitting/stepping time (activPAL™ monitors), executive functions (Go/No-go task – inhibition – and NIH toolbox – working memory), brain activity (functional-near-infrared spectroscopy), time-on-task (systematically observed with one class per study group). All assessments were conducted at baseline and post-trial. Sitting/stepping and time-on-task were also measured at mid-trial. ANOVAs and linear regressions, adjusting for sex and age, were conducted using Stata/SE 15.0.

Results: AB significantly reduced sitting and increased physical activity. Inhibition significantly improved in the intervention compared to the other groups. A regression analysis revealed that the relative change in sitting was predictor of inhibition (B*=-.303; p= 0.01). No statistical differences were found in working memory, time-on-task nor brain activity. Yet, the relative change in school time stepping predicted higher brain activity (B*=.405; p< 0.05).

Conclusions: Cognitively challenging AB can effectively interrupt children's sitting time and promote physical activity in primary schools. Cognitive functions may benefit from this strategy, but further research is required to clarify the role of tasks' cognitive demand.

What's next? AB can help teachers support children's physical health and cognitive enhancement. The advantage of this approach is that it is low cost and requires little space.

#4. Mechanisms of action of metformin in beta cells to improve islet survival in diabetes

Jacob McCann

Background: Diabetes is a severe chronic condition that affects approximately 422 million adults globally. It is characterised by elevated blood-glucose levels, which is due to insufficient amounts of the glucose-lowering hormone, insulin. There are two main types of diabetes, Type 1 and Type 2. Failure of insulin producing beta cells is a major contributor of Type 2 diabetes and to the failing of Type 1 diabetes transplants. Therefore, beta cell failure is a common factor of both variants of the disease and should be targeted. Beta cell failure is poorly understood. Our laboratory and others have demonstrated that the common Type 2 diabetes drug Metformin can protect beta cells from a diabetic environment and improve beta cell function, however its mechanisms in beta cells remain unknown.

Purpose/aims: To determine the mechanisms of action of Metformin in beta cells

Methods: INS-1E cells, an immortalised rat beta cell line, were cultured under low or high glucose conditions to mimic a normal and diabetic environment respectively, and treated with and without Metformin. Glucose-induced insulin secretion measured beta cell function and was quantified via insulin ELISA and cell death was assed via apoptosis assay. Molecular mechanisms of Metformin were examined via western blotting and qPCR.

Results: Data was found to be normally distributed and groups were compared either via 1-way or 2-way ANOVA with LSD post-hoc analysis (n=10). Increased insulin secretion with Metformin treatment demonstrated its ability to protected beta cells in diabetic conditions. This was associated with activation of the 5' adenosine monophosphate-activated protein kinase (AMPK) and activation of protein kinase-A (PKA).

Conclusions: Identification of these pathways may prove to be powerful in reducing diabetes progression and development.

#5. Lipopolysaccharide binding protein & bone mineral density

Jasmine Cleminson

Background: Increased risk of osteoporosis and fracture are associated with gastrointestinal diseases, including ulcerative colitis and irritable bowel syndrome. A possible link between bacterial lipopolysaccharides (endotoxins) and downstream effects on bone remain unknown.

Purpose/aims: To investigate lipopolysaccharide binding protein (LBP) levels and bone mineral density (BMD) in a randomly selected population-based cohort of men.

Methods: Serum LBP (ng/mL) was measured using enzyme-linked immunosorbent assay (ELISA) for 1149 men (ages 20-96yr, median 61yr) enrolled in the Geelong Osteoporosis Study. BMD (g/cm2) was measured at the PA-spine, hip, total body and forearm using dual-energy X-ray absorptiometry. Weight and height were measured; medication use, physical activity and smoking status were self-reported. LBP values were natural-log transformed (ln-LBP) and associations between ln-LBP and bone measures were tested using Pearson's correlation. Multivariable linear regression models were developed to test associations after adjusting for age, weight, height, physical activity and medications affecting bone (thyroid medication, bisphosphonates, oral glucocorticoids).

Results: Relationships between ln-LBP (median 16.5ng/mL, IQR:11.5-23.1) and age (r^2=0.06, p=0.04), weight (r^2=-0.08, p=0.005), total body (r^2=-0.09, p=0.003), spine (r^2=-0.05, p=0.08), distal- (r^2=-0.02, p=0.003) and mid-forearm BMD (r^2=-0.15, p=<0.001) were significant. After adjustments, LBP was associated with decreased BMD at the mid-forearm (β -0.013, SE±0.004, p<0.001) and showed a trend with decreased spine (β -0.012±0.009, p=0.19) and total body BMD (β -0.006±0.004, p=0.13). No associations between LBP and hip (β -0.002±0.006, p=0.77) and distal-forearm BMD (β 0.001±0.003, p=0.66) were evident.

Conclusions: While acknowledging potential unrecognised confounding, these data suggest LBP is independently associated with mid-forearm, and potentially spine and total body BMD, in men. This study is the first to identify an association between LBP and decreased BMD. Given the paucity of data, replication and future studies are warranted.

What's next? Implications of these findings underline the importance of gut health for bone health.

#6. Investigating the impact of ADAMTS proteoglycanases in influenza virus immunity

Jess Pedrina

Background: Each year, influenza viruses are responsible for seasonal epidemics and occasional pandemics, causing acute, respiratory illness in the human host. Current mitigation strategies such as vaccines and antivirals focus solely on the virus. Mismatches between vaccine and circulating strains and antiviral drug resistance necessitates the need for the development of alternative strategies. One such strategy involves shifting the focus away from the virus and targeting host responses instead. Extracellular matrix (ECM) enzymes such as a disintegrin-like and metalloprotease with thrombospondin-1 repeats (ADAMTS)5 have been shown to contribute to influenza-specific immunity through regulation of T cell migration.

Purpose/aims: We now present data from a related but uncharacterised family member, ADAMTS15, and assess its contribution to influenza-specific immunity.

Methods: It was hypothesized that extracellular matrix enzymes such as the ADAMTS family are required for normal immune cell trafficking from the mediastinal lymph node to the lung during influenza virus infection by cleaving versican and remodeling the ECM. By disrupting the Adamts15 gene in mice we examined innate and adaptive immune responses following intranasal virus infection. This was achieved through analysis of lung viral titres and flow cytometric analysis.

Results: Preliminary data suggest ADAMTS15 contributes to immunity and plays an important role in the resolution of influenza virus infection through a yet to be determined mechanism.

Conclusions: Targeted overexpression of ECM enzymes such as those in the ADAMTS family have the potential to improve disease outcomes and reduce the burden of disease related to influenza virus infection.

#7. Neurobiological underpinnings of social and emotional functioning in children with comorbid ADHD+ASD

Kate Stephens

Background: Children with ADHD and clinically significant levels of ASD symptoms (ADHD+ASD) have been shown to have substantially impaired functioning, over and above having ADHD alone, in particular social and emotional functioning. Abnormalities in white matter tracts have been implicated in both ADHD and ASD, however, research has not yet explored whether there is an association between measures of social and emotional functioning and limbic system tract properties in children with ADHD+ASD.

Purpose/aims: This study aimed to examine whether measures of social and emotional functioning were associated with limbic tracts in children with ADHD and ADHD+ASD.

Methods: This study used baseline diffusion MRI data from a longitudinal study of children with ADHD (N=84) and non-ADHD controls (N=80). ADHD status was confirmed using the Diagnostic Interview Schedule for Children version 4 (DISC), while the severity of ASD symptoms was evaluated using the Social Communication Questionnaire (SCQ) and emotional and peer difficulties were measured using the Strengths and Difficulties Questionnaire (SDQ). Clinically elevated ASD symptoms was defined as an SCQ score of 11 and over.

Results: Preliminary analyses demonstrated a statistically significant difference between the control, ADHD and ADHD+ASD groups on emotional and peer problems measures ($p<0.001$). An association between emotional problems and mean fractional anisotropy (FA) in the bilateral cingulum was found to be statistically significant for the ADHD+ASD group ($p<.01$).

Conclusions: Consistent with previous research, children with ADHD+ASD were shown to have greater emotional and peer relationship difficulties than children with ADHD alone. The findings of cingulum anomalies supports previous research, which has linked ASD severity to abnormalities of the cingulum.

What's next? A longitudinal analysis will be conducted to determine whether there are changes in social and emotional functioning over time, and whether this is reflected in changes of mean FA in the limbic tracts across groups.

#8. Family history of Type 2 diabetes alters muscle capillary perfusion after a meal

Katherine Roberts-Thomson

Background: Muscle microvascular blood flow (MBF) is enhanced in response to insulin or a mixed meal and plays a key role in muscle glucose uptake. MBF is blunted in populations with insulin resistance and type 2 diabetes.

Purpose/aims: We aimed to determine whether healthy people with a family history of type 2 diabetes (FH+) have impaired MBF when compared to those without a family history (FH-).

Methods: Fifteen (7FH-, 8FH+) age and BMI matched overnight-fasted volunteers underwent a liquid mixed meal challenge (MMC, 295 kcal). Plasma glucose and insulin levels were monitored every 30 minutes over 2 hours following the MMC. Brachial artery blood flow (Doppler ultrasound) and forearm muscle microvascular recruitment (contrast-enhanced ultrasound) was assessed at baseline and 60 min following the MMC.

Results: Both groups had similar plasma glucose and insulin levels before and during the MMC (Table 1). Despite similar brachial artery blood flow, FH+ exhibited impaired MBF in response to the MMC (Table 1). This is the first study showing impaired MBF in healthy FH+, using a MMC.

Conclusions: Reduced MBF in FH+ may in part explain elevated risk for type 2 diabetes in this population.

#9. The role of Amyloid Beta 42 in heart disease

Liam Hall

Background: Heart failure is a major cause of mortality in obesity and can occur in the absence of other established risk factors such as hypertension. This is known as obese cardiomyopathy and an alteration in cardiac metabolism is thought to be one of the key drivers of the disease, however, little is known on the contributing factors. Serum levels of the Alzheimer's disease protein amyloid beta 42 (Aβ42) increase in obesity and our research group has recently found that mice administered Aβ42, to increase levels to those seen in obesity, develop cardiac dysfunction.

Purpose/aims: The aim of our research is to determine the mechanisms of action of Aβ42 on cardiomyocytes in order to better understand the pathogenesis of the disease and potentially uncover therapeutical targets to prevent and treat it.

Methods: Hearts from mice administered Aβ42 or scrambled peptide were examined using RNA sequencing, western blotting and qPCR. H9C2 cardiomyocytes were used to screen for receptors and signalling pathways mediating the effects of Aβ42.

Results: Analysis of RNA sequencing data revealed a number of signalling pathways that may be important in Aβ42 mediated changes including the nerve growth factor and fibroblast growth factor signalling pathways. Furthermore, mice administered Aβ42 and Aβ42 treated cardiomyocytes showed evidence of inflammatory and ER stress responses.

Conclusions: Inhibition of protein kinase D (PKD) in AÎ²42 treated cardiomyocytes impaired these responses, suggesting it may be an important signalling molecule.

What's next? The importance of PKD in Aβ42-mediated cardiomyopathy will be examined in mice with a cardiac specific loss of PKD activity. In addition, the effectiveness of drugs developed for the treatment of Alzheimer's disease to preventing obese cardiomyopathy in a mouse model of obesity will be examined.

#10. Creatine metabolism and supplementation of the maternal uterus

Mamatha Philip

Background: Creatine (Cr) and phosphocreatine (PCr)serve as a reserve of high-energy phosphates in muscle and brain. Additionally, it has been well documented that phosphocreatine levels are increased in the uterus during pregnancy. During pregnancy, there are large changes in maternal physiology and metabolism and there is an increased nutrient demand made by the growing fetus. One of the maternal organs undergoing major adaptations during pregnancy is the uterus. Uterine creatine metabolism has not been studied in detail, which is perhaps surprising given that in labour the uterus may be involved in producing intense contractions over many hours involving a relatively large energy expenditure. Recent work using animal models of pregnancy has investigated the effect of maternal dietary creatine supplementation (CrS) on fetal creatine loading and fetal protection from birth asphyxia. Interestingly, this dietary approach seemed effective in protecting the fetus from significant tissue injury and death but the effect of creatine supplementation on the mother during pregnancy has not been well studied.

Purpose/aims: In this study, we aim to determine the effect of supplementing the maternal diet with Cr on uterine creatine metabolism in pregnant spiny mice.

Methods: We will have two groups of pregnant spiny mice. One group would be the control (n=8) and the other the experimental group (n=8). The experimental group will receive a diet supplemented with creatine monohydrate and the control group will receive normal chow. After euthanizing the spiny mice mothers, uterine tissue will be extracted from both the control and the experimental group. We aim to measure total creatine and GAA levels in the uterine samples of both group. We also aim to determine relative mRNA expression of CrT in the uterine tissue sample.

Conclusions: The findings from this study will address the gap in our basic knowledge of uterine Cr metabolism during pregnancy.

#11. Shifting the validation paradigm for patient-reported outcome measures (PROMs): assembling and evaluating quantitative and qualitative validity evidence

Melanie Hawkins

Background: The 2014 Standards for Educational and Psychological Testing defines validity as 'the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests'. Validation, therefore, is not about the test: it is an evaluation of the plausibility of the inferences (i.e., decisions) made from test scores, as based on evidence and the theory of the construct under investigation. However, the current validation paradigm for patient-reported outcome measures (PROMs) relies primarily on testing for separate types of (mainly statistical) validity. The Standards framework describes five types of validity evidence (not types of validity) through which test score inferences can be evaluated, but a theoretical foundation such as this is lacking from PROM development and validity testing papers.

Purpose/aims: To use the Standards' framework to examine methods, particularly qualitative methods, used to generate validity evidence for the Health Literacy Questionnaire (HLQ), a multidimensional measure of health literacy.

Methods: A rapid literature review to categorise validity testing methods into the Standards' five sources of validity evidence: test content, response processes, internal structure, external variables, and consequences of testing.

Results: Eight papers reported validity evidence for the HLQ. Most frequently reported was internal structure (7 papers) and external variables (5 papers). Consequences of testing was reported only once.

Conclusions: Even though evidence was reported across the five categories of the Standards, there is still a preponderance of statistical evidence for internal structure and external variables. Validity evidence generated from quantitative and qualitative methods across the five categories of the Standards enables a systematic evaluation of the degree to which inferences from PROM scores are valid for specific contexts.

What's next? It is time for a shift in PROM validation practice to align with the theoretically-driven framework of the 2014 Standards to ensure valid inferences are made from PROM data.

#12. Intra- and inter-regional priming of ipsilateral human primary motor cortex with continuous theta burst stimulation does not induce consistent neuroplastic effects.

Michael Do

Background: Human responses to non-invasive brain stimulation (NIBS) techniques can be highly variable. Recently, priming protocols involving a conditioning round of NIBS applied to a target brain region prior to the application of a test protocol have shown promise in inducing more reliable effects.

Purpose/aims: We investigated whether intra- or inter-regional priming of the left primary motor cortex (M1) using continuous theta burst stimulation (cTBS) can induce consistent, and reliable modulation of corticospinal excitability.

Methods: Twenty healthy adults (six males) underwent four cTBS protocols. For intra-regional priming, cTBS was applied twice to the left M1 (M1-M1). For inter-regional M1 priming, cTBS was applied to the ipsilateral (left) dorsal premotor cortex (dPMC-M1), and ipsilateral (left) dorsolateral prefrontal cortex (DLPFC-M1). In the control condition, sham stimulation was applied to left M1, followed by active cTBS also applied to the left M1 (sham-M1). Each round of cTBS was separated by 10 min. Neuroplastic responses were indexed using motor evoked potentials (MEPs) elicited from the left M1 hand region, and measured from the contralateral first dorsal interosseous (right hand). MEP measurements were taken before the first round of cTBS priming, then immediately, 10, 20 and 30 min after the second test round of cTBS.

Results: The primary two-way repeated measures ANOVA revealed no significant differences in MEP responses across each condition (no main effects or interaction).

Conclusions: Intra- and inter-regional priming of the left M1 using cTBS does not induce consistent neuroplastic effects.

What's next? Further work is required to identify factors which contribute to such variability in human responses to NIBS.

#13. A mapping review of evaluations of alcohol policy restrictions targeting night-time entertainment precincts

Nicholas Taylor

Background: Alcohol-related harm in night-time entertainment precincts (NEPs) is disproportionately high for the amount of alcohol consumed within these areas. Previous evaluations of alcohol restrictions targeting NEPs have often looked at restrictions in isolation and not attempted to create a comprehensive theoretical explanation that takes multiple restrictions into account.

Purpose/aims: The aim of this review is to establish which restrictions have been adequately evaluated in previous literature, and to identify any research which may provide the basis for a theoretical model that explains the interactions between different alcohol restrictions in NEPs and their combined impact on alcohol-related-harm

Methods: A mapping review was conducted to plot evaluations of the effectiveness of different alcohol restrictions in NEPs at reducing assault and injury rates (protocol PROSPERO 2017: CRD42017069773). Six databases and 145 websites were searched, results were categorised based on the type of restrictions evaluated: Outlet density, trading hours, lockouts, price, patron bans, and drinks restrictions.

Results: Forty-eight articles were identified out of 20,743 returned by the systematic search. Thirty-five of these papers were original works, and 13 reviews. Outlet density was examined in 15 of the papers, trading hours in 30, lockouts in 21, price in 2, patron bans in 7 and drinks restrictions in 15.

Conclusions: No pre-existing theoretical models were identified. Outlet density, trading hours, and price restrictions all had evidence that suggested high levels of effectiveness in NEPs and would be suitable for inclusion in a theoretical model.

What's next? More research is required before attempting to include lockouts, patron bans and drinks restrictions in a theoretical model. Future research should focus on establishing a theoretical model based on evidence of effective alcohol restrictions and gathering an evidence base for under-researched restrictions.

#14. Hillwalking and walk leading motivations and perceived benefits: looking beyond physical activity

Nora Morocza

Background: Hillwalking as a nature-based exercise has the scope to provide physical and mental health benefits arising from both physical activity and exposure to nature.

Purpose/aims: The aim of this study was to understand the complexity of factors that influence sustained engagement in walking by exploring motivations for and perceived benefits of hillwalking and walk leading.

Methods: The study used a mixed methods design consisting of hillwalking interviews, physical activity measurements, location data and the Nature-relatedness questionnaire. Seventeen walk leaders participated in the data collection who had extensive walking experience and had in-depth understanding of the social aspects of walking through leading groups. Qualitative analysis following a combined thematic and grounded theory approach was conducted on the interview data. The qualitative data was merged with quantitative measurements to provide understanding on the environmental and nature related aspects of walking.

Results: Primary hillwalking motivations included being outside, pleasure, and escape from everyday life and pressures. Physical activity related health benefits were reported as secondary motivations. The interaction between environment, personal history, and attitudes were important indicators of sustained engagement. Emerging overarching themes such as balance, adaptation and achievement were linked to various aspects of walking including: health; nutrition; physical activity; and environment. Perceived psychological benefits of hillwalking included better self-awareness, increased self-esteem, stress-release and restorative experience. Walk leading was perceived as a rewarding experience and was associated with psychological benefits, such as social inclusion, increased self-esteem and self-worth.

Conclusions: Hillwalking served as an escape and re-charge, which were reported as essential elements of a balanced life. The pleasure arising from various aspects of hillwalking was the drive for sustained engagement, therefore a primary intrinsic motivation.

What's next? The findings have the scope to inform future walking promotion programs and encourage long-term engagement by shifting the focus of promotion messages to intrinsic motivational factors.

#15. Resistance training and skeletal muscle protein metabolism in females: implications for researchers and practitioners

Olivia Knowles

Background: Resistance training is a key component of exercise, essential for health and performance benefits including increasing skeletal muscle mass, improving metabolic health and increasing strength and power output. Resistance training research in female populations is limited. Recent increases in the promotion of, and in turn the participation by females in sport and exercise, demands a commensurable contribution by researchers. Understanding the outcomes of exercise for females is critical for exercise practitioners to appropriately prescribe resistance training.

Purpose/aims: The aim of this narrative review was to provide an overview of the current research regarding female resistance training performance and skeletal muscle adaptation, with a focus on the hormonal variables that may influence resistance training outcomes.

Results: Findings suggest that menstrual cycle phase may impact strength and hypertrophy, but not skeletal muscle protein metabolism.

Conclusions: However, further research to investigate the impact of estrogen in young females is warranted. In comparison, oral contraception use may reduce skeletal muscle hypertrophy and protein synthesis, but not strength outcomes when compared to eumenorrheic females. Resistance training also appears to play a positive role in the maintenance of skeletal muscle mass and strength during pregnancy and menopause.

What's next? The review concludes with recommendations for researchers, to assist them in the inclusion of female participants in resistance training research. Commentary is provided on the most appropriate methods of controlling for, or understanding, the implications of hormonal fluctuations in females. For practitioners, the current evidence suggests possible resistance training practices that could optimise performance outcomes in females.

#16. Food choices: Perceptions and experiences of Australian fathers

Sara Campolonghi

Background: Preventable conditions and diseases, including noncommunicable diseases (NCDs) and obesity, are of global concern, both in adult and children's populations, despite being modifiable through lifestyle changes such as healthy eating. The family context is pivotal in shaping children's food/eating preferences and habits in the first years of life and these are likely to persist throughout adulthood. Fathers can play a unique role in orienting food choices in the family. Previous literature has established the importance of paternal diet, feeding practices and modelling in influencing children's eating behaviour, however an understanding of what shapes fathers' food choices and their contribution to the family food context is currently lacking.

Purpose/aims: The present study aims to explore perceptions and experiences of fathers living in Australia about their food choices and the relationship between food and health.

Methods: A qualitative description approach will be used. Semi-structured, in-depth interviews (phase 1) and focus groups involving 6-8 participants per group (phase 2), will be conducted with individuals playing an active fathering role in their children's life aged 1 to 12, resident in Melbourne or Geelong regions. Data from audio recordings and responses to key artefacts (photos) will be transcribed and analysed using an inductive, interpretative approach.

Conclusions: This study will provide an in-depth insight into fathers' lay theories of food, eating and health, their personal food choices, perceived enablers and barriers to healthy eating, and fathers' role in the family food context.

What's next? This evidence may inform policies and interventions for healthy eating specifically addressing parents and families.

#17. Informing the future of Australian army recruit training load and wellbeing monitoring

Sean Bulmer

Background: Military training has historically adhered to tradition-based training principles. At present there is a push to modernise Army's approach to soldier's training and include a monitoring framework. Australian Army Basic Recruit Training elicits high levels of psychological and physiological stress and fatigue. Whilst measures of psychological and physiological change related to training load and wellbeing have been investigated in several Recruit Training programs around the world. None of these studies employed repeated daily and weekly data collection of variables across the entire duration of the current Australian recruit training program.

Purpose/aims: Therefore, the aim of this study was to investigate relationships between training load, perceived measures of stress, fatigue, wellbeing and performance across the 12-week Australian Basic Recruit Training program. This may inform an improved health management strategy in future

Methods: At the commencement of the study n=48 recruits consented to participating in the project. A suite of psychological and physiological markers of stress and fatigue were routinely measured (i.e. daily or weekly) across a 12-week Basic Recruit Training course from June to October 2018. Daily measures included Rating of Perceived Exertion (category rating scale), NASA Task Load Index, and perceived sleep quality and duration, while activity counts and steps were collected using accelerometers. Each week the Short Recovery Stress Scale and Multi-component Training Distress Scale questionnaires were completed upon waking.

Results: Lessons learned, and preliminary findings will be presented and the relative merits of combining these measures or a validated subset to assist in training load management during Basic Recruit Training will be discussed.

What's next? A move toward a more sophisticated soldier management system during basic training will require more high resolution measures and therefore, more demand on individual personnel. The current study will help inform Army's management personnel in considering options for such a program.

#18. The immunological effects of recombinant influenza viruses expressing shSOCS1

Shasha Zhao

Background Influenza infection is a major heath burden globally. The elderly (≥65 years old) are highly susceptible to influenza virus infection as vaccine effectiveness is poor. MicroRNAs (miRNAs) are small non-coding RNAs (~ 22 nucleotides) that have been shown to regulate immunity. Our lab has shown enhanced immunogenicity in mice following infection with a recombinant X31 (H3N2) influenza virus expressing miR155. Suppressor of cytokine signalling 1 protein (SOCS1) is a negative regulator of cytokine signalling and a validated target of miR155. One of the difficulties associated with the application of miRNAs in the clinic is the potential for off-target effects. Short hairpin RNAs (shRNAs) are small interfering RNAs that can be designed to be fully complementary to target genes reducing the likelihood of off-target effects.

Purpose/aims: To deliver a shRNA targeting murine SOCS1 (shSOCS1) using recombinant influenza viruses and evaluate immunity in a mouse model of influenza virus infection.

Methods: ShSOCS1 was inserted into the non-structural (NS) gene segment and reverse genetics performed to rescue recombinant PR8 (H1N1) and X31 (H3N2) influenza viruses. The expression of mature SOCS1 siRNA from these recombinant viruses was assessed by stem-loop RT-qPCR.

Results: We have rescued recombinant PR8 and X31 influenza viruses expressing shSOCS1 and demonstrated mature SOCS1 siRNA expression by stem-loop RT-qPCR. The immunological impact on murine immune responses will be assessed in vivo.

Conclusions: ShRNAs can be delivered and expressed by influenza viruses. miRNAs or shRNAs may be used as an alternative adjuvant to improve influenza vaccine efficacy.

What's next? C57/BL6 mice will be intranasally infected with recombinant X31 influenza virus expressing shSOCS1 and samples analysed to assess the impact on virus-specific immunity.

#19. Using the schizotypal personality questionnaire instruments in China: A validation study

Shujuan (Tina) Liu

Background: Schizotypy is a multidimensional construct that is closely linked to psychosis-spectrum disorders but how it manifests in different cultural contexts needs clarification.

Purpose/aims: This study aimed to examine the structural validity of associated measures of schizotypal traits i.e. Schizotypal Personality Questionnaire (SPQ), Schizotypal Personality Questionnaire "Brief (SPQ-B) and Schizotypal Personality Questionnaire" Brief Revised (SPQ-BR) in a Chinese sample.

Methods: 1410 Chinese participants (age range from 18 to 51 years old, M = 20.03 years, SD = 2.80 years) were recruited across multiple provinces through partnering universities.

Results: The reliability of the schizotypal measure scores, estimated with McDonald's, ranged between 0.90 to 0.96 across all schizotypal measures for total scores, and values for subscale scores ranged between 0.76 to 0.86 for the SPQ, 0.77 to 0.81 for the SPQ-B and 0.64 to 0.80 for the SPQ-BR. Confirmatory factor analysis (CFA) revealed that neither the purported 3- nor 4 factor models (including second order factors) examined in SPQ, SPQ-B and SPQ-BR fit the Chinese sample desirably.

Conclusions: Results suggest that neither SPQ nor its shortened versions - SPQ-B and SPQ-BR are ideal for assessing schizotypy in Chinese population potentially due to cultural and ethnic confounds. Further investigation is necessary to determine how cross-cultural application of SPQ may influence its underlying structure.

What's next? Such findings present important theoretical and clinical implications for cross-cultural research of schizotypy, cross-cultural psychological assessment as well as psychiatric diagnostic systems.

#20. Breast cancer and radiolabelling aptamers for theranostic application

Umair Khalid

Background: Triple Negative Breast Cancer (TNBC) is the most aggressive breast cancer and is difficult to treat with current therapies, as TNBC is the only breast cancer that does not have specific target receptors. Currently, our only option to treat TNBC involves chemotherapy or a symptomatic approach to treatment. The EpCAM expression that occurs on the surface of cancer cells, is now a suggested target for TNBC. Aptamers are one modality that has shown high potential for binding to receptors on target cells and that can be developed for therapeutic purposes.

What's next? Radiolabelling of aptamers could provide a unique strategic approach to successfully treat the deadly TNBC and their metastases. In particular, Ga (gamma-ray emitter only) and Lu (emits both gamma-rays and beta-particles, simultaneously) provide promise in the diagnostic and therapeutic fields, respectively, if applied to TNBC. GaDOTA is now used as a diagnostic agent for neuroendocrine metastatic tumors and has not demonstrated any complication and toxicity. The same GaDOTA can be used with an aptamer linkage to target TNBC and their small metastatic sites.

Lu has convincingly demonstrated theranostic success in patients with prostate cancer by PSMA binding. Beta particles emitted by Lu extends only millimeters in human tissue and provides a therapeutic radiation does, while, the emitted gamma-rays can be used for diagnostic imaging. By creating and using a LuDOTA-EpCAM conjugate, there is great possibility to achieve a theranostic effect for TNBC patients.

Radiolabelled aptamer conjugates can provide positive hope for future diagnosis and treatment and will start a new era in oncology. Due to complications that exist with current approved therapies – and if proven successful – radiolabelled aptamers will be used frequently in our clinical environment as a theranostic tool.

#21. Quantitative heel ultrasound (QUS) and anticonvulsant use in a population-based study

Vinoomika (Veena) Chandrasekaran

Background: Anticonvulsant use has been previously linked with decreased bone density. Quantitative heel ultrasound (QUS) is a cost-effective, portable screening tool used to assess fracture risk.

Purpose/aims: To determine the association between QUS measures and anticonvulsant use in a population-based sample of men.

Methods: Complete information on medication use and QUS measures were available for 849 men (age range: 24-98) participating in the Geelong Osteoporosis Study. Bone quality was assessed using QUS, which comprised of the following measures: Stiffness Index (SI), Broadband Ultrasound Attenuation (BUA) and Speed of Sound (SOS). Height and weight were measured and BMI calculated (kg/m2). Medication use, activity levels and smoking status were self-reported. Multiple linear regression was used to assess the relationship between QUS and anticonvulsant use.

Results: Fifteen men (1.8%) reported using anticonvulsants. Anticonvulsant users were less physically active compared to non-users [physically active: 6 users (40%) vs 599 non-users (72%), p=0.007]. Before and after adjustment for age (years), BMI and agents affecting calcium, anticonvulsant users had lower SI (mean: 84.4 ± 26.9% vs 100.1 ± 20.2%, users vs non-users, p=0.04), BUA (106.4 ± 17.6 dB/MHz vs 120.7 ± 15.9 dB/MHz, p=0.01) and SOS (1540.0 ± 57.0 m/s vs 1572.7±40.9 m/s, p=0.05) compared to non-users. Further adjustment for smoking status did not affect the relationships.

Conclusion: Our data suggest that bone quality, as assessed using QUS, is reduced for men using anticonvulsants. QUS may therefore be a useful screening tool to identify anticonvulsant users with a higher risk of fracture.

#22. Role of feared self and morality in OCD

Yoon Hee Yang

Background: Feared-self has been widely accepted as a vulnerability factor of many psychiatric disorders, however empirical studies are scarce especially in the field of Obsessive Compulsive Disorder.

Purpose/aims: This study examined the role of feared-self in OCD in an online experiment.

Methods: A total of 120 participants were recruited through Prolific (79 males) aged between 18 and 63 (M = 30.63, SD = 10.63). Morality related feared-self was primed through two tasks, as morality is a main theme in OCD. Participants were randomly allocated to control group and morality feared-self group, then further divided into personally relevant and non-relevant groups. In the first priming task, participants were given 20 sets of scrambled words and were instructed to put those words in a meaningful order. Morality group participants were given ten filter sentences and ten feared-self sentences while control group was given 20 filter sentences. Personal relevance group participants were given sentences written in first person to further prime the sense of feared-self, while the others were given sentences written in third person. For the second task, morality group wrote about a time when they/others were being immoral, while the control group wrote about latest shopping expenditure. Following these priming tasks, the Word Sentence Association Test for OCD was used to measure threat interpretation bias. Lastly participants were given six short vignettes and asked to rate the probability of threat in those vignettes, their urge to act, and the probability of them actually acting in such situations.

Results: A series of ANOVA showed significant two-way interaction between responsibility and morality for the vignette ratings, while WSAO results were not significant.

Conclusions: This study contributes to gaps in empirical literature of feared-self and the results indicate that subtle triggers in the environment could lead to heightened sense of fear and subsequent OC symptoms.