Independent Learning Projects (ILP) Awards 2015
Discipline of Paediatrics

Wednesday 18th November 2015
Welcome to the 3rd Annual Independent Learning Project (ILP) Awards.

2015 has been an exciting year with our highest number of ILP students to date and we are thrilled to be showcasing the impressive research projects these students have undertaken.

The ILP provides our students with a fabulous opportunity to undertake a research project in paediatrics as part of their undergraduate course at UNSW. This would not be made possible without the direction and guidance of their dedicated supervisors, for whom we are very grateful.

A big thank you to all the ILP students who submitted abstracts this year. The standard, as usual, was exceptional and gave the judges a very difficult task in choosing the final four.

I’d like to congratulate all students who will be presenting today. Please remember to vote for your favourite presentation, two prizes will be awarded – Overall Winner and People’s Choice. The winners will be announced at the end of the presentations.

It is also a pleasure to welcome our guest speaker, Hannah Uebel, the recipient of the Margaret Dance Honours Prize for 2014.

I would like to thank Dr Sean Kennedy, Discipline of Paediatrics' Director of Education and Sam McFedries, Research Manager for organising this event.

If you would like further information about potentially supervising an ILP student in the future, please contact Samantha McFedries, Research Manager – s.mcfedries@unsw.edu.au

Enjoy the presentations,

Professor Adam Jaffe

John Beveridge Professor of Paediatrics
Head of Discipline of Paediatrics
School of Women’s & Children's Health

Associate Director of Research
Sydney Children’s Hospitals Network
(Randwick)
PROGRAMME OVERVIEW

WELCOME:
12:55PM Chair: Dr Steven Leach
Research Fellow, Inflammation
Discipline of Paediatrics, School of Women’s & Children’s Health,
UNSW Medicine

FINALISTS PRESENTATIONS:

1:00PM Carol Hunter NEONATOLOGY
Supervisors: Dr Timothy Schindler; Conjoint A/Prof Julee Oei
Project Title: Cerebral oxygenation as measured by Near-Infrared Spectroscopy (NIRS) in the neonatal intensive care environment: correlation with arterial oxygenation.
Abstract: Page 17

1:15PM Christopher Campbell NEUROSCIENCE
Supervisors: Prof Rhoshel Lenroot; Dr Jason Bruggemann
Project Title: Are you paying attention? An fMRI study of visual attention and emotion processing in adolescent boys.
Abstract: Page 8

1:30PM Harleen Kaur ENDOCRINOLOGY
Supervisors: Prof Maria Craig; Prof Kim Donaghue
Project Title: Risk factors for albuminuria and the regression of albuminuria in children and adolescents with type 1 diabetes.
Abstract: Page 19

1:45PM Bahaven Jeyaratnam RESPIRATORY
Supervisors: Prof Adam Jaffe; Dr Penelope Field
Project Title: Long Term Pulmonary Morbidity in Children with Empyema - A pilot study.
Abstract: Page 18

GUEST SPEAKER: MARGARET DANCE HONOURS PRIZE WINNER 2014

2:00PM Hannah Uebel NEONATOLOGY
Supervisors: Conjoint A/Prof Julee Oei; Dr Lucinda Burns
Project Title: What happens to children of drug using mothers? A linkage study to determine health and mortality outcomes of children affected by maternal drug-use
Abstract: Page 30

AWARD PRESENTATIONS

2:15PM Presentation of the ILP Overall Winner; ILP People’s Choice; and Margaret Dance Honours Prize 2014.
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In 2013, the Discipline of Paediatrics offered (for the first time) Independent Learning Project (ILP) students the opportunity to submit abstracts on the research they had been undertaking, competing to win one of two UNSW Paediatrics ILP Awards.

Since 2014, all UNSW Medicine students who were completing their ILP that year in the field of paediatrics were invited to enter. The Discipline received 22 abstracts that were scored by a review panel. Four finalists were selected and will present their work at this special, Sydney Children’s Hospital Grand Rounds.

Judges will decide the Overall Winner based on today’s oral presentations.

The audience will cast their votes at the end of the presentations, which will determine the People’s Choice Award.

The winners of both awards will be announced at the conclusion of the presentations.

WHAT ARE INDEPENDENT LEARNING PROJECTS (ILP)?

The Independent Learning Project (ILP) is intended to provide UNSW medical students with a period of in-depth study that engenders an approach to medicine that is constantly questioning and self-critical.

The ILP is undertaken in Phase 2 of the undergraduate medicine program at UNSW.

The ILP aims to promote lifelong learning patterns and skills which will enable students to approach future medical challenges in their careers with a rigour and depth not possible without a detailed knowledge of the formal processes of research, literature appraisal, data collection, analysis and presentation.

By the end of the ILP the students will be expected to achieve the following specific goals:

- An ability and inclination to question the basis of current scientific thinking in relation to medical and public health practice.
- To retrieve literature on a topic and demonstrate a familiarity with the use of medical databases.
- To evaluate current knowledge in a field and to provide a critical appraisal of that body of knowledge.
- To identify a problem in their chosen field and to understand and participate in the process of designing a scientific investigation of the problem.
• To be aware of the ethical issues involved in medical research as applied to their area of study.
• To critically evaluate data including the appropriate use and application of analytical procedures.

JUDGING CRITERIA
ILP abstracts submitted as entries for the awards were scored based on the following criteria:
• Is it well written with a clear and logical structure?
• Are the methods appropriate and adequately described?
• Are the results meaningful?
• Are the conclusions justified?
• Does there appear to be a significant amount of work in the study?
• Would it make an interesting oral presentation?

ACKNOWLEDGEMENTS
Thanks to Dr Sean Kennedy, Senior Lecturer and Director of Education for the Discipline of Paediatrics who developed the concept of the ILP Awards.

Thanks also goes to our review panel who kindly scored all 22 written abstracts; and to those that will be judging the oral presentations today.

Thanks also to the students supported by their supervisors, who submitted abstracts for the awards.
There is a well-documented relationship between visual attention and emotion processing - increased visual attention is typically associated with increased emotional processing. There may also be some overlap in the neurological structures underlying attention and emotion, particularly in limbic structures such as the insula and ACC, which are active in top-down attentional processing as well as emotion processing. Given this, we sought to elucidate the extent to which this brain activity is attributable to increased emotion processing and what is the result of directing attention.

We hypothesised that activity in the ACC and insula would increase when attention is deliberately directed to the eyes of face images, relative to undirected face viewing. Brain activity was assessed using fMRI in 18 healthy male participants aged 8-16, comparing the difference in activity while viewing fearful faces, relative to neutral, when attention is undirected, directed to the eyes or directed to the mouth of the face images. Eye gaze patterns were recorded simultaneously throughout this task. Increased activation in the insula and ACC was seen when comparing directed conditions to undirected, while gaze patterns remained similar between undirected and directed-eyes condition.

These data suggest that looking at a stimulus is not necessarily the same as attending to it, and that the instructions given can have an effect on brain activity that is unaccompanied by change in outwardly observable behaviour.
Background and Aims: Primary Dysmenorrhea (PDM) commonly affects adolescent females and limits daily activities in 10-20% of sufferers. PDM characteristically presents as recurrent acute pain with a symptom complex of somatic and psychological symptoms. PDM has been reported to acquire the neurobiological characteristics of chronic pain (1). PDM is associated with other pain disorders in adults. Our aims were to investigate genetic influence and associations between PDM and primary pain disorders in adolescents and young adults.

Methods: We conducted a twin family case-control design with twin individuals (female twin pairs aged 11- to 22-years-old), mothers and oldest female siblings, from responders to a continuing twin family study conducted with the Australian Twin Registry. Questionnaires were used to assess heritability and prevalence of PDM outcomes. Valid analyses for twin family studies were applied.

Results: For lifetime prevalence (3 months) of menstrual pain severity and PDM symptom complex, genetic influence estimates were 0.53 and 0.60 respectively. For current average and highest menstrual pain, genetic influence estimates were 0.69 and 0.68 respectively. Associations were observed between lifetime menstrual pain and low back pain (β=0.77, p<0.01), also restless legs syndrome (RLS) (β=1.01, p<0.01). Lifetime PDM symptom complex was associated with recurrent abdominal pain (β=2.61, p<0.05) and RLS (β=4.35, p<0.05). There were statistically significant associations between current PDM pain measures and iron deficiency and RLS.

Conclusions: PDM in adolescents is probably genetically influenced. The association profile for PDM demonstrated some similarities with primary pain disorders in having associations with RLS and iron deficiency, but differed in having fewer pain associations.
Clinical and psychosocial factors associated with single ventricle congenital heart disease ... are experiences different with hypoplastic left heart?

Student: Chrishan Dhanapalaratnam

Supervisors: A/Prof Nadine Kasparian; Professor David Winlaw

Aims: i) To explore the medical and clinical characteristics of a patient cohort with single ventricle congenital heart disease (SVCHD) at the Heart Centre for Children (HCfC). ii) To identify potential differences in clinical factors between children with hypoplastic left heart (HLH) and children with other SVCHD. iii) To examine parents' perceptions of the quality of life experienced by their young children. iv) To explore the impact of having a child with SVCHD on the parent, their quality of life, and the overall impact on the family.

Methods: Clinical data of children between the ages of one and eight with SVCHD was collected from the Heart Centre for Children at The Children’s Hospital at Westmead. Parents of these children were invited to complete surveys assessing the physical, emotional and social health and well-being of themselves and of their child.

Results: Clinical data (n=118) revealed long hospital and ICU stays, over four weeks and two weeks respectively for stage one, especially for children with HLH. Preliminary psychosocial results revealed high quality of life ratings by parents but low rating in the social functioning domain. Parents also experienced a myriad of fears and concerns about the cause of their child’s heart condition as well as how they will progress in the future.

Conclusions: There are not only significant physical effects, but emotional and social impacts as well, on the child with SVCHD and on the family that necessitates appropriate supportive programs be implemented to better the care of these families.
Background: Long-term morbidity is an important aspect of outcomes for children with Oesophageal atresia (OA) and/or Tracheoesophageal fistula (TOF). Hospitalisations are one indicator but there has been little published on this beyond the neonatal period.

Objectives: To characterise childhood hospitalisations and mortality after OA/TOF repair.

Methods: Linked perinatal, neonatal, hospitalisation and death records for all births in New South Wales, Australia, between 2000-2011 for infants with OA/TOF (n=200) were compared to matched controls (n=400).

Results: 10-22 (mean 16) OA/TOF children were born each year from 2000-2011. Neonatal length of stay (LOS) was longer than controls (median 20 vs 4 days, p<0.0001, RR, 95% CI: 2.56, 2.42-2.70) but decreased over the study period. 46.9% of OA/TOF children required post-neonatal readmission and had lengthy hospitalisations, especially from infancy to 2.5 years of age (mean 25.76 days, 0-276 days). The presence of VACTERL association and low 5-minute APGAR scores increased likelihood of longer hospitalisation stays. 79% of admissions were due to respiratory, gastrointestinal and ENT causes. 10% of OA/TOF children died. The death rate was 6.24 times higher than controls (p<0.0001, 95% CI 2.51-15.53). Associated factors included male gender, rural residence, abnormal APGAR scores and concomitant congenital malformations. Rural OA/TOF children were 3.70 times more likely to die (p=0.018,-95%-CI-1.26-11.74).

Conclusion: OA/TOF children have lengthy hospitalisations throughout childhood for respiratory, gastrointestinal and ENT issues. They are also more likely to die than controls especially if from rural locations. It is hoped that with proactive multidisciplinary outpatient follow-up, unplanned hospitalisations can be reduced and more attention to rural children can improve outcomes.
Background/Aims: It is not known whether the increased availability of anti-tumour necrosis factor alpha (anti-TNF) biological agents used to treat Crohn’s disease (CD) has reduced the rate of resectional surgery in the paediatric population. The aims of this study, therefore, were to determine the surgical rates of paediatric CD and its changes over time.

Methods: This was a retrospective study of paediatric CD cases recruited between 1991-2009 from a tertiary paediatric hospital. Resectional surgical data over three eras by year of diagnosis (Era A 1991-1999, Era B 2000-2004 and Era C 2005-2009) were compared using Kaplan-Meier and log-rank test. Association between resectional surgery and medications were investigated using propensity score matching and logistic regression.

Results: 250 patients were recruited (median follow-up time: 4.9 years, IQR: 3.88). Baseline demographics were similar across the three eras. Use of anti-TNF therapy increase significantly from Era C compared to Era A (p<0.001) and Era B (p=0.002). Cumulative resectional-free survival, however, did not change significantly across the three eras (A vs B p=0.68; B vs C p=0.29; A vs C p=0.92). In an adjusted analysis, sporadic anti-TNF therapy was significantly associated with higher need for surgery (p=0.009, OR 2.47, 95% CI 1.18 to 5.19). However maintenance anti-TNF therapy was not associated with a decline in need for surgery (p= 0.624).

Conclusions: Despite significantly increased use of anti-TNF therapy in the last 10 years, surgical rates have remained unchanged in the paediatric CD population. This may be due to the more severe phenotype of CD in children and suggests a need for improved treatment strategies and drugs.
Vascular endothelial growth factor receptor (VEGFR) 1 has been reported to mediate astrocyte proliferation and facilitate expression of astroglial growth factors, while VEGFR 3 has been reported to mediate adult neurogenesis. It has been suggested that VEGFR 1, 2 and 3 may each play a role in the neurogenic response to hypoxic injury in the neonatal brain. The expression of VEGFR 1, 2 and 3 in the normal versus hypoxic developing rat diencephalon and hindbrain has not been previously documented with double-labelling immunohistochemistry. Here we report that, between post-natal days 10, 14 and 21, VEGFR 1 and 2 are expressed on neurons of normal developing rat diencephalon and hindbrain, and this expression is diminished following hypoxic injury in apoptotic regions, without significant upregulation seen on astroglia or neuronal progenitor cells. A weak neural progenitor response was identified in hindbrain subventricular zone, in contrast to that reported in forebrain. VEGFR3 was expressed in normal diencephalon and hindbrain on neurons and astroglia, with minimal variation seen after hypoxic injury. VEGFR 1-3 were generally diminished in the hypoxic diencephalon and hindbrain compared to controls, suggesting that while the VEGF family may have significant functions in normal developing hindbrain, it may not play an active role in the endogenous response to hypoxia in the developing rat diencephalon and hindbrain. Given that the VEGF receptors show persistent although reduced expression in hindbrain following hypoxic injury, they may still be a useful therapeutic target and warrant further study.
The value of biomarkers in predicting escalation to TNF-blocking therapy or surgery in children with Crohn’s Disease, and the potential for a multivariate predictive panel

Student: Bianca Galgut

Supervisors: Dr Steven Leach; Conjoint A/Prof Avi Lemberg

Crohn’s Disease (CD) poses an immense burden on patients, and an accurate means of distinguishing patients that will require Tumour Necrosis Factor (TNF)-blocking therapy or surgery, from those who will not, allows for its early introduction for better outcomes.

Aims: To determine the predictive value of serum and stool inflammatory markers and to produce a panel of markers that can accurately predict need for therapy escalation within 3-4 months.

Methods: Sixty-nine CD patients were recruited at the Sydney Children’s Hospital IBD clinic. Patients provided stool at baseline and at intervals of 3-4 months following baseline. Faecal S100A12 and Calprotectin levels were assayed by Enzyme-Linked ImmunoSorbent Assays (ELISAs). Clinical data and serum inflammatory marker data were collected at each time point. All clinical and inflammatory variables were analysed to identify variables that predicted an escalation in therapy and/or surgery.

Results: Of the 69 patients, 5 were escalated to TNF-blocking therapy/surgery. The best individually performing variables were Vitamin D, Neutrophil count, C-Reactive Protein, Age of Diagnosis, Haemoglobin and Albumin as determined by ROC analysis. The best performing panel of markers was the weighted combination of Age of Diagnosis, Haemoglobin and the natural logs of Neutrophil and Lymphocyte counts, giving an AUC of 0.959, outperforming all individual markers. A cut-off of -2.0851 gave 100% sensitivity and 89% specificity for predicting therapy escalation.

Conclusion: While stool markers were insufficiently accurate, the individual and combination of serum markers and Age of Diagnosis provides the most accurate prediction for therapy escalation within a 3-4 month window.
Genetic Testing for Cancer Survivors’ Risk Of Late Effects: Consumer Understanding, Acceptance and Willingness to Pay

Student: Gabrielle Georgiou

Supervisors: A/Prof Claire Wakefield; Ms Brittany McGill

BACKGROUND: Genetic technology to determine cancer survivors’ risk of developing late effects will be increasingly utilized in cancer care. However, the extent to which childhood cancer survivors and their families understand and accept this technology, and its implications, is not clear.

METHODS: Stage 1 involved a pilot study, with 24 participants, which informed the Stage 2 interview schedule. In Stage 2, 20 childhood cancer survivors (55% female; mean age 26.0 (18-39), SD = 0.80) and 20 parents of childhood cancer survivors (55% male; mean age of child survivor 14.2 (10-19), SD = 0.79) completed a 20-minute semi-structured interview (response rate 40%). Interviews were transcribed verbatim and analyzed using NVivo 10.0 software.

RESULTS: Most participants (96%) stated that they were willing to undergo genetic testing for late effects, and reported that it would be acceptable to pay more than AUD5000 for the service (over 65%). The majority of participants reported that it would be acceptable if the results were returned up to six months after testing, and if it were offered immediately after treatment or when the survivor reached adulthood. Participants were asked to rate how seven potential benefits and seven potential concerns would factor into their decision-making to uptake testing, whereby decisional balance ratios were derived. Ratios in both groups indicated a positive decisional balance amongst both survivors (M = 0.5, SD = 0.38) and parents (M = 0.5, SD = 0.39), with overall leaning towards uptake of the testing.

CONCLUSIONS: Childhood cancer survivors and parents described positive interest in taking up testing for risk of late effects. Perceived benefits of the technology outweighed negatives, and the majority of participants would be willing to pay, and wait, for such testing.
Objectives: To improve parents' understanding of extremely preterm infant outcomes data through identifying the most effective/unbiased method/s of presentation.

Background: Parents faced with extremely preterm birth are presented with outcomes data in many forms. Complex information is often provided at a time when parents are experiencing stress, pain and grief over the loss of a normal pregnancy. To make informed decisions about their baby's care, parents need accurate, understandable and meaningful information. Currently, the best way of communicating outcomes data is unclear. This study focuses on identifying how to improve the content and delivery of information.

Methods: This is Phase One of a Two-Phase study. We conducted focus groups with parents who have experienced extremely preterm birth. Parents evaluated different presentations of hypothetical data that included positive versus negative framing, percentages versus probabilities, differing visual representation and, importantly, discussed their own experiences.

Results: This report presents preliminary analysis of the data from two focus groups analysed for the purpose of submitting this ILP report. Three further focus groups and more in-depth analyses are planned. Results to date suggest that both the content of written information (including linguistics, statistics and visual representations) and delivery during consultation affect parents' understanding of health outcomes following preterm birth. Findings will inform an online questionnaire for distribution to a wider parent group (Phase Two).

Conclusion: Working with parents as partners in the development of outcomes data information is essential to improve communication and enhance informed choice and shared decision-making in the future.
Background: Continuous assessment of cerebral haemodynamics is essential to early detection and treatment of hypoxia/hyperoxia. Near-infrared spectroscopy (NIRS) is a potential tool that provides continuous non-invasive monitoring. However, research into this technology remains limited and clinical uptake unknown.

Objectives: This study presents two key objectives: 1) To assess global uptake and applications of NIRS by neonatal intensive care units; and 2) To assess correlation between cerebral oxygenation (measured by NIRS) and arterial oxygenation (measured by arterial blood gases) in preterm infants.

Methods: A validated questionnaire was produced and distributed to 12 perinatal societies for dissemination to members working within neonatal intensive care. Preterm neonates (<37 weeks gestation) were recruited. The NIRS sensor was placed on the frontolateral aspect of the head 10 minutes prior to blood gas analysis and continuous recording performed for 20 minutes. Data was analysed using binomial logistic regression and mixed linear modelling respectively.

Results: 268 questionnaire responses were collected. Of these, 101 (37.7%) owned a NIRS device for clinical and/or research purposes. However, its role in treatment and prognosis was much lower (8.7% and 2.9% respectively). The main factor hindering its uptake was the controversial evidence on efficacy. 22 neonates were recruited and 75 readings obtained. No significant correlation was identified between cerebral oxygenation and PaO2 (fixed effect 0.33, standard error 0.36, p=0.37).

Conclusions: Current NIRS usage is limited by a lack of quality evidence-based advice regarding its clinical indications. The clinical component of this study reinforces this viewpoint and the need for extensive research to unlock the full potential of NIRS.
Pneumonia is the leading killer of children worldwide. Up to 10% of children with pneumonia develop empyema. There is limited literature assessing long term pulmonary sequelae of empyema, with no studies comparing outcomes for the two main treatment modalities: intrapleural fibrinolytics and video assisted thorascopic surgery.

We conducted a multi-centre prospective pilot study assessing conventional lung function (spirometry, plethysmography), cardiopulmonary exercise capacity and peripheral airway function (Lung Clearance Index and Forced Oscillometry).

Seventeen children admitted to hospital with empyema a mean of 5.5 ± 1.5 years ago, were recruited to undergo multi-modal lung function testing. Their respiratory health was assessed clinically, as well as through administration of the Liverpool Respiratory Questionnaire. Static and Dynamic lung function testing was performed.

Static lung function was normal in most patients, as was the Liverpool Respiratory Symptom Questionnaire. Cardiopulmonary exercise testing revealed that 7/15 patients who were able to successfully complete the test had abnormally low breathing reserves. Furthermore, patients treated with VATS (n=6) had significantly lower breathing reserves (28.77 ± 13.29%) when compared to their fibrinolytic counterparts (n=9) (32.66 ± 21.83%) (p=0.019). These patients also had significantly different ventilatory equivalents to their urokinase counterparts.

Therefore, the long-term pulmonary sequelae of empyema are still unclear, but these results call for investigation into dynamic lung function in empyema survivors on a larger scale, with comparison to case matched controls. Whilst these results are statistically significant, this study was not powered to assess differences between treatment modalities.
Objective: To describe the risk factors for albuminuria and the factors affecting regression of albuminuria in children and adolescents with type 1 diabetes, followed for up to 26 years.

Research design and methods: This study included a longitudinal cohort of 2415 patients; analysis of predictors for development and regression of albuminuria was performed using generalized estimating equations. Albumin excretion rate (AER) was measured on three timed overnight urine collections on at least two occasions. Normoalbuminuria was defined as an AER 20μg/min and albuminuria as an AER between 20-200μg/min. Regression of albuminuria was defined as a reduction of AER to normoalbuminuric ranges.

Results: The prevalence of albuminuria was 4.7% (95% CI 4.0-6.0). Predictors of albuminuria were HbA1c (odds ratio 1.12 [95% CI 1.04-1.21]), HbA1c SDS (1.25 [1.01-1.56]), diabetes duration (1.06 [1.02-1.10]), DBP SDS (1.37 [1.22-1.55]) and insulin dose (1.67 [1.17-2.38]). The regression of albuminuria was frequent, with a cumulative incidence of 68.7% (95% CI 61.0-77.0). The use of angiotensin-converting-enzyme inhibitors was not associated with the regression of albuminuria. However, low HbA1c levels (0.86 [0.77-0.97] and low BMI SDS (0.52 [0.36-0.74]) were independently associated with regression of albuminuria.

Conclusions: Frequent regression of albuminuria in children and adolescents with type 1 diabetes implied elevated urinary albumin excretion does not always progress to overt proteinuria. Identification of the factors associated with the regression of albuminuria suggest glycaemic control and weight management may have a role in the prevention of early diabetic nephropathy after albuminuria first appears in young people.
The Developmental Clinic at Sydney Children’s Hospital uses the Australian Developmental Screening Test (ADST) to review children 0-5 years old for developmental difficulties. Depending on the outcome, children are recommended for interventions and/or formal developmental assessments.

In 2011, this service was audited – it revealed that 14.1% of families did not complete the formal assessments when recommended and were lost to follow-up. Sixty-seven percent of these families were from Culturally and Linguistically Diverse (CALD) backgrounds. Because children from these backgrounds have a higher prevalence of undetected developmental disorders (Woolfenden et al., 2015), the Clinic partnered with local non-governmental organisations to better engage with CALD communities. Additionally, due to structural and funding changes, the Developmental Clinic team changed from a multidisciplinary one, with input from speech and occupational therapists, to a doctor-only one.

In 2015, a re-audit was performed to assess the results of these changes. It demonstrated that the loss to follow-up rate decreased, from 14.1% to 3.6%, with no CALD children lost to follow-up as of June 2015. There were similar rates (98% to 92.3%) of diagnosis of developmental, intellectual, behavioural and learning disorders, which suggests the Clinic has maintained quality of referrals at reduced cost. There was an increase in referral sources and types of intervention services recommended to these children. The next step in improving service quality would be further develop relationships with local non-governmental organisations in order to engage more vulnerable populations.
Purpose: Health literacy, as a critical determinant of health, is an emerging public health concern. Not much is known about the health literacy of adolescents and young adults (AYAs), or about the ability of patients to communicate health needs and critically evaluate information. We used qualitative methods to investigate all aspects of health literacy in Australian AYA cancer survivors.

Methods: Forty Australians, aged 15-25 either at diagnosis or invite, participated in semi-structured interviews. Participants were asked about sources of information, ability to understand information, communicate questions and critical evaluate the validity and reliability of information, and relevancy of information to their own situations. Self-reported adherence levels and advice for AYA-specific care was also obtained.

Results: Almost all AYAs named their doctor as the primary source of information. Most AYAs reported no difficulties with understanding, communicating or assessing relevancy. Conversely, reported assessment of validity and reliability was rare. There was a perceived lack of support (especially peer support), and the doctor-patient relationship was an influential factor in all aspects of health literacy.

Conclusions: Self-reported comprehension and communication were present in high levels, whilst levels of critical evaluation were mixed. The impact of the doctor-patient relationship on all domains of health literacy suggests that focus could be shifted from improving patient skills to promoting health literacy at physician, community and societal levels.
Objective: To investigate the neonatal outcomes among infants whose mothers have diabetes in comparison to infants whose mothers have a normal glucose tolerance (NGT) during pregnancy in Wagga Wagga Base Hospital (WWBH).

Methods: A retrospective audit was conducted at WWBH looking at women who had delivered within the previous five years. Patients were identified using the Obstetrix database and then randomly selected; both paper-based and electronic records were used to collect patient information. Women were placed into three groups: gestational diabetes (GDM), pre-gestational diabetes (PGDM), and NGT.

Results: We found that PGDM was more strongly associated with large for gestational age LGA infants, prematurity, admission to special care nursery, and transfer to a tertiary hospital compared to GDM. Neonatal hypoglycaemia was significantly more common in infants whose mothers had diabetes of any type. Women with PGDM were more likely to have a CS than women with a NGT. We found that the need for resuscitation at birth was greater in the non-diabetic cases than the GDM cases, and there was no significant difference in resuscitation at birth among infants of mothers with PGDM and NGT.

Conclusions: Pregnancies affected by PGDM are associated with a higher risk of poor neonatal outcomes compared to GDM, and thus should be more closely monitored. There is a minimal increased risk in neonatal outcomes in pregnancies affected by GDM. Our results suggest that women with diabetes in pregnancy are at no higher risk of needing resuscitation at birth, and can thus deliver at smaller hospitals provided there are no other risk factors.
Aim: Congenital diaphragmatic hernia (CDH) is a rare congenital condition that can have a severe impact on growth in children. The aim of this study was to describe the nutritional status of CDH children in the first 5 years of life and evaluate current practice and attitudes of health professionals regarding CDH follow-up.

Method: A retrospective review of CDH children treated at our centre from 2006 to 2013 was undertaken. Weight was assessed at birth, intensive care unit (ICU) discharge, hospital discharge, 6 months, 12 months, 24 months and 2-5 years. Cox regression analyses was used to identify any factors that impacted failure to thrive (FTT). An 18 question survey on CDH follow-up was distributed to multidisciplinary health professionals.

Results: Poor growth was observed from birth to hospital discharge, with improvement to population mean by 12-24 months. Twenty-three percent had FTT by ICU discharge, 16% by hospital discharge, 28.6% at 6 months, 17.6% at 12 months, 11.8% at 24 months and 8.7% at 2-5 years. Significant impacting factors were low birth weight and chronic lung disease. Sixty-one professionals responded to the questionnaire. There was an overall consensus that multi-disciplinary clinics (MDCs) are ideal for CDH follow-up, and that nutritional parameters and dietician involvement are crucial components for successful management.

Conclusion: Poor growth in CDH children is most prominent in the early hospitalisation period after birth. Therefore this timeframe should be targeted for aggressive management and MDCs are considered best for coordinating care, with emphasis placed on nutrition as a severe comorbidity.
Background: The IFIH1 gene encodes an RNA helicase-DEAD box protein, the melanoma differentiation-associated protein 5. This is a cytoplasmic receptor that senses double stranded RNA molecules generated during viral replication, triggering downstream cascades that promote the production of type 1 interferons and pro-inflammatory cytokines. Thirteen well-described single nucleotide polymorphisms (SNPs) in the IFIH1 locus have been associated with development of islet autoimmunity and type 1 diabetes (T1D).

Method: Systematic review of the association between IFIH1 SNPs and islet autoimmunity or T1D using Medline and EMBASE databases was undertaken. A study was eligible for inclusion if it had a case-control, cohort or family-based association design and examined association between IFIH1 SNPs and IA or T1D in humans. The 27 papers meeting the eligibility criteria included 98,933 participants and 17,377 families. For SNP meta-analysis, association with T1D was analysed for the protective allele.

Results: Meta-analysis of 14 case-control studies (involving 65,726 participants) demonstrated that six IFIH1 gene SNPs associated with T1D: rs1990760, rs2111485, rs3747517, rs13422767, rs35744605 and rs984971 with OR ranging from 1.11 to 1.24, and three (OR 0.55, 0.32-0.95, p=0.03), and rs35667974, rs35744605, and rs3788964 protected against T1D with OR ranging from 0.5 to 0.86. In subgroup analysis by ethnicity, the increased risk of T1D for rs1990760 remained only in the Caucasian subgroup.

Conclusion: IFIH1 SNPs are associated with T1D. However, prospective studies are needed to establish an aetiological association between IFIH1 SNPs and viral infection in the development of islet cell autoimmunity and progression to T1D.
Clinical Outcomes of Early Pseudomonas Infection in Children with Cystic Fibrosis

**Student:** Zara Rolfe

**Supervisors:** Dr Yvonne Belessis; Prof Adam Jaffe

**Aims:** To determine the prevalence and age of acquisition of P. aeruginosa in infants and young children with CF, to evaluate the effectiveness of Sydney Children’s Hospitals early bronchoscopy surveillance and P. aeruginosa eradication programme in relation to global studies and to determine whether early detection and treatment of P. aeruginosa improved clinical outcomes.

**Methods:** Retrospective chart review of children with Cystic Fibrosis enrolled in the Sydney Children’s Hospital (SCH) Early Airway Remodeling, Lung Infection and Inflammation in CF (EARLII-CF) Surveillance Programme from 2010-2014. Descriptive statistics were used to estimate the effect of P. aeruginosa acquisition on clinical outcomes, and to determine the effectiveness of the SCH P. aeruginosa eradication protocol.

**Results:** Seventy-nine children participated in the EARLII-CF programme from 2010-2014. Thirty-six had a history of a P. aeruginosa isolation. Average age of initial isolation was 2.95 years. Eradication at 12 months post-treatment was 85% with an average time of 3.9 years to the next isolation. There was no statistical significance in clinical outcomes between those who had not isolated P. aeruginosa (n=28) compared to those who had (n=21) at their first review. An extensive infection history was a risk for initial P. aeruginosa infection. Conclusion: This study suggests that eradication of initial P. aeruginosa infection prevents/postpones the decline associated with chronic infection. A significant infection history is a risk factor for the acquisition of P. aeruginosa infection and SCH’s eradication protocol is of comparable efficacy to other major international regimens.
BACKGROUND: Surveillance biopsies of kidney transplants may provide information about acute and chronic graft pathology, particularly subclinical rejection and calcineurin inhibitor-induced nephrotoxicity, which can guide subsequent management decisions and improve long-term graft survival.

METHODS: A review of pathology detected on the six-month surveillance biopsies of 35 paediatric renal transplant recipients from one centre and analysis of the consequent management decisions.

RESULTS: Of the 35 patients in the study, 24 patients displayed pathology on their surveillance biopsies. One patient (2.9%) had subclinical acute cellular rejection, 7 patients (20%) had borderline cellular rejection, 16 patients (45.7%) had signs of calcineurin inhibitor toxicity, 9 patients (25.7%) had interstitial fibrosis/tubular atrophy, and 3 patients (8.6%) had BK virus. Of those 24 patients with biopsy-proven pathology, 22 (91.7%) experienced a subsequent change in management at their 1 month follow-up after surveillance biopsy. Two of the patients without signs of pathology (18.2%) also experienced a reduction in their calcineurin inhibitor dose in light of the absence of rejection. There were no major complications from surveillance biopsies and minor complications (11.5%) self-resolved without intervention or increased length of hospital stay.

CONCLUSIONS: Findings on surveillance biopsies prompted an adjustment in therapy for the majority of paediatric patients in this study. Surveillance biopsies are safe and remain as the most viable tool for detecting subclinical rejection and early calcineurin inhibitor-induced toxicity. They offer exclusive and timely information about the renal allograft, ensuring the patient receives the best available management and has a better chance of long-term graft survival.
Background: Children with cystic fibrosis (CF) are advised to follow a high-caloric (120–150% of non-CF intake), and high-fat diet to prevent malnutrition and optimise growth. However, it remains unclear how this recommendation is translated into practice among Australian CF children. This study aims to compare dietary intakes of CF vs. controls, evaluate for association between socioeconomic factors and dietary intake as well as explore the relationship between nutritional status and lung function.

Methods: Using the Australian Child and Adolescent Eating Survey (ACAES) food frequency questionnaire (FFQ), the dietary intake of a wide range of macro- and micronutrients in Australian CF children (n=37), and non-CF controls (n=23) was evaluated.

Results: CF children consumed a higher amount of energy (152.1±6.647% vs.122.5±7.941%, p=0.0064), saturated fat (17.4±0.4940% vs.15.8±0.4976%, p=0.0357) and potassium (166.8±8.225% vs.135.8±9.422%, p=0.0177) than controls. However, the proportion of energy derived from fat (36%) was below recommended value of 40%. CF subjects also had a significantly greater intake of non-core food (43.54±2.135% vs.31.83±1.882%, p=0.0286) and lower intake of core food (56.46±2.135% vs.64.26±2.796%, p=0.0286). A higher family income was associated with a higher intake of polyunsaturated fat (r=0.3756, p=0.04078) and monounsaturated fat (r=0.4023, p=0.0275). Furthermore, anthropometric measures positively correlated with paternal education. Finally, FEV1 was found to increase with higher BMI z-scores.

Conclusion: CF children consumed a higher amount of energy, saturated fat and discretionary foods. Better socioeconomic status may also lead to healthier food choices and improved nutritional status, which may have an effect on lung function.
Paediatric attention deficit hyperactivity disorder (ADHD): associations with primary pain disorders, iron deficiency, restless legs syndrome, anxiety and depression, and autism spectrum disorder in a twin family case-control study.

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**Background:** This twin family case-control study aimed to determine whether the reported sensitivity to pain in ADHD and ASD is reflected in associations with common paediatric pain disorders. Associations with RLS, AD and ID, generally associated these neurodevelopmental disorders and primary pain disorders, were also tested. Secondary aims were to test for known genetic influences and associations of ADHD and ASD with each other as validation of the sampling. This understanding is an important precursor in identifying potential shared genetic influences and causal factors.

**Methods:** Surveys were sent to families via the Australian Twin Registry who previously participated in a multi-phase twin family study, with 348 evaluable responses. Lifetime prevalence of ADHD and ASD as well as behaviours consistent with the disorders were determined by questionnaires. Logistic regression was used to investigate associations between ADHD/ASD and the conditions analysed in previous phases of the twin study.

**Results:** Notwithstanding a low response rate (34%), ADHD was found to have univariate associations with recurrent abdominal pain (RAP), chronic pain (CP), ID, AD and ASD. ASD also showed significant univariate associations with CP, ID and AD. Multivariate analysis showed independent associations of ADHD with RAP and ASD, and additionally ASD with AD. Multivariate analysis of ADHD and ASD showed significant monozygous greater than dizygous cotwin associations, and associations with mothers consistent with genetic influence. Casewise concordance analyses also supported genetic influences on ASD.

**Conclusions:** The lack of confirmed independent associations between the neurodevelopmental disorders ADHD and ASD and the primary paediatric pain disorders, except for ADHD and RAP, was influenced by insufficient power. ADHD and ASD were familial, probably reflecting shared genetic influence being independently associated with each other.
Background: Neonatal supraventricular tachycardia (SVT) is a rare but important health problem as it rapidly leads to heart failure and death if untreated.

Aim: To determine long-term childhood mortality and hospitalisation outcomes after neonatal SVT.

Methods: Analysis of routinely collected birth, hospitalization and mortality data for all infants born between 2000 and 2011 in New South Wales (NSW), Australia, and diagnosed with SVT (WHO ICD-10 code ‘I47.1’). The average available follow-up duration was 6.5 years.

Results: Neonatal SVT was diagnosed in 238 (0.02%) of 1,027,135 live births (August 2000 – December 20011) in NSW. Nine (3.8%) infants died, all within the first year of life. Using logistic regression methods we showed that congenital abnormalities significantly increased the risk of death (OR 20.8, 95% CI 2.3 – 191.1, p = 0.007). Fifty-six surviving children (24.5%) were readmitted with SVT (median age of first recurrence 2.4 months, range 0.3 – 108.9 months). The risk of SVT recurrence was highest in the first year of life (20.5%), after which it decreased to 7.5% by 10 years of age.

Conclusions: This is the first population study of childhood outcomes after neonatal SVT. Approximately half of all patients are readmitted by the age of one, and 1 in 5 patients need readmission for SVT recurrences in the first year of life. Hence, increased surveillance may be warranted in this period. Parents must be educated that there is a chance of SVT recurrence and/or death, especially within the first year of life and in infants with congenital abnormalities.
BACKGROUND AND OBJECTIVES: Neonatal abstinence syndrome (NAS) occurs after in utero exposure to opioids, but there is little data after infancy because follow-up in this high-risk population is exceedingly difficult. Our objectives were to determine childhood hospitalization and mortality outcomes after NAS on a population level.

METHODS: To use linked perinatal, hospitalization and death data to determine childhood outcomes for all births in New South Wales (NSW), Australia, between 2000-2011. Infants with NAS (P96.1, ICD-10, n = 3,842) were compared to infants without NAS (n = 1,018,421) to a maximum age of 11 years.

RESULTS: Infants with NAS were more likely to be admitted into a nursery (odds ratio 15.6, 95% confidence interval: 14.5–16.8) and be hospitalized longer (10.0 vs 3.0 days). In childhood, they were more likely to be rehospitalized (1.6, 1.5–1.7), die during hospitalization (3.3, 2.1–5.1), and be hospitalized for assaults (15.2, 11.3–20.6), maltreatment (21.0, 14.3–30.9), poisoning (3.6, 2.6–4.8), and mental/behavioral (2.6, 2.1–3.2) and visual (2.9, 2.5-3.5) disorders. Mothers of infants with NAS were more likely to be Indigenous (6.4, 6.0–7.0), have no antenatal care (6.6, 5.9–7.4), and be socioeconomically deprived (1.6, 1.5–1.7). Regression analyses demonstrated that NAS was the most important predictor of admissions for maltreatment (odds ratio 4.5, 95% confidence interval: 3.4–6.1) and mental and behavioral disorders (2.3, 1.9–2.9), even after accounting for prematurity, maternal age, and Indigenous status. A total of 45 (1.2%) NAS children died (vs 3,665 (0.4%) non-NAS deaths; 3.3, 2.4-4.4*). Children with NAS were more likely to die between 1 – 12 months of age (7.6, 5.3-11*), particularly from SIDS (10.7, 5.3-21.8*). Between 1-4 years, they were more likely to die from assault (39.8, 11.8-134.0*) and accidents (7.4, 2.7-19.9*). Overall, they were less likely to be hospitalized for any illness before death.

CONCLUSIONS: Children with NAS are more likely to be rehospitalized during childhood for maltreatment, trauma, and mental and behavioral disorders even after accounting for prematurity. They are also three times more likely to die during childhood than those without NAS, particularly from SIDs, accidents and assaults. This emphasizes the critical need for continued support of this vulnerable group after resolution of NAS.