



BOOK OF PROCEEDINGS

2019 UQMS-OMSA Research Conference & Showcase
October 9, 2019



The following Book of Proceedings is comprised of abstracts submitted by University of Queensland medical students to the 2019 UQ Medical Student Research Conference and Showcase, hosted by University of Queensland Medical Society (UQMS) and Ochsner Medical Students Association (OMSA). This conference gives medical students an opportunity to celebrate their achievements in research, whether conducted at UQ or through prior research experiences. Several students were selected to present their abstract as a poster or oral presentation to a panel of peers, physicians, and scientists at the conference. Presenters and award winners are recognized below, followed by the submitted abstracts.

AWARD WINNERS

Recipient	Award
Ian Doig	Queensland Brain Institute Poster Award
Chloe Yap	Translational Research Institute Poster Prize
Omeed Faghieh	Ochsner Clinical School Prize for Best Phase 1 Research
Grace Boyd	QIMR Berghofer Research Institute Oral Presentation Prize
Cody Frear	Faculty of Medicine 'People's Choice' Award
Andrew Su	Faculty of Medicine Award for Best Poster Presentation
Cody Frear	Faculty of Medicine Award for Best Oral Presentation

Oral Presentations

Speaker	Topic
Teresa Liew	A Multicentre Retrospective Investigation into the Effect of Extracorporeal Membrane Oxygenation on Leukocyte Fate in Adults - An Interim Analysis
Sava Turcan	Increased utilization of constraint in total knee arthroplasty following anterior cruciate ligament and multiligament knee reconstruction
Grace Boyd	Endoscopically resected colorectal polyps ≤ 10 mm are not always innocuous: caution against a routine discard policy
Cody Frear	Negative pressure wound therapy for small-to-medium-sized paediatric thermal burns
Omeed Faghieh	Preclinical development of methionyl-tRNA synthetase inhibitors as novel antibiotics against gram-positive bacteria
Nicolas Sieben	Factors influencing physicians' risk estimates for acute cardiac events in patients with suspected acute coronary syndrome
Emma Morton	The Management of Out of Hospital Cardiac Arrest (OHCA) Patients in the Princess Alexandra Hospital (PAH) Emergency Department (ED)
George Simchun Yeung	Pill-Packing Intervention on Health Outcomes Among High-Risk Patients

Poster Presentations

Presenter	Topic
Danielle Cha	Parsing Metabolic Heterogeneity in Mood Disorders: A Hypothesis-Driven Cluster Analysis of Glucose and Insulin Abnormalities
Sarah Chisholm	The effects of lesion-associated staphylococcus aureus on human keratinocytes cytokine induction and squamous cell carcinoma progression
Caleb Chu	Radiographic Assessment of Sarcopenia in the Acute Care Setting: A Systematic Review
Ian Doig	The effect of day of admission and surgeon experience on hip fracture outcomes tracked one year post-operatively
Alisha D'Souza	Postnatal growth and neurodevelopmental outcomes in preterm infants
Nordan Flaaten	Patient Outcomes in Neck of Femur Fractures between Consultants and Trainees
Tonchanok Intraprasert	Do geriatric hip fractures with operative delay display worst post-operative outcomes when stratified based on ASA scores? A retrospective study.
Andrew Jiang	Rescheduling decreases codeine-related presentations to a clinical toxicology unit
Stanimira Kartolova	Using the ieMR to compare presenting complaint, ED diagnosis and in patient diagnosis
Emily Kelsoe	Incidence of adherence to osteoporosis medication following fragility hip fractures and associated outcomes
Yun-Hsuan (Stellina) Lee	A mechanism for ketamine in treatment-resistant depression?
Shamima Banu Mohamed Ansari	A pilot Aquatic Exercise Program to improve the health and well-being of people with dementia and their family carers
James O'Leary	Emergency Intraoperative Vascular Surgery Consultations at a Tertiary Center
Jared Ong	N-of-1 Trials of Melatonin for Insomnia in Stimulant-Treated Children with ADHD
Shrida Sahadevan	The diagnostic accuracy and utility of the Ages & Stages Questionnaires: Social-Emotional screen in children born very preterm
Angela (Jaewon) Choi	Systematic review: Sarcopenia as a prognostic factor in gynecological malignancy
Andrew Su	Deep Learning Model for Automated Cancer Classification based on Image data and Molecular Markers
Sindusa Wignarajan	Major Trauma Response in the ED Resus at the Princess Alexandra Hospital
Chloe Yap	Connecting comorbidities with brain-gut-microbiome-stress axis biology in autism spectrum disorder: a review
Isabel Yoon	The Role of Fatigue in Functional Outcomes for Youth with Chronic Pain

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Resting State Functional Connectivity of the Brain in Epilepsy

Arash Arabshahi

Introduction: Epilepsy affects 1% of the global population and is associated with significant morbidity and mortality. The main treatment option for epilepsy is anti-epileptic drugs. However, approximately one third of patients are refractory to drug treatment. Refractory epilepsy is usually treated with surgical resection of the seizure focus but the long term success of epilepsy surgery in achieving sustained seizure control is less than 50%. The main challenge of epilepsy surgery is localising the epileptogenic brain areas for resection, which currently require extensive evaluation including the use of invasive intracranial electrodes. Resting state functional magnetic resonance imaging (rs-fMRI) is increasingly being used in the preoperative assessment of epilepsy patients to localise epileptogenic brain regions. In this project, I use rs-fMRI to assess alterations in functional connectivity of the epileptic brain and assess its accuracy in localising epileptogenic zones in epilepsy.

Methods: 25 patients with refractory epilepsy and 25 aged matched healthy controls were recruited from the Advanced Epilepsy Unit at the Mater Hospital. All subjects had rs-fMRI scans performed at the Herston Imaging Research Facility (HIRF). In addition, all epilepsy patients had routine stereo-electroencephalography (SEEG) evaluation performed as part of their pre-surgical evaluation at the Mater Hospital, which localised the epileptogenic brain areas. The rs-fMRI data is currently being analysed in conjunction with the SEEG data to investigate how epilepsy affects the functional connectivity of brain networks and whether rs-fMRI can be an effective and less invasive imaging modality in localising epileptic brain regions.

Endoscopically resected colorectal polyps ≤ 10 mm are not always innocuous: caution against a routine discard policy

Grace Boyd

QIMR Berghofer Research Institute Oral Presentation Prize

Introduction: The low risk of adenocarcinoma developing in colorectal polyps < 10 mm is used as justification to resect and discard these without histopathology.

Methods: Polyps ≤ 10 mm were identified from a database of 216 consecutive intact endoscopically resected malignant polyps. General clinicopathological features were recorded together with specific pathological features associated with local recurrence and/or lymph node metastases.

Results: 37 polyps were ≤ 10 mm (17%) including two ≤ 5 mm in diameter. Median age was 69 years (29-83 years) and 21 were male (56%). 76% were left-sided. 81% arose in tubular or tubulovillous adenomas and 76% were sessile. Invasive adenocarcinoma width was 0.2-7.5 mm (median 3.4mm). Carcinoma depth was 0.1 to 5.0 mm (median 1.8 mm). 23 (61%) polyps had ≥ 1 adverse risk feature for local recurrence at the site or for regional lymph node metastases. These were margin involvement in 10 cases (27%) and margin clearance was < 1 mm in 9 (24%); poor differentiation/dedifferentiation in 12 (32%); lymphatic and/or venous invasion in 6 (16.2%) and tumour width > 4 mm in 18 (47%) and/or > 2 mm deep in 17 (45%). 20 cases (54%) underwent surgical resection, with no residual tumour. One case had lymph node metastases from an incidental ileal neuroendocrine tumour.

Discussion: Colorectal polyps ≤ 10 mm diameter can harbour invasive adenocarcinoma with high-risk histology warranting colectomy. Caution is warranted if a universal discard policy is enacted.

Cesarean section improves neonatal outcomes only from 24+0 weeks for periviable breech but not cephalic infants

Grace Boyd

Introduction: The optimum mode of birth at periviable gestations remains unclear. Whilst cesarean delivery may minimise birth trauma, intrapartum stillbirth and birth asphyxia, it may not necessarily improve longer term outcomes. This study assessed the impact of mode of birth on neonatal outcomes for infants with breech compared to cephalic presentation at periviable gestations (22+0 – 25+6 weeks).

Methods: This was a retrospective cohort study of women who delivered a single, non-anomalous infant at 22+0 – 25+6 weeks gestation at a large tertiary center in Australia. Obstetric and neonatal outcomes were analysed comparing both breech and cephalic presentation and mode of delivery.

Results: Of the 688 women who fulfilled the inclusion criteria, 39.7% were breech births and 60.3% were cephalic. Vaginal breech birth was associated with higher odds of very low Apgar scores, intrapartum stillbirth and neonatal death compared to both vaginal cephalic births and cesarean breech births. At 22+0 – 22+6 weeks gestation outcomes were universally fatal regardless of mode of delivery. At 24+0 – 24+6 weeks and at 25+0 – 25+6 weeks gestation vaginal breech birth was associated with lower odds of survival compared to cesarean breech births.

Discussion: The results of this study show that cesarean section improves survival and neonatal condition at birth for periviable breech infants >24+0 weeks gestation. No difference in outcomes was seen in the periviable cephalic cohort.

Differences in Morbidity and Mortality Between Emergency List and Scheduled List Neck of Femur Fractures

David Cabaniss, Nicholas Newcomb, Heather Yerdon

Introduction: The Princess Alexandra Hospital has emergency and planned surgical lists for patients awaiting neck of femur fracture (NOF) repair, a surgical procedure associated with relatively high rates of morbidity and mortality. While research is available on the negative effects that weekend and after-hours surgery have on surgical outcomes of NOF repair, data specifically illustrating differences between emergency and scheduled lists is limited. This study aims to examine whether differences exist between scheduled and emergency lists regarding patient mortality, mobility, procedure duration, readmission, and re-fracture up to one year post-operatively.

Methods: A retrospective analysis was completed on patients presenting to Princess Alexandra Hospital between 2012 and 2018. A total of 1159 patients were included in the study, with even distribution between scheduled (N = 557) and emergency lists (N = 602). Patient data was collected directly from the hospital's Hip Fracture Database. Patient information was subsequently analysed for significance between scheduled and emergency lists by the MSH Biostatistics Clinic.

Results: Analysis revealed no significant difference between scheduled and emergency lists regarding mortality, Parker Mobility Score, readmission rates, re-fracture rates, post-surgery delirium, blood loss, or surgical delay. Patients on the emergency list were found to have a longer surgical duration by 15 minutes on average ($p < 0.001$).

Discussion: This study found no significant differences in negative outcomes associated with emergency or scheduled lists. This data may provide a basis for implementation of scheduled and emergency NOF repair lists in other hospitals. Future research should evaluate if implementation of a scheduled list enhances theatre efficiency, further supporting their implementation.

Parsing Metabolic Heterogeneity in Mood Disorders: A Hypothesis-Driven Cluster Analysis of Glucose and Insulin Abnormalities

Danielle S Cha

Introduction: Mood disorders (MD) have a bidirectional association with metabolic diseases. Accumulating cross-sectional and prospective evidence has indicated that MDs are associated with obesity, type 2 diabetes mellitus (T2DM) and metabolic syndrome. Metabolically-based distinctions for disturbances in glucose and insulin may provide meaningful insights both clinically and mechanistically.

Methods: Data were derived from 352 subjects of previously completed clinical studies with a MD (BD: n=179, MDD: n=173) and 218 healthy controls. We conducted a factor analysis to replicate a priori dissociable factors informed by glucose and insulin levels and indices of insulin resistance and beta-cell function: elevated insulin and insulin resistance (IR), increased fasting glucose, and reduced insulin secretion ("glucotoxicity"). Cluster analyses were conducted, separately in men and women, to evaluate the clinical relevance of subtyping individuals with MDs using insulin-IR and glucotoxicity factor scores.

Results: Factors insulin-IR and glucotoxicity explained 92.64% and 92.09% of the variance in men and women, respectively. Three clusters were replicated in men and women separately: metabolically healthy (MH), high glucotoxicity (GT), and insulin-resistant (IR). After adjusting for age, sex, study cohort, MD diagnosis, and antipsychotic use, body mass index (BMI) and mean arterial pressure were higher in IR- vs. GT- or MH-clustered individuals; GT-clustered individuals had more metabolic syndrome components and higher C-reactive protein. Glucotoxic-clustered subjects reported greater impairments in cognitive and global function.

Discussion: We identified stable, sex-convergent, subgroups of individuals that significantly diverged on measures of cognitive dysfunction, self-reported anhedonia, functional disability, BMI, and blood pressure.

Brexiprazole as an augmentation agent to antidepressants in treatment resistant major depressive disorder

Danielle S Cha, Xinyi Luo, Juhie Ahmed, Larissa Becirovic, Rebekah H Cha, Roger S McIntyre

Introduction: Approximately 50% of adults with major depressive disorder (MDD) who receive a first-line antidepressant treatment, at an appropriate dose, do not achieve an adequate response. Brexpiprazole is a novel serotonin-dopamine activity modulator in the second generation/atypical antipsychotic class. In general, second generation/atypical antipsychotics are widely used in the treatment of treatment resistant depression with brexpiprazole providing preliminary evidence for broad-spectrum efficacy across multiple domains affected by MDD. The foregoing observations are a basis for further elucidating its mechanistic effects to inform novel drug discovery for this highly heterogeneous clinical population.

Methods: A review of computerized databases (PubMed, MEDLINE, Google Scholar, Scopus, PsycINFO) from 2006 to February 2019 was performed. The search was augmented with a manual review of relevant article reference lists. Articles selected for review were based on topic relevance via author consensus.

Results: Brexpiprazole has been demonstrated to be effective and safe to use as an augmentation agent to antidepressant treatment among individuals with treatment resistant MDD due to its considerably improved tolerability profile when compared to other second generation/atypical antipsychotics.

Discussion: It is important to exercise clinical judgement when selecting disparate augmentation agents on a case-by-case basis with consideration for the increasingly common multimorbid presentation (e.g., type II diabetes mellitus, overweight/obesity, metabolic syndrome) in patients with MDD, particularly among those identified as being treatment resistant with accumulating evidence demonstrating that this subpopulation tend to present with greater social, economic, and personal burdens.

The effects of lesion-associated staphylococcus aureus on human keratinocytes cytokine induction and squamous cell carcinoma progression

Sarah Chisholm

Introduction: Squamous cell carcinoma (SCC) is the second most common form of skin cancer following basal cell carcinoma with more than 1 million cases diagnosed in the U.S. each year. Premalignant actinic keratosis (AK) and SCC skin lesions are associated with a higher abundance of the gram-positive bacterium *Staphylococcus aureus*, however, the direct impact of increased bacterial colonization on the lesion microenvironment and progression is unknown. We hypothesize that *S. aureus* secreted products can induce chronic cutaneous inflammation and thus contribute to disease progression from AK to SCC.

Methods: *S. aureus* was isolated from AK and SCC lesions in 8 different patients. The isolated strains were cultured into its stationary phase and sterile supernatant collected. Next, the effects of lesion associated *S. aureus* secretions on human keratinocytes was assessed in vitro at the transcription level. Looking specifically at cytokine induction and markers specific to SCC progression.

Results: There were increases in gene expression of certain genes that have been identified in transition from action keratinocyte to squamous cell carcinoma. IL-6 and IL-8 increased in SCC and AK sample. The SCC samples that had increased IL-6 expression also had an increased MMP1 expression showing potential tumor invasive properties.

Discussion: Data indicates that certain isolates can induce inflammatory markers linked to SCC progression; however, due to small number of patients and isolates we would like to expand by using large scale RNAseq. Using this method we can also investigate cytokines involved in other cancer pathways.

The Contribution of Time to First Analgesic Medication In Emergency Department Length of Stay

Jacqui Chiu, James A Hughes, Nathan J Brown, Brandon Allwood, Kevin Chu

Introduction: Pain is the most common presenting symptom in emergency department (ED) patients. Many factors such as workload and age are known to affect the time taken to deliver analgesic medications (TTA), which can impact on patient's ED length of stay (ED LOS).

Methods: A retrospective cohort study was conducted in a tertiary-referral, inner-city ED. 2,000 adult patients who presented with pain and received analgesic medication(s), between August and October 2018, were randomly selected. The relationship between ED LOS and TTA was described using bivariable and multivariable linear regression models with the latter adjusting for sex, triage category, ED location where patient was first seen by a clinician, departure destination, and workload metrics (average daily time to be seen, and daily access block).

Results: Of the 2,000 patients, 727 (36.4%) had pain as a symptom on arrival, 423 (21.2%) had analgesic medication administered. Median (IQR) age was 35 (25-52) years and 53.3% were female. Median (IQR) TTA was 62 (36–105) minutes and median (IQR) ED LOS was 218 (160–318) minutes. TTA was found to be an independent predictor of ED LOS, contributing to 7.0% of the variance in ED LOS in the multivariable model.

Discussion: Reducing ED LOS through faster pain care, benefits the patient through faster pain relief and benefits the department by reducing the total amount of care delivered in the ED. Reducing total care delivery frees up resources, thus improving care for other ED patients. Therefore, interventions that reduce TTA in the ED are important.

Systematic review: Sarcopenia as a prognostic factor in gynecological malignancy

Angela (Jaewon) Choi

Introduction: There is a growing evidence that imaging and quantifying cancer patients' muscle mass can be applied in clinical practice to prognosticate and guide therapy options. This review will interrogate the concept of sarcopenia as a prognostic tool for oncological outcomes, treatment efficacy and treatment related complications in the context of gynecological cancers.

Methods

Search Strategy: The following databases will be searched: PubMed, Embase, and CINAHL.

Selection of Studies: Two authors will independently review abstracts to identify all studies that potentially meet the inclusion criteria, and assess each full text article to determine whether it met all of the selection criteria.

Critical appraisal of studies: Cochrane Risk of Bias tool will assess randomized trials. Newcastle-Ottawa Scale (NOS) will be adapted and used for the cohort studies.

Statistical Analysis: To determine the effects of sarcopenia on progression free survival, overall survival rate, adverse events, and tolerability of treatment, we will calculate the pooled hazard ratios and their corresponding 95% confidence intervals.

Results: We reviewed 336 citations, and 20 studies with a total sample size of 5,250 patients were selected for analysis. The main findings are the pooled HRs (95% CIs) for the four outcomes of interest. They are 1.42 (1.26-1.60) for overall survival, 1.56 (1.18-2.04) for progression-free survival, 1.45 (0.83-2.54) for complications, and 2.15 (1.46-3.17) for non-home discharge. They are statistically significant, except for complications.

Discussion: This review associates low skeletal muscle index and low skeletal muscle radiation attenuation with significant morbidity and mortality in women with gynecological malignancy, and highlights the potential of sarcopenia as a prognostic indicator.

Arm size and conicity in adults presenting for elective surgery – implications for blood pressure

Christopher Chow

Introduction: Accurate perioperative non-invasive blood pressure (NIBP) measurement is essential. Arm conicity (identified by the arm slant angle) has been associated with NIBP measurement error. Predicting arm conicity may guide pre-operative decisions.

Methods: Standard measurements were taken from both upper limbs. Slant angle was calculated: $SA = \arccosine[(C1-C2)/(2\pi L)] * (360/2\pi)$ (C1,C2=upper and lower circumference, L=arm length). Right mid-arm circumference (MAC) was compared to recommended cuff sizes. Independent t-tests were used to compare measurements. Linear regression was used to determine the best predictor of right slant angle. Correlation coefficients and R2 values evaluated. Statistical significance was set at $\alpha < 0.05$.

Results: 454 patients were recruited. Mean (SD) age was 59.9 (16.6) years, 247 (54.4%) were female and 409 (92.1%) were Caucasian. The median (IQR, range) BMI was 28.1kg/m² (24.2–33.4, 16.1–60.9). The most common surgical specialties were plastic 130 (28.6%) and general surgery 71 (15.6%). Diagnosed hypertension was present in 197 (43.4%) with 78 (48.1%) taking two or more antihypertensive medications. The mean (SD, range) right MAC was 31.0 cm (5.0, 20.8 – 52.5) and slant angle was 86.9° (1.3, 80.3–90.5). There was no statistically significant difference between right MAC and right slant angle between males and females. BMI, weight and right MAC all had low to moderate correlation with right arm slant angle (r=0.49, 0.39, 0.38, p<0.001 for each). Six (1.3%) had a slant angle < 83°.

Discussion: In pre-operative patients, BMI or right MAC could be used to help predict right arm conicity, explaining 24% and 23% of the variation in slant angle observed. The mid-arm circumference was outside the range for one patient. Based on arm conicity, 6 may be expected to have erroneous NIBP measurements.

Radiographic Assessment of Sarcopenia in the Acute Care Setting: A Systematic Review

Caleb Chu, Daniel Zumsteg, Mark Midwinter

Background: Compared with similarly injured patients of a younger age, elderly patients have worse outcomes from acute illness. One factor adversely affecting outcomes is frailty, which has been assessed in healthy elderly populations through established clinical criteria. However, in the acute care setting, no such criteria has been established. Sarcopenia has been opportunistically assessed via radiographic means as a surrogate marker for frailty, but there is as of yet no gold standard. The purpose of this review is to summarize the radiological methods used to diagnose sarcopenia in the acute care setting, and suggest ways in which these methods may lead to a consensus definition of sarcopenia and its relationship to patient outcomes.

Methods: A systematic survey of medical databases was conducted, with 902 unique publications identified. After screening and application of inclusion and exclusion criteria, data regarding study population, outcome, imaging modality, and criteria for assessment of sarcopenia were extracted from 20 studies. Quality was assessed with the Newcastle-Ottawa Scale.

Results: Computerized tomography was the imaging modality for 18 of the studies, with total psoas muscle cross-sectional area at the level of L3 and L4 being the dominant method for assessing sarcopenia. Adjustment for body morphology most commonly utilized patient height or L4 vertebral body area.

Conclusions: The majority of papers found radiographically-assessed sarcopenia to be significantly correlated to outcomes such as mortality, length of hospital stay, morbidity, and in-hospital complications. Establishing a consistent definition would strengthen its applicability and generalizability to admission and discharge planning.

The effect of day of admission and surgeon experience on hip fracture outcomes tracked one year post-operatively

Ian Doig, Nicholas Newcomb

Queensland Brain Institute Poster Award

Objective: Weekend hospital admission has been associated with poorer mortality rates when compared to weekday admission (1, 2). However, recent studies examining weekend admission for hip fractures have resulted in contradictory conclusions regarding associations with negative outcomes or longer delays to surgery (3, 4). This audit aims to illuminate the relationship between the “weekend effect” and adverse events for hip fracture patients.

Methods: The effects of day-of-admission and surgeon experience on fragility hip fracture outcomes were retrospectively assessed from 2012-2018 using the PAH hip fracture database. 1164 patients were split into two groups based on admission day: weekday (Monday-Friday) or weekend (Saturday-Sunday) and then subdivided based on surgeon experience (473 consultant vs 690 non-consultant). Outcomes included: mobility, surgical delay, surgical duration, readmission, and one year mortality. Patient groups were controlled for age, sex, previous fractures, fracture type, fixation type, and ASA score.

Results: No significant relationship was found between day-of-admission and surgeon experience ($p=0.7$). However, an increase in mortality at the 12 months was found. Weekend admissions experienced a 32.6% mortality rate compared to a 22.5% mortality rate for weekday admissions ($p=0.02$). Consultants also performed surgeries 0.3 hours faster than trainees ($p<0.01$), had fewer delays to surgery >48 hours ($p=0.02$), and trended toward a lower 12 month mortality rate (22% vs. 28%, $p=0.06$).

Conclusion: The increased mortality rate of this study was observed without significant differences in delay to surgery. There is a clear risk to patient mortality based on our data and requires further research to establish potential causes.

Postnatal growth and neurodevelopmental outcomes in preterm infants

Alisha D'Souza

Introduction: Infants born preterm (<37 weeks' gestation), especially those extremely preterm (<28 weeks' gestation), are at greater risk of growth restriction and neurodevelopmental impairment. Further, inadequate postnatal growth is frequently linked with poor neurodevelopmental outcomes. This study assessed growth velocities of preterm infants in hospital against neurodevelopmental outcomes at 2 years' corrected age.

Methods: This is a retrospective study of 421 infants born at <1500g or <29 weeks' gestation, born from January 2007-June 2016 and admitted to the NICU of the Royal Brisbane and Women's Hospital. Participants were followed up for developmental assessment at 2 years. Anthropometric data on weight and head circumference was collected at birth and at discharge, and compared against the Fenton 2013 growth standard to derive z-scores and change in z-score. Patel's exponential model was used to calculate weight gain velocity, while growth in head circumference was predicted by a linear model. Neurodevelopmental outcomes were assessed using the Bayley Scales of Infant and Toddler Development-III.

Results: We used univariate and multivariate regression analyses to identify the individual correlates impacting on outcome and model for confounding factors, including gestational age at birth and birth weight z-scores. We found no statistically significant relationship between growth velocities or changes in z-scores with Bayley III scores across the five domains.

Discussion: We found no association between growth and neurodevelopmental outcome. Nevertheless, we acknowledge that our analysis is preliminary. We intend to address further confounding factors, including in-hospital and birth-related morbidities, as well as evaluate growth against additional measures of neurodevelopment.

Preclinical development of methionyl-tRNA synthetase inhibitors as novel antibiotics against gram-positive bacteria

Omeed Faghih, John Gillespie, Ranae Ranade, Fred Buckner, Erkang Fan, Zhongsheng Zhang
Ochsner Clinical School Prize for Best Phase 1 Ochsner Research

Introduction: Antibiotics with new mechanisms of action are needed to treat emergent drug resistant bacterial infections. This research focuses on lead optimization work on novel compounds which inhibit the essential protein synthesis enzyme methionyl-tRNA synthetase (MetRS) found in gram-positive bacteria.

Methods: MetRS inhibitors were synthesized by Dr. Fan's lab aided by structure-based drug design. Strains of bacteria were obtained from ATCC and tested for Minimum Inhibitory Concentrations (MIC) following CLSI procedures. Additional experiments include measuring the Minimum Bactericidal Concentration, MIC shift in serum supplemented media, resistance frequency determination, cytotoxicity, pharmacokinetic studies, and neutropenic mouse thigh infection model.

Results: New selective inhibitors were shown to be highly active against Gram-positive bacteria with MICs of $\leq 0.125\mu\text{g/mL}$ against Staphylococcus and Enterococcus strains but have negligible activity against Gram-negative bacteria, consistent with Gram-negative bacterial species containing a different type of MetRS enzyme. Variable susceptibility was noted for Streptococcus strains with MICs ranging from 1 to $>16\mu\text{g/mL}$. MetRS inhibitors show low cytotoxicity in vitro and are well tolerated in mice when dosed for 10 days. The compounds 1717 and 2144 tested in a Staphylococcus aureus murine thigh infection model demonstrated efficacy through 3- to 4- log decreases in bacterial load compared to vehicle-treated mice, which is comparable to the results of comparator drugs vancomycin and linezolid.

Discussion: The research describes lead optimization work to identify MetRS inhibitors with improved oral bioavailability, potency, and safety margin to represent a class of compounds acting by a novel mechanism with potential for clinical development.

Patient Outcomes in Neck of Femur Fractures between Consultants and Trainees

Nordan Flaaten, Nicholas Newcomb

Introduction: Neck of femur fractures are a common and potentially life altering injury to many Australians each year. This project aims to determine if there is a difference in operation time and post-operative outcomes of neck of femur fractures between consultants and trainee surgeons. We hypothesised that operation times will be longer and outcomes will be less favourable for those whose surgery was completed by a trainee surgeon.

Methods: Using the Neck of Femur Fracture Database from a tertiary medical centre in Australia, 833 patient's data were collected from 2014 to July 2018. Surgical time, blood loss and change in Parker Mobility were collected from the database. Types of surgeries completed were, Cannulated Screws, Dynamic Hip Screw/Condylar Hip Screw, Intermedullary Nail, Cemented and Uncemented Hemiarthroplasty, and Cemented and Uncemented Full Hip Arthroplasty. Significance was determined using a p-score of 0.05 ($p < 0.05$).

Results: All post-operative outcomes were determined to have no significant differences between consultants and trainees. Further, Surgical times was found to show no significant difference between consultant and trainee in all types of surgery.

Discussion: Complications are common for surgeries of neck of femur fractures. This paper shows that at one hospital in Australia has no difference in certain outcomes when comparing their consultants and trainee orthopaedic surgeons. Further there is no significant difference in the time it takes to complete these surgeries which means the hospital does not lose OR time by having trainee surgeons operating.

Defining “Successful Surgery” in Colonic Resection Patients Using Patient-Reported Outcome Measurements

Cora Ianiro, Dr. Andrew RL Stevenson, Dr. David Clark, Dr. Craig Harris

Introduction: Patient reported outcome measures (PROMs) were developed from growing consensus that patient contribution is essential to developing meaningful measures in healthcare. In colorectal surgery, there are currently no published series which identifies the patient experience. This study was developed to identify if the surgeon’s definition of a “successful surgery” is comparable to the patient’s.

Methods: Participants were recruited from 3 high-volume colorectal surgeon’s practices. Participants were eligible if they were preop/postop for a robotic/laparoscopic bowel resection due to cancer or another pathology. The questionnaire uses open-ended, ranking, and the 10-point Likert Scale.

Results: The questionnaire was administered to 25 bowel resection patients aged 29-87. The most commonly reported definition of “successful surgery” was “removal of cancer,” where 14 participants (56%) stated this as a major determinant. The most important outcome to avoid was “R1/R2 margin” reported by all participants as 10/10 on the Likert Scale. The least important outcome to avoid was the “NGT insertion” with a mean of 6.93/10. Fifteen participants (60%) reported Pfannestiel incision as their site of preference.

Discussion: As this sample size is only half of this study’s intended 40, the analysis of data is limited. The questionnaire was well received, and most needed no assistance. The pattern of high scores for all 10 outcomes suggests the outcomes important to clinicians are similarly important to patients. Although more patient data must be collected, we can conclude the current trend is the surgeon’s and patient’s definition of a “successful surgery” is mutually aligned.

Do geriatric hip fractures with operative delay display worst post-operative outcomes when stratified based on ASA scores? A retrospective study.

Tonchanok Intaprasert, Nicholas Newcomb, Andrew Witherow, Genni Lynch, Cameron Cooke

Introduction: Geriatric hip fractures pose major health concerns worldwide with only 50% of patients returning to previous level of mobility and one-year mortality rate up to 30%¹⁻³. Additionally, elderly patients often have several pre-operative conditions, quantified into The American Society of Anesthesiologists (ASA) score. These conditions can delay fixation surgery and result in worse outcomes^{2, 4}. Patients with higher ASA scores typically experience longer surgical delay to stabilize any concomitant condition and prepare for surgery^{5, 6}. However, the American Academy of Orthopedic Surgeons suggests hip fixation surgeries should be performed within 48 hours of injury^{4, 7}. Our research investigates if the benefits of delaying surgery for patients with higher ASA score outweighs the risks of a timelier procedure without pre-operative treatment.

Methods: A retrospective review of patients over 50 years-old presenting with a neck of femur fracture to the Princess Alexandra Hospital between July 2012-July 2018 was conducted. 1164 patients were categorized based on ASA score and subcategorized by time intervention (<48 hours or >48 hours). Differences in post-operative mortality and morbidity were then analyzed between each group up to one-year postoperatively.

Preliminary Results & Discussion: Our preliminary results are consistent with prior studies indicating that worst pre-operative condition (higher ASA score) correlates with worst post-operative outcome^{8, 9}. However, we also found mortality doubles at 12 months postoperatively in ASA group III-V who received surgical delay versus no delay. This may suggest that the practice of delaying surgery to stabilize the unwell patient may need to be further investigated.

Rescheduling decreases codeine-related presentations to a clinical toxicology unit

Andrew Jiang, Keith Harris, Robert Knoeckel, Katherine Z Isoardi

Introduction: On 1st February 2018, due to concerns over misuse and dependence, codeine was rescheduled to a Schedule 4 (prescription only) medication. Previously, only products containing <30mg codeine were available over-the-counter. We examined the impact of rescheduling on codeine-related presentations to a Clinical Toxicology Unit.

Methods: A retrospective review of codeine-related presentations to the Princess Alexandra Hospital Clinical Toxicology Unit in Brisbane before and after codeine rescheduling on the 1st February 2018. Our relational database was searched for ingestions containing codeine during the 24-month period from 1st February 2017 to 31st January 2019. Patient demographics, ingestion details, clinical effects, treatments and complications were extracted from the medical record.

Results: There were 240 codeine-related presentations over the 2-year period. 163 presentations occurred in the year before rescheduling, decreasing to 77 presentations subsequently ($p < 0.0001$). The median dose of ingested codeine was similar at 200mg (IQR 130-390mg, range 6-1800mg) pre-rescheduling compared to 270mg (IQR 120-600mg, range 24-2240mg) post-rescheduling. The absolute number of presentations with preparations containing 30mg of codeine was similar (57 pre v 62 post-rescheduling) however, the proportions increased significantly from 35% to 81% ($p < 0.0001$). Intensive care (1 pre vs 5 post, $p = 0.03$) and psychiatric admissions (12[7%] pre vs 20[26%] post-rescheduling, $p = 0.0002$) were increased post-rescheduling.

Discussion: There was a reduction in overall codeine-related presentations following rescheduling due to fewer over-the-counter preparation poisonings. However, there was more acuity in the post-rescheduling cohort with a significant increase in ICU and psychiatric admissions which may reflect increased intent coupled with higher dose codeine formulations.

Using the ieMR to compare presenting complaint, ED diagnosis and in patient diagnosis

Stanimira Kartolova

Introduction: ED patients are triaged with a presenting complaint, given an ED diagnosis, and as an inpatient, are given a discharge diagnosis. Concordance between presenting complaints and ED diagnoses and between ED and discharge diagnoses have been used in many studies for audit and quality control. These studies have used paper records either entirely or in part, and studies using a fully integrated electronic medical records system (where all aspects of ED and inpatient care are recorded in a single system) are absent. An integrated Electronic Medical Record (ieMR) system was first introduced in Queensland at the PAH in November 2015.

Aim: To determine whether an ieMR is a suitable repository of data to enable a comparison of diagnoses during patients' journeys throughout hospital.

Objectives: To compare differences between presenting complaints and ED diagnoses and between ED and discharge diagnoses using an ieMR.

Methods: Exploratory descriptive study of 1,000 randomly selected patients who presented to the PAH ED from November 2017 to November 2018, and were subsequently admitted to hospital. An ieMR (FirstNet) was used to collect all patient data.

Results: The concordance rate between presenting complaint and ED diagnosis was 98.2%; and between ED diagnosis and discharge diagnosis was 94.5%. Discordance was associated with increased average hospital and ED length of stay, male sex, and older patients.

Discussion: An ieMR is an effective tool in analyzing patient's' diagnostic data after emergency admissions. Diagnostic concordance is much higher than previously reported in literature.

Incidence of adherence to osteoporosis medication following fragility hip fractures and associated outcomes

Emily Kelsoe, Nicholas Newcomb

Introduction: Adherence to osteoporosis therapy is crucial for preventing fractures. Despite evidence of drug efficacy, medication adherence remains poor. This study investigates the effect of a six-monthly denosumab treatment protocol on adherence to osteoporosis medication, compared with standard therapy.

Methods: A retrospective review of 525 patients presenting with a neck of femur fracture to Princess Alexandra Hospital was conducted over a five-year period, July 2014 – July 2018. Patients were prescribed a post-operative osteoporosis treatment protocol of a six-monthly denosumab subcutaneous injection (n=459) or alendronate oral dosage weekly (n=66). Adherence and outcomes were collected at 30 days, 6 months, and 12 months. Data and statistical analysis were conducted at Queensland Cyber Infrastructure Foundation.

Results: Preliminary results revealed a 79.38% adherence to denosumab regimen at 6 months and 79.12% at 12 months. A 78.57% adherence to bisphosphonates was seen at 6 months and 59.01% at 12 months. A mean decline in Parker Mobility score of -1.625 and -1.185 was experienced in the bisphosphonate and denosumab treatment groups, respectively. Overall mortality was 10.61% and 14.16% in the bisphosphonate and denosumab groups, respectively. The study is in the process of future statistical analysis.

Discussion: The denosumab treatment protocol may be useful in modifying or influencing future fragility fracture protocols. Overall maintenance of adherence to medication was seen in patients on denosumab, with an average 12-month adherence of 79.25% compared with 68.79% in the standard therapy group. Thus, the denosumab protocol may serve to increase adherence for the prevention of future fragility fractures.

A mechanism for ketamine in treatment-resistant depression?

Yun-Hsuan (Stellina) Lee

Introduction: Up to a third of patients with a clinical diagnosis of depression are resistant to currently available antidepressants. Ketamine, an NMDA receptor antagonist, has rapid antidepressant efficacy in a subset of these patients with treatment-resistant depression (TRD), the mechanism of which remains unclear. We aim to demonstrate the effects of ketamine on neurotrophic signalling, microglial activation, and dendritic spine growth in TRD.

Methods: We used an established rodent model of TRD in which chronic adrenocorticotrophic hormones (ACTH) induces hypothalamic-pituitary (HPA) axis dysfunction. Wistar rats (N=32) were randomly assigned to either ACTH (100µg/day) or saline (0.9%) for 15 days (i.p.). On day 16, half of each group received ketamine (10mg/kg) and were euthanised 2 hours later. A subset of animals underwent behavioural tests. Western blot, golgi staining and immunohistochemistry were performed to investigate the differential expression of neurotrophic proteins, microglia, astrocytes, and dendritic spines in specific brain regions.

Results: Preliminary results show that ketamine increased neuronal and dendritic growth in the infralimbic cortex (ILPFC) while decreasing activity in the prelimbic cortex (PLPFC) in ACTH-treated but not control animals. ILPFC and PLPFC are known to have contrasting functions in stress response and behavioural flexibility. Upregulation of ILPFC coupled with downregulation of PLPFC suggest that ketamine increased active coping in ACTH-treated animals.

Discussion: Ketamine's antidepressant effects appear to be region specific and may alter overall activity in brain circuitry critical for mood and behavioural outcomes. This work may inform pharmaceutical development and individualised treatment approaches for refractory depression.

A Multicentre Retrospective Investigation into the Effect of Extracorporeal Membrane Oxygenation on Leukocyte Fate in Adults - An Interim Analysis

Teresa Liew

Introduction: Extracorporeal membrane oxygenation (ECMO) has been increasingly used to support critically ill patients with severe cardiorespiratory failure. Despite greatly improving clinical outcomes, it is still associated with significant complications and mortality. Particularly, refractory leukocytopenia during and post-ECMO is associated with poorer prognoses, but studies reporting this are few and based on small, diagnosis-specific cohorts. To investigate this correlation, this study aims to develop a large-scale, multicentre leukocyte profile for veno-arterial (V-A) and veno-venous (V-V) adult ECMO patients.

Methods: Patients who underwent V-A and V-V ECMO from 3 Australian and 2 European intensive care units (ICU) from 2016 to 2017 have been included in this retrospective study. The temporal trend of leukocyte profiles will be analysed with multivariate analysis. Then, its correlation with patient outcomes including mortality, length of ICU stay, and common complications such as bleeding, infection and multi-organ dysfunction, will be assessed using multivariable regression. Any known causes of leukocytopenia will be included as well.

Results: Interim analysis on 131 patients had the following median demographics: male (88%), 59 (49-69) year-old, BMI 27.5 (24-31) kg/m², SOFA 11 (8-14) and SAPSII 36 (30-42) at admission. Most patients were supported with V-A ECMO (64.1%) via peripheral cannulation (87.1%). Mortality was reported in 58% of the patient population. Leukocyte profiles are being collated for further analysis.

Discussion: Through providing further insight into the correlation between differential leukocyte counts and ECMO-related patient outcomes, the study aims to develop a preliminary prognostic tool that could refine ECMO indications and improve outcomes in the future.

Defining patterns of inflammatory marker expression associated with suspicious skin rashes

Timothy J Liu

Introduction: Each year, many patients are admitted to Emergency and other hospital departments presenting with moderate-to-severe inflammatory skin rashes. Rashes can be caused by various inflammatory processes, including medication-induced hypersensitivity, allergic reaction and infections by bacteria, viruses and fungi. The standard workup for determining the causes of rash involves correlation of clinical and histopathological observations. However, many rashes are both clinically and histopathologically indistinguishable from one another, thus creating a diagnostic challenge for the physician. This project attempts to address this unmet need in clinical practice by investigating the potential of an immunological approach to rash diagnosis. Since studies have shown observable differences in cytokine and chemokine levels between different skin conditions, it is plausible that different rash types have a different inflammatory 'signature'. This project aims to investigate whether these inflammatory signatures can be defined for each rash type. If successful, this would be the first in a series of projects which aim to develop an immunological test for rapid and accurate diagnosis of rashes.

Methods: 140 patients with inflammatory skin diseases will be recruited from the Princess Alexandra Dermatology Department. Each patient receives a 2 mm punch biopsy of both 'lesional' (rash) and 'perilesional' (normal) skin. Skin samples are weighed, homogenised and frozen until they are immunoassayed using Biologend LEGENDplex™. Eventually, the data will be modelled and aligned with patient diagnosis (as determined by medical records) in order to analyse whether immune signatures correlate with rash type.

Results: 72 patients have been recruited to date.

Effect of Melatonin on Sleep Onset Latency in Children with ADHD: An Analysis of Parental Expectations of Perceived Benefit in an N-of-1 trial

Marge Malone, Garrett Robson, Jane Nikles, Hugh Senior, Geoffrey Mitchell, Helen Heussler, James McGree

Introduction: Attention Deficit Hyperactivity Disorder (ADHD) is a common behavioural condition that affects thousands of children and families in Australia. Children with ADHD often have difficulty sleeping and settling down in the evening. This can be complicated by the medications used to treat ADHD, such as stimulants like Ritalin and Dexamphetamine. Melatonin has been proven effective in treating insomnia symptoms and decreasing Sleep Onset Latency (SOL) in adults.

Methodology: Upon recruitment, all participants/parents received information and a fifteen minute counseling session to review optimal sleep hygiene (SH). The family was then asked to trial the sleep hygiene strategies for fourteen days, with a telephone interview via research assistant at day seven. If the child did not respond adequately to SH, they were enrolled in the intervention portion of the trial. These participants then commenced an N-of-1 trial comprising six one week treatment periods of randomly allocated melatonin and placebo. Prior to the start of the trial the parents of the recruited participants were asked about their child's average SOL, parental target SOL, and parental target reduction in SOL.

Results: The study recruited 83 children between the ages of six and seventeen with a known diagnosis of ADHD, being treated with stimulant medications, and experiencing sleep difficulties, particularly getting to sleep. At baseline, the average SOL was 82.3 minutes (range 34-240 minutes, SD 38.8), the average parental target time to sleep was 39.8 minutes (range 10-120 mins, SD 20.6), and the average parental target reduction in SOL was 42.8 minutes (range 10-120 minutes, SD 26.4). 16 participants received benefit from sleep hygiene and did not continue. 3 withdrew during the sleep hygiene phase, leaving 64 who commenced the trial phase, of whom 2 withdrew, leaving 62 whom completed the trial.

Conclusion: By the end of the six-week trial phase, 66.0% of the 62 participants who completed the trial phase had met parental targets for reduction of SOL on melatonin compared to 39.8% of participants on placebo. This demonstrates a clinically important effect in favour of melatonin in regards to meeting parental expectations for reducing SOL in children with ADHD on stimulants.

Using N-of-1 Tests to Identify Responders to Melatonin for Sleep Disturbance in Parkinson's Disease

Marge Malone, Jane Nikles, John O'Sullivan, Geoff Mitchell, Alex Ritchie, Simon Smith, Hugh Senior, James McGree, Nadeeka Dissanayaka

Objective: The primary aim of this study is to determine the effectiveness of melatonin in reducing insomnia in people with Parkinson's Disease, based on change in PDSS-2 (Parkinson's Disease Sleep Scores).

Background: Parkinson's Disease (PD) is Australia's second most common neurological disorder. Sleep disorders are a very prevalent problem in people with PD, with 37% reporting that they have insomnia. Studies in other populations indicate that melatonin can increase sleep efficiency, shorten sleep onset latency and improve insomnia.

Methods: This trial is an N-of-1 double-blind design, where patients receive both the placebo and the active drug, acting as their own controls. There is an initial run-in phase in which patients take 3 mg of melatonin. At the end of this period, the study doctor assesses the patient's response to and tolerance of the medication and prescribes either 3 or 6 mg as the trial dosage. The 12 week trial period consists of three pairs of alternating 2 week treatment/placebo periods, with treatments randomized separately within each period (eg ABBAAB). At the end of the trial, the patient and doctor receive a report of the individual results to review.

Results: The trial is still ongoing. In the past year (from July 2018 – July 2019), there have been 78 enquiries about the trial – mostly self-referrals. Of these, 47 have been screened and 19 have been eligible. All 19 enrolled in the study. Thus far, 7 have completed the trial, 3 are currently participating in the trial phase, and 3 are in the run-in phase. 6 participants have withdrawn, one from the trial phase and the rest during or immediately following the run-in. Two participants experienced a serious, unrelated adverse event (hospitalisation for unrelated reasons) but remained in the study. Subjectively, several patients have stated that they can tell the difference between drug and placebo and intend to remain on melatonin after the end of the trial. Participants report looking forward to discussing results with their physicians.

Discussion: Melatonin is a promising treatment for insomnia in Parkinson's Disease. Additionally, N-of-1 trials are a means of achieving both higher statistical power and individual feedback for participants.

A pilot Aquatic Exercise Program to improve the health and well-being of people with dementia and their family carers

Christine Neville, Elizabeth Beattie, Elaine Fielding, Toby Pavey, Rhonda Dawson, Jane Nikles, Emily Neville, Aleksandra Lindgren, Shamima Banu Mohamed Ansari

Introduction: Dementia is the leading cause of disability among older Australians. Majority of older people with dementia in residential aged care facilities experience behavioural and psychological symptoms at some time during the course of this syndrome. Previous research suggested health improvements associated with aquatic exercise in people with dementia. This pilot study aimed to determine effectiveness of an aquatic exercise program, Watermemories Swimming Club, on behavioural, psychological, and physical wellbeing of people with dementia and their family carers.

Methods: Participants with dementia, with at least one behavioural and psychological symptom, participated in the program for 12 weeks. Assessments were done at baseline using the Psychological Well-Being in Cognitively Impaired Persons and Revised Memory and Behaviour Problems Checklist; and their family carer, with the General Health Questionnaire and Caregiver Hassles Scale. The dyad was assessed again after completion of the program and scores were compared to baseline.

Results: Six participants with dementia and a minimum level of exercise tolerability, and their family carer, were enrolled and five dyads completed the trial. A trend towards improvement in revised memory and behaviour reaction was observed, but not in psychological well-being. Family carers did not show positive trends for general health or carer burden.

Discussion: This pilot study revealed that it is feasible to offer aquatic exercises as a non-pharmacological treatment option for individuals with dementia. Future studies should consider increasing the number of aquatic sessions over longer length of time to examine sustenance of the benefit of the treatment in this study.

The effectiveness of different methods of debriefing in reducing simulation-induced anxiety (SIA) within the Emergency Department (ED)

Mingshuang Ding , Odhran Keating, Julie C Humphries, Hansel Addae, Gillian Ray Barruel, Shamima Banu Mohamed Ansari

Introduction: ED staff must be prepared to manage many potential clinical situations which they may not have encountered in a significant amount of time. Simulation based education is an invaluable tool for refreshing knowledge and practicing the clinical skills required to manage important but uncommon clinical presentations. However, SIA impairs performance, disrupts learning and may indeed be harmful to the learner. Post scenario debriefs allow learners to interrogate their cognitive and emotional responses to a scenario, reflect on these with peer and educator feedback and to develop a new approach for trial in future scenarios. Hence, the aim is to review the available evidence on different methods of debriefing and their effectiveness in reducing SIA within the ED.

Methods: A systematic review was undertaken using the following databases (1990 - Jan 2018): CINAHL, Cochrane, Embase, Medline and PubMed.

Results: Twelve studies were included in the review, each describing different methods of debriefing. Findings show that debriefing had a positive impact on the educational outcomes and useful in reducing SIA.

Discussion: Debriefing is an imperative component of simulation training contributing to improved learning outcomes. Review of these studies imparts information on the different ways to design and execute debriefing that can effectively enhance educational outcomes and reduce anxiety. Further exploration is required on the lack of consistency and generalisability on the effectiveness of debriefing methods in reducing SIA.

The Management of Out of Hospital Cardiac Arrest (OHCA) Patients in the Princess Alexandra Hospital (PAH) Emergency Department (ED)

Emma Morton

Introduction: Survival rates for out-of-hospital cardiac arrests (OHCAs) have remained low for decades, and a detailed evaluation of current OHCA practice within the PAH ED had not previously been performed. The objective of this research was to assess presentation, management and outcomes of adult patients who presented via the Queensland Ambulance Service (QAS) following an OHCA.

Methods: A retrospective audit was performed, using the PAH FirstNet® database as the primary data source, and descriptive analyses were conducted.

Results: During 2017, 1031 OHCAs occurred in the Metro South Health area. 859 (83%) were declared deceased in the community, and 172 (17%) achieved pre-hospital return of spontaneous circulation (ROSC). 98 (10%) patients were transported to the PAH ED and met inclusion criteria for this study.

The median age was 63 years and 72 (74%) were male. A cardiac aetiology was most prevalent in 81 (83%) patients, with 38 (39%) presenting with evidence of ST elevation myocardial infarction (STEMI). 31 (82%) of STEMI patients received a coronary angiogram. 48 (49%) patients survived to hospital discharge, with 36 (75%) of survivors returning to their usual residence.

Discussion: Almost half of patients who present to the PAH ED with ROSC following an OHCA will survive to hospital discharge, a significant statistic previously unknown to the PAH ED. Three-quarters of survivors returned to their usual residence, indicating good neurological function. There is a need to improve data collection processes to benchmark current hospital management of OHCA patients against best-practice guidelines.

Scaling-up Mental Health Resources for Young People in Low-Income and Middle-Income Countries

Ahmed Noreddin

Introduction: Increasing awareness and improving mental health care resources has been a global emphasis recently due to the increasing burden of mental health disorders. Low-income and middle-income countries (LMIC's) experience a vast gap in access to mental health care. The population of young people in their developing stages are particularly vulnerable to the development of mental disorders.

Methods: In this critical analysis I conduct a literature review of various interventions in South Africa, India, and Chile that aimed at scaling up mental health resources for young people in LMIC's in order to understand common themes and challenges and develop recommendations. These recommendations are aimed at providing a template for LMIC's to scale up their mental health resources and find solutions for challenges they may encounter.

Results: The literature review provided seven successful interventions which focused on task shifting, integration of mental health into primary care, community youth health promotion, telehealth, and school-based mental health services.

Emergency Intraoperative Vascular Surgery Consultations at a Tertiary Center

James O'Leary

Introduction: Tertiary hospitals provide an array of specialized surgical care. The success of complicated surgical procedures not only relies on the expertise of the primary surgeon but often the supporting team. Vascular surgeons are frequently called upon to provide emergency assistance to surgical colleagues as a result of unexpected complications that arise during surgery.

Methods: This single center retrospective study identified 419 emergency intraoperative consults to vascular surgeons over a 15-year period (01-Jan-2002 – 31-Dec-2016). Operative data and patient demographics, comorbidities, and post-operative outcomes were collected.

Results: Patients were 51% male, with an average age of 57 years and BMI of 28.3kg/m². The most frequently consulting subspecialties included surgical oncology (n=139, 33.2%), cardiac surgery (n=82, 19.6%), and orthopedics (n=44, 10.5%). Index cases were classified as elective/non-urgent (n=324, 77.3%), urgent (n=27, 6.4%), and emergent (n=68, 16.2%), with a majority involving tumor resection (n=240, 57.3%). The primary reasons for vascular consultation were revascularization (n=213, 50.8%), control of bleeding (n=132, 31.5%), assistance with dissection/exposure (n=46, 11%), and embolic protection (n=24, 5.7%). The primary blood vessel and anatomic field of intervention were categorized. Most cases required preservation of blood flow (n=264, 63%) through a variety of methods including primary arterial repair (n=181, 43.2%), patch angioplasty (n=83, 19.8%), bypass (n=63, 15%), and thrombectomy (n=38, 9.1%). Postoperative mean hospital length of stay was 15 days with 30-day and 1-year mortality of 7.2% and 26.5% respectively.

Discussion: This study testifies to the essential services vascular surgeons provide to a wide variety of specialties over wide ranging anatomic regions employing a variety of skills and techniques.

Clinical Evaluation of Portable Intermittent Compression Therapy to Improve Residual Limb Tissue Perfusion in Below Knee Amputees

James O'Leary

Introduction: Patients with dysvascular amputations frequently experience a progression of the underlying disease that can result in additional, higher-level amputations. Rapid intermittent compression (IC) therapy increases blood flow to the extremities and increases limb salvage rates. However, current commercial IC systems lack portability. Therefore, we aim to develop a therapeutic intermittent compression socket (TICS) to provide a portable, self-contained, convenient, and non-invasive solution to enhance residual limb blood flow and prevent complications among amputees.

Methods: TICS prototypes were created and tested on instrumented limb models. Customizable TICS devices were constructed and tested in three males with below knee amputations. CASMED Foresight Elite near-infrared spectroscopy (NIRS) sensors were used to monitor changes in tissue perfusion via tissue oxygen saturation. Follow up testing was conducted in four males with below knee amputations using a standard IC device in a normal and pre-compressed simulation.

Results: Human subject testing with a portable IC device integrated into prosthetic sockets was well tolerated and resulted in increased levels of tissue oxygen saturation in 25 of 27 conditions. However, increases were less than expected. Therefore, follow up testing was conducted and confirmed pre-compression in the limb substantially decreased improvements in tissue perfusion.

Discussion: Portable TICS devices were created and successfully trialed, providing modest improvement in tissue perfusion. Compression of veins by the socket was hypothesized to reduce the effectiveness of the IC. Further improvements to reduce intra-socket pressure during therapy must be made to maximize the benefit for patients.

N-of-1 Trials of Melatonin for Insomnia in Stimulant-Treated Children with ADHD

Jared Ong, Catherine J. Nikles, Hugh Senior, Geoffrey Mitchell, Helen Heussler, James McGree

Introduction: Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurological disorder affecting 5% of children worldwide. Stimulant medications used to manage symptoms may exacerbate the severity of existing initial insomnia. The use of pharmacological agents to promote sleep is common, but evidence regarding safety and effectiveness for pediatric use is lacking. In the absence of approved pharmacotherapy, melatonin may be particularly effective in children with ADHD to improve sleep onset latency (SOL).

Methods: We conducted a multicenter, randomised, triple-blind, placebo-controlled series of N-of-1 trials with an embedded RCT. The trial was conducted remotely, with melatonin/placebo delivered to patients, and data were collected via online sleep diaries. Upon recruitment, participants implemented optimal sleep hygiene (SH) measures (2 weeks) then underwent three pairs of treatment/placebo periods (total of 6 weeks). We used weight-based dosing, giving 3 mg of sublingual melatonin to children < 40 kg and 6 mg to those ≥ 40 kg.

Results: From 199 potentially eligible patients, we enrolled 83 into the Sleep Hygiene phase. Three withdrew; sleep hygiene worked for 16. Of 64 patients, 62 completed the trial phase. There were 45/62 (72.6%) clinical responders (SOL <30 minutes) and 45/57 (78.9%) parent-defined responders (reduction of SOL by a parent-specified time). All patients tolerated melatonin well. One patient acquired a skin rash unrelated to the treatment.

Discussion: ADHD is an emerging health concern for children across developed nations. Melatonin reduced SOL for over 70% of participants. Aggregated N-of-1 trials are a powerful alternative way to obtain high-grade evidence to support clinical therapies in chronic disease management.

The diagnostic accuracy and utility of the Ages & Stages Questionnaires: Social-Emotional screen in children born very preterm

Margo Pritchard, Jane Squires, Leith Poulson, Ravin Lai, Nicholas Delaney, Shrida Sahadevan, Peter Gray

Introduction: Mental health disorders are a major contributor to the childhood global burden of disease with preterm children, at a 3-4 times higher risk. This study aimed to determine the diagnostic accuracy and utility of the Ages & Stages Questionnaires: Social-Emotional, Second Edition (ASQ:SE-2) as screening for social-emotional behaviour in preterm children during early childhood.

Methods: A prospective cross-sectional cohort of children 4 to 24 months corrected age (ca) for prematurity born <28 weeks' gestation or <1,000 grams birthweight were recruited from the Mater Mothers' Hospital Brisbane. Of 228 children enrolled, 190 (83.3%) completed both the ASQ:SE-2 screen and the Bayley Scales of Infant and Toddler Development, Third Edition Social-Emotional Scale (Bayley-III-SE) assessment. Diagnostic accuracy was determined for the ASQ:SE-2 against Bayley-III SE using screening test characteristics with 95% CI. Receiver Operator Characteristics (ROC) curves were used to determine the most optimal cut-off scores. Analysis for the total cohort and by age group was performed.

Results: Of the 190 children, 11 (5.8%) were diagnosed with a social-emotional problem (Bayley-III-SE <70) and 58 (30.5%) were screened positive using the established ASQ:SE-2 (Referral) cut-off scores. Sensitivity for the ASQ:SE-2 was 72.7% (95% CI 39-94%) and specificity was 72.1% (95% CI 65-79%). Screening accuracy was higher in 8 to 24-month age range than the 4-month age group. ROC curve adjustments had marginal impact on improving screening performance.

Discussion: With sound screening test characteristics, ASQ:SE-2 screening could be used to identify early social-emotional risks in children aged 8 to 24 months.

Characterisation of Naloxone Use in Patients Presenting to a Clinical Toxicology Unit

Keith Harris, Sikta Samantray, Andrew J Brier, Colin B Page, Katherine Z Isoardi

Context: Hospital presentations for opioid toxicity are increasing. Naloxone is an established antidote used in the treatment of opioid toxicity. This study aims to characterise naloxone use in patients presenting to hospital.

Methods: This was a retrospective review of a toxicology database of poisoned patients presenting to a Clinical Toxicology Unit in Brisbane from January 2015 to December 2017. Patient demographics, drug(s) ingested, clinical effects, naloxone dosing, observation periods, complications and length of stay (LOS) were extracted from a clinical database or medical records.

Results: There were 267 patients (187 male [70%]), median age 37 years (range 15-92) who received naloxone during the study period. The most frequent exposure was heroin 117 (44%) followed by oxycodone 31 (11%), morphine 18 (7%) and fentanyl 18 (7%).

Of the 106 (40%) patients who received pre-hospital naloxone, 82 (77%) received a standardised dose of 1.6mg IM. The remainder received titrated IV naloxone with a median dose of 200mcg (IQR 100-362.5). Of the IM pre-hospital naloxone group 17 (20%) received a naloxone infusion compared to 9 (38%) of the titrated IV group.

There were 161 (60%) patients who received their first dose of naloxone in hospital. The median dose was 200mcg (IQR 100-407.5) and 74 (46%) required a naloxone infusion.

Overall, 100 (37.5%) patients received a naloxone infusion. This rate was higher if long acting or sustained release products were ingested, where 16 (60%) patients required an infusion. The median infusion peak rate was 400mcg/hr (IQR 200-500) with a duration of 12.9 hours (IQR 7.5-19.6). The median observation time following infusion cessation was 7 hours (IQR 3.6-10.4).

Complications of naloxone were uncommon with chemical restraint provided in 8 (3%) patients following administration. Intensive care admission was required in 18 (6.7%) patients, most commonly to manage severe aspiration or co-ingestion. One death occurred which was unrelated to opioid exposure.

Conclusion: A single large IM bolus of naloxone effectively treated the majority of opioid toxicity. Naloxone infusions were required more often in those exposed to long-acting or sustained release preparations and in patients who received titrated IV aliquots of naloxone. Complications of naloxone provision were uncommon.

Metabolic changes in cardiac patients after left ventricular assist-device implantation: systematic review

Krishnaa Sivapalan, Regina Yu, Adèle C Green, Kyoko Miura

Introduction: Left ventricular assist devices (LVADs) are effective in the management of heart failure, and an interim alternative to heart transplantation. However, after LVAD implantation, changes in body weight and glucose metabolism can occur that affect health and potential candidature for transplantation. However, findings about the direction and magnitude of weight and metabolic changes are conflicting and we therefore comprehensively reviewed all relevant published evidence.

Methods: We searched PubMed and Embase to February 2019. Cohort studies that assessed change in body mass index (BMI), blood glucose and glycated haemoglobin (HbA1c) from pre- to at least 3 months post-LVAD implantation in adults were eligible.

Results: Of 846 studies identified, 90 full articles were reviewed, and 7 studies (5 retrospective, 2 prospective) were deemed eligible. Of 3 studies that reported BMI change in diabetic patients at 6 months post-LVAD implantation, one reported a reduction in mean BMI (-0.9 kg/m²) while two reported increases ($+0.4$, $+1.5$ kg/m²). One study of BMI in obese patients observed a reduction (-4.3 kg/m²), and all 4 studies of blood glucose in diabetic patients reported reductions in glucose levels (-14 to -54 mg/dL) and HbA1c (-1.4 to -1.7%) 6 months following LVAD implantation. Six of the 7 studies used incorrect statistical methodology to assess changes in outcomes, and thus actual magnitude of changes are unknown.

Discussion: Currently available evidence is inadequate to assess the extent of changes in weight and glucose markers in patients who receive an LVAD.

Deep Learning Model for Automated Cancer Classification based on Image data and Molecular Markers

Andrew Su

Faculty of Medicine Award for Best Poster Presentation

Introduction: Advances in machine learning have spurred the development of automated cancer classification systems. These systems are trained on pathologist annotated tissue images, however, these qualitative annotations are variable between pathologists, time consuming and often not at the pixel-level. These annotations rely on prior knowledge to link diseases with tissue morphological features and ignore the rich molecular information within the tissue.

Methods: To overcome these current pathological classification limitations, we developed a deep learning model that uses molecular markers, instead of pathologist annotations, to train Haematoxylin & Eosin (H&E) imaging data. Our model analyses H&E images using a convolutional neural network to learn morphological features corresponding to cancer cells as identified by positive staining for TP53, a molecular marker for cancer. We trained our model on paired TP53 stained and H&E stained tissue sections from adjacent slices within the same tissue block. To achieve this, we developed automated approaches to segment the TP53 stain and register the TP53 images to the H&E images, correcting for tissue misalignment and artefacts.

Results and Discussion: We tiled 30 pairs of high-resolution colon cancer images into thousands of tiles for model training. We show that our model performs better than an existing cutting-edge model, DeepSlide. We further show that our approach can utilise genetic markers like that generated from spatial transcriptomic technologies which can capture spatial gene expression of ~16,000 genes on a tissue section. We expect our model is generalisable to other cancers and will be testing it on gastric cancer samples from 36 patients.

A History of Spine Surgery Predicts a Poor Outcome after Hip Arthroscopy

Sava Turcan

Introduction: This study compared patient reported outcomes scores (PROMs) between patients undergoing hip arthroscopy who have and have not had previous lumbar spine surgery. We aimed to determine if prior spine surgery impacts the outcome of hip arthroscopy.

Methods: Data were prospectively collected and retrospectively reviewed in patients who underwent hip arthroscopy between 2010 and 2017. Twenty cases were identified for analysis and matched to a control group. Four PROMs were collected pre-operatively and between 6 months and 2 years postoperatively (mean 16.2 months): Modified Harris Hip Score (mHHS), Hip Outcome Score-Activities of Daily Living (HOS-ADL), Hip Outcome Score-Sports (HOS-Sports) and the 33-item International Hip Outcome Tool (iHOT-33).

Results: Patients with previous spine surgery reported significantly worse (P-value <0.001) postoperative scores on all PROMs and smaller net changes on all PROMs with the difference on the mHHS (P-value 0.007), HOS-Sport (P-value 0.009) and iHOT-33 (P-value 0.007) being significant. Subsequent analyses revealed that the type of spine surgery matters. Patients with a spine fusion reported worse post-operative scores on all PROMs compared with patients with a spine decompression surgery with the difference on the mHHS (P-value 0.001), HOS-ADL (P-value 0.011) and HOS-Sport (P-value 0.035) being significant.

Discussion: Overall, patients with prior decompression surgery experienced considerable improvements from hip arthroscopy whereas patients with a prior spine fusion reported poor post-operative outcomes. Given these results, it is vital that hip preservation surgeons understand the impact of the lumbar spine on the outcome of hip arthroscopy.

Increased utilization of constraint in total knee arthroplasty following anterior cruciate ligament and multiligament knee reconstruction

Sava Turcan

Introduction: Anterior cruciate ligament (ACL) and multiligament knee (MLK) injuries increase the risk of development of knee osteoarthritis and eventual need for total knee arthroplasty (TKA). The aim of this study was to compare the use of constrained implants and outcomes among patients undergoing TKA with a history of prior knee ligament reconstruction (PKLR) versus a matched cohort of patients undergoing TKA with no history of PKLR.

Methods: Patients with a history of ACL or MLK reconstruction who underwent TKA between 2007-2017 were identified in a single-institution registry. There were 223 patients who met inclusion criteria (188 ACL, 35 MLK). A matched cohort of 223 patients was identified based on age, BMI, sex, and year of surgery.

Results: There was a significantly higher use of constrained implants among patients with PKLR (34.1%) compared with the control group (17.9%; $p < 0.001$). Subgroup analysis showed a higher use of constrained implants among patients with prior MLK reconstruction (60.0%) compared with ACL reconstruction (29.3%; $p < 0.001$). Mean operative time ($p < 0.001$) and tourniquet time ($p < 0.001$) were longer in patients with PKLR compared with controls. There were no significant differences in complications or patient reported outcomes.

Discussion: Results of this study suggest a history of PKLR results in increased use of constrained implants but no difference in postoperative knee ROM, patient-reported outcomes, or incidence of revision surgery.

Utility and Cost-Effectiveness of 3-Dimensional Printed Materials for Clinical Use

Julian Vitali, Matthew Cheng, Michael Wagels

Introduction: As 3D printing becomes increasingly popular for a range of clinical applications, it is important to gauge its utility. For any given application, considering all material and non-material costs, a cost benefit analysis is essential to achieve this. This review summarises the utility of 3D-printing as a surgical adjunct, with emphasis on cost-effectiveness.

Methods: The relevant literature was analysed outlining the utility and/or cost-effectiveness of 3D-printing for clinical use.

Results: Compared with existing methods the evidence suggests an advantage of using 3D-printing as a technology in the treatment of complex clinical cases. However, in high frequency cases, the additional preoperative expenses are not justified. Considerable evidence of its clinical benefits exists for the application of 3D- printed anatomical models and teaching tools. However, the evidence supporting 3D-printing's use as surgical guides or implantable devices is less clear. Furthermore, caution must exist when using these devices in the clinical setting due to a paucity of rigorous testing, global regulation and long-term data.

Discussion: When novel technologies are introduced to the market, there is often urgency by many to implement the technology into broad and varied aspects of the field. However, caution must be taken in these situations as novel technology often lacks stringent regulatory parameters and guidelines for best clinical use may not be fully established.

Why is tertiary anatomy and physiology becoming a greater obstacle for students to overcome?

Conner Blackmore, Julian Vitali, Siavash Mortazavi, Ryan Anderton

Introduction: Anatomy and physiology undergraduate programs experience some of the highest failure rates across the nation, with growing awareness of student's learning difficulties. While interventions have been developed in an attempt to remediate this concerning phenomenon there is a paucity of collaborated evidence to determine the reason anatomy and physiology (A & P) pose such an obstacle to students as well as the predictive factors for success or failure in the field. Countless career paths, including nursing, veterinary science, physiotherapy and medicine, require a basic understanding of A & P for progression and success further emphasising the requirement for an understanding of why students struggle with tertiary A & P.

Methods: Major databases were searched for relevant research outlining contributing factors for success in tertiary level A & P courses.

Results: A number of factors were identified as influencing student engagement and success in tertiary A & P. Significant factors included elevated high school matriculation scores, engagement in A & P at high school, female gender and government schooling.

Discussion: Understanding the multitude and weighting of factors that contribute to student academic success in foundational science courses is essential in guiding student success. The number of students entering university with higher level or intermediate STEM subjects is declining, and although different factors affect different populations, academic success in high school STEM has a strong association with increased performance in A & P, which correlates to greater tertiary academic performance.

Major Trauma Response in the ED Resus at the Princess Alexandra Hospital

Sindusa Wignarajan, Glenn Ryan, James Collier, Rob Eley

Introduction: Traumatic injury is a leading cause of death in Australia. Immediate and organized trauma response reduces morbidity and mortality; however, guidelines and policies vary. Princess Alexandra Hospital is a tertiary referral centre in Queensland equipped with x-ray gantry within the trauma bays and adjoining Computed Tomography (CT) supporting concurrent handover, resuscitation and imaging. The aim of the project was to benchmark the hospital's efficiency in major trauma response by means of time to radiographical imaging in our sickest trauma patients (trauma respond).

Methods: In a retrospective case series 71 trauma responds were analyzed from time of patient reception in emergency to radiological image capture. Using data derived from electronic patient records and the IMPAX imaging database four time points were recorded: 1. Patient registration, 2. Chest X-ray (CXR), 3. Pelvic X-ray (PXR), and 4. CT. Mean time to each imaging modality from time of registration was calculated.

Results: CXRs and PXRs were taken within 2.05 (95% CI [0.82, 3.28]) and 3.45 (95% CI [2.05, 4.85]) minutes of arrival respectively; CTs commenced at 22.03 (95% CI [18.81, 25.20]) minutes. Negative time to image in 23 patients suggest x-rays were taken before registration and handover completion 1/3rd of the time.

Discussion: Radiographical imaging in the resus drastically revolutionizes major trauma response and workflow. Imaging at times is done faster than patients could be registered. Hemodynamically unstable patients can have plain x-rays integrated into the primary survey amid handover and subsequent transfer to CT with continuous resuscitation within minutes of arriving to our emergency department. In this rapid sequence, clinicians and surgeons obtain critical diagnostic information in a timely manner facilitating appropriate definitive management.

Connecting comorbidities with brain-gut-microbiome-stress axis biology in autism spectrum disorder: a review

Chloe X Yap, Naomi R Wray, Susanne Brix, Jacob Gratten

Translational Research Institute Poster Prize

Introduction: Autism spectrum disorder (ASD) is a psychiatric condition that emerges early in life and impacts upon the entire lifespan. There is significant heterogeneity in ASD at both the clinical and genetic level, which has frustrated research efforts to date. Interestingly, individuals with ASD are disproportionately burdened by comorbidities including gastrointestinal symptoms, anxiety, sleep abnormalities, immune disorders and epilepsy. These allude to a more systemic process than is implied by the purely neuropsychiatric diagnostic criteria of social and communication deficits and restricted and repetitive behaviors.

Methods and Results: In this Narrative Review, we synthesize epidemiological, clinical, physiological, microbial, cellular and genetic evidence to propose an integrative “systemic” hypothesis of ASD pathogenesis. We reconcile ASD comorbidities with emerging biological mechanisms in a “brain-gut-microbiome-stress” axis framework. We explore parallels between mechanisms of chronic stress with comorbid anxiety, sleep and sensory disturbances, and immune dysfunction, and relate ASD-associated gastrointestinal disorders to brain-gut-microbiome axis dysfunction. These two mechanisms appear to converge upon neuroinflammation, which may explain the core psychiatric manifestations of ASD.

Discussion: Awareness and identification of comorbidities in ASD is important as they independently worsen ASD symptomatology. The ubiquity of comorbidities also has broader implications because they are likely to share pathophysiological mechanisms involved in ASD development. We advocate for a holistic systems-based approach that integrates the spectrum of clinical to molecular evidence to provide etiological insights and disentangle ASD heterogeneity.

Pill-Packing Intervention on Health Outcomes Among High-Risk Patients

George Simchun Yeung

Introduction: Non-adherence to medications contributes to adverse treatment outcomes, higher morbidity, and additional hospitalizations. Pill packaging (PP) provides a mechanism for patients with polypharmacy to take all medications at designated times. A meta-analysis in 2014 on the benefit of pill packing revealed adherence to medications increased from 63% to 71%. This study aims to evaluate the impact of pill packing intervention on health outcomes among high-risk patients.

Method: A retrospective cohort study from 2016 to 2018 was performed for each patient at Ochsner MedVantage Clinic (MVC), with forty patients met inclusion criteria. We compared health markers from six (6) months prior to and following the PP intervention.

Result: The percentage of MVC patients with controlled blood pressure (BP \leq 140/90) increased from 50% before PP to 83% after PP ($p < 0.001$). Mean values and interquartile ranges of low-density lipoprotein (LDL), hemoglobin A1c (HbA1c), and body mass index (BMI) all decreased respectively (93 to 81 with $p = 0.053$, 7.7 to 7.3 with $p = 0.109$, 33.2 to 32.6 with $p = 0.179$). The percentage of MVC patients with at least one (1) emergency department (ED) visit in 6 months decreased from 48% before PP to 28% after PP ($p < 0.005$).

Conclusion: Pill-packing intervention increased medication adherence and improved health outcomes among high-risk patients. BP control and reduction in ED utilization are statistically significant.

The Role of Fatigue in Functional Outcomes for Youth with Chronic Pain

Isabel A Yoon

Introduction: As a complex multidimensional construct, fatigue may play an important role in the physical and psychosocial functioning of youth with chronic pain. Based on a model previously tested in adults, the current study similarly utilized Patient-Reported Outcomes Measurement System (PROMIS) to examine how fatigue contributes to functional outcomes for youth with chronic pain. The model tested self-reported ratings of pain intensity, depressive symptoms, and sleep disturbance as predictors of outcomes (mobility, pain-related interference, and school functioning) as mediated by ratings of fatigue.

Methods: 285 youth with chronic pain ages 8–17 years and their caregivers, completed surveys as part of their initial clinical evaluation at a tertiary pediatric pain clinic. Study measures included: pediatric PROMIS domains (mobility, pain interference, sleep disturbance, fatigue, and depressive symptoms), Pediatric Quality of Life (PedsQL) school functioning, and pain intensity. All mediated effects were calculated via a 1000-draw bootstrap-estimation method in Mplus.

Results: Fatigue was found to be a statistically significant mediator of the effects of pain intensity, sleep disturbance, and depressive symptoms on outcomes of pain interference, mobility, and school functioning. While pain intensity was found to independently contribute to mobility and pain interference, depressive symptoms did not show significant effects on any outcome beyond its association with fatigue. Sleep disturbance predicted pain interference while fatigue predicted school functioning.

Discussion: Findings suggest that fatigue is an important intervening factor for functional outcomes among youth with chronic pain. Targeting fatigue may be effective in optimizing school functioning and reducing the deleterious effects of depressive symptoms.