CELEBRATE PEDIATRIC RESEARCH DAY ABSTRACTS MARCH 8, 2013

ABSTRACT #1 SPEAKER: Dr. Zaneta Lim Resident Year 3

THE ROLE OF iPAD AND iPHONE TECHNOLOGY IN PEDIATRICS EDUCATION AND RESIDENCY EVALUATION.

Zaneta Lim, V Leung, A Roberts, S Hasan, S Long-Gagne Division of General Pediatrics

Background: Postgraduate education exists as didactic sessions at formal half days. Before smart phone/tablet technology, resources to support improvised teaching at the beside have not been easily accessible. There is no current literature that explores the functionality and impact on teaching using smart phone/tablet technology. Clinical evaluation of Canadian residents is currently desktop computer based which leads to delayed or inaccurate documentation due to its inaccessibility. Smartphone/tablet technology offers an efficient, real time alternative to this system. The only literature available assesses outdated PDA instruments that have limited utility. **Objectives:** The purpose of this study is two-fold; firstly, to determine if smartphone/tablet technology facilitates pediatric residents' teaching and learning experience in a clinical setting. Secondly, this study will determine if this technology can improve efficiency and accuracy in evaluation of residents in a Canadian Pediatric program. **Methods:** To assess the role of tablet technology in medical education, interactive touch screen PDF approaches to metabolic diseases and immunodeficiency have been created for the iPad. Tablets with these modules are provided monthly to residents on the Clinical Teaching Units at BC Children's Hospital. Residents are given a multiple choice quiz before and after this intervention to evaluate their understanding of immunodeficiency and metabolic diseases.To assess the role of smartphone technology in residency evaluation, the pre-existing computer based "one-45" logging program for pediatric residents has been replaced by a newly created iPhone application that allows residents to record completed procedures on their iPhone. The number of logged procedures before and after this intervention is compared. **Results:** Preliminary data for the role of tablet technology in medical education is available for the first six months of the study. 44 residents participated, 39 individuals have taken the immunodeficiency/ metabolic disease quiz, 5 residents did not take the quiz due to time constraints. There were 19 residents in the control group (no smartphone/tablet with modules) and 20 residents in the group with the tablet and modules. Both groups consisted of similar number of residents in each year of training (Table 1). The mean score out of 10 for the control group was 5.7 and for the tablet/module group was 5.6. An independent student one-tailed T-test showed a p value of 0.4 and the equivalent two-tailed T-test showed a p value of 0.8. The results of the study involving smartphone technology for residency evaluation are still pending. **Conclusions:** Preliminary results show no statistically significant difference in quiz results between the control group and the group with tablets and modules. In fact, the current mean scores are higher in the control group (5.7 compared to 5.6). This is likely due to several confounding factors such as small sample size, up to two residents have taken the quiz twice due to scheduling conflicts, the modules involve uncommon pediatric topics which may limit the module's use in ward teaching, and that the amount of time available to teach in general can be severely limited by hectic CTU demands. Future studies require a larger sample size and teaching modules involving more common pediatric concepts.

	Control Group	Tablet/Module Group
R1	7	10
R2	5	6
R3	5	2
R4	2	2
Total	19	20

ABSTRACT #2 SPEAKERS: Dr. Genevieve Ernst (Resident Year 3) & Dr. Saadoun Hasan (Resident Year 4)

THE HI-FLO STUDY: A PROSPECTIVE OPEN RANDOMIZED CLINICAL TRIAL COMPARING HIGH FLOW NASAL CANNULA OXYGEN THERAPY AGAINST STANDARD THERAPY FOR CHILDREN HOSPITALIZED WITH BRONCHIOLITIS

Genevieve Ernst, Saadoun Hasan, M Seear Division of Respirology /Critical Care

Introduction: High flow nasal cannula oxygen therapy (HFNOT) has been increasingly used as a new method of respiratory support in bronchiolitis despite limited evidence to support its clinical use. The use of HFNOT has theoretical justifications and the limited published practical experience has also been positive. However, those impressions have never been confirmed by a prospective study. **Objective:** To determine if the use of HFNOT for children admitted to hospital with bronchiolitis reduces their work of breathing (as assessed by a non-invasive scoring system), length of hospital stay and admission to the Intensive Care Unit (ICU) when compared to a cohort of children receiving the current standard of care. **Methods:** The study design is prospective, randomized, controlled but not blinded. Patients under the age of 18 months with a clinical diagnosis of bronchiolitis admitted to the paediatrics ward are eligible. One group will be treated in the conventional manner with low flow nasal oxygen. The other will be given 8 L of humidified high flow oxygen via nasal prongs. Both groups will be monitored every 3 hours. At each of these points, respiratory distress will be measured with a non-invasive score and oxygen will be weaned as tolerated. Primary outcomes are time to reach room air, time to reach a pre-set value on the scoring system. The secondary outcome is the number of patients in each group that deteriorate on the ward requiring admission to the ICU. **Results**: A pilot study (n=23) carried out in the winter of 2011-2012 suggested that the length of hospital stay for patients receiving HFNOT was one day shorter that those receiving conventional therapy. **Discussion:** Our institutional experience of the use of HFNOT in the ICU would suggest that it is a modality of treatment worth trying in children with bronchiolitis. If it is found that HFNOT therapy is effective, then it will become standard practice in the care of children with bronchiolitis at British Columbia Children's Hospital (BCCH).

ABSTRACT #3 SPEAKER: Dr. Sarah Freedman Resident Year 4 Research in Progress

EFFECTS OF PERFLUOROALKYL SUBSTANCES (PFASS) ON NEONATAL THYROID HORMONES

Dr. Sarah Freedman, GM Webster Developmental Neurosciences & Child Health

Background: Perfluoroalkyl substances (PFASs) are a group of chemicals used widely as stain, grease and water repellants; they are found in consumer products such as stain-resistant products for carpets and fast food packaging, and are used to make non-stick cookware and outdoor water repellant clothing. PFASs are detectable in nearly 100% of human serum samples, including pregnant women, and are known to cross the placenta to the developing fetus. In rodents, maternal PFAS exposure has been linked to thyroid disruption, structural fetal anomalies as well as negative effects on gestation length, birth weight, post-natal growth and behavioural anomalies. In particular, perfluorooctane sulfonate (PFOS) has been linked to maternal and offspring hypothyroxinemia, i.e. decreased free T4 without a compensatory elevation of TSH. Thyroid effects in humans are less clear. Recent studies suggest links between PFOS or perfluorooctanoic acid (PFOA) in non- pregnant populations and either thyroid disease in general or hypothyroidism. There is a potential association between concentrations of PFASs in maternal or fetal cord serum and concentrations of thyroid hormones in cord serum but results have not been consistent in the small number of studies. Pregnant women with high thyroid peroxidase antibodies (Hashimoto's disease) may be particularly susceptible to PFAS-induced thyroid disruption of already low fT4 and high TSH. As fetuses do not make their own thyroid hormones reliably until the 3rd trimester, they are dependant on maternal thyroid homeostasis. Thyroid hormones are important for normal fetal

development of multiple organ systems, growth, metabolic rate, as well as neuron development, cell migration, and differentiation in the developing brain. Maternal subclinical hypothyroidism during critical windows of gestation may have long lasting effects on intellectual and motor development. **Objectives:** To examine PFAS-thyroid hormone associations in a population of Vancouver mothers and their infants. We hypothesize that elevated maternal serum levels of four PFASs would be associated with lower fT4 and higher TSH in cord serum. **Methods:** This study uses data from 116 mother-neonate pairs enrolled in the Metro-Vancouver based Chemicals, Health and Pregnancy (CHirP) study. Multivariable regression models will be used to examine associations between maternal serum levels of four PFASs (PFHxS, PFNA, PFOA and PFOS) measured at 16 weeks gestation, and free T4 and TSH levels measured in umbilical cord serum. **Results** are forthcoming as data analysis has not yet begun. Research challenges related to acquisition of additional neonatal TSH data from the Newborn Screening Program will be discussed.

ABSTRACTS - RESIDENT & FELLOW BEST RESEARCH PAPER COMPETITION 2013

ABSTRACT #4 | **SPEAKER: Dr. Brett Schrewe** | **Resident Year 4** | **Resident Paper #1**

CONVERSION THROUGH CONVERSATION: TOWARDS AN UNDERSTANDING OF MEDICAL PROFESSIONAL IDENTITY EVOLUTION THROUGH EVERYDAY INTERACTION

Brett Schrewe, W McKellin, D Pratt, A Roberts Division of General Pediatrics

There is emerging awareness of professional identity formation's central role in undergraduate medical education and its implications for training, practice, and patient care. Educational leaders have suggested that the making of appropriate professional identity be a key curricular goal, recognizing that who physicians become is inseparable from what physicians do. Gee (2005) notes that people integrate "language, actions, interactions, ways of thinking, believing, valuing, and use various symbols, tools, and objects to enact a particular sort of socially recognizable identity."

Medical students learn to use language to construct patients appropriately for medical treatment, to participate meaningfully as a clinical teaching unit (CTU) member, and, by extension, to establish a professional identity that both legitimates their use of language and is legitimated by the biomedical world that they are joining. How they learn to talk about sick persons as patients in relevant ways is thus not merely superficial mimicry of a certain vocabulary set. Rather, it is a deeper and comprehensive adoption of beliefs and shared understandings – ways of being – that lead one to talk and act in certain ways for certain purposes rather than others.

Through a lens of activity theory, we employed a multi-step approach examining clinical communicative acts through which medical students learn to participate appropriately. Through interviews, we explored attending pediatricians' teaching practices, definitions of "good" students, and accepted content of case presentations. One member then conducted a CTU microethnography, recording handover rounds and student bedside case presentations. Transcripts were created from both steps. The former were used to provide context for phenomena observed in the latter, itself transcribed into conversation analysis notation. Data were analyzed to understand how, through repeated interactions, students learned to organize and populate their case presentations in legitimate ways.

We suggest that medical students, through their progressive mastering of the language and structure of case presentations, adopt normative practices of constructing sick persons primarily as biomedical disease. In so doing, they develop a nascent medical identity in keeping with the legitimized norms of the biomedical profession. While these acts grant legitimacy and allow them to effect treatment strategies, they also perpetuate persistent power asymmetries that threaten well-intended initiatives such as family-centred rounds and patient-centred care. By making explicit these normative processes often understood as natural, space opens to consider how medical education may be reformed such that a more harmonious relationship is achieved between the curative and meaning-making aspects of health care.

ABSTRACT #5 | **SPEAKER: Dr. Francine Ling** | **Resident Year 3** | **Resident Paper #2**

IS THE TROPIC FEEDING PROTOCOL USING HUMAN MILK ADEQUATE FOR VERY LOW BIRTHWEIGHT INFANTS?

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Background: Mother's own milk (OMM) is the ideal nutrition for very low birth weight infants (VLBW). Early enteral nutrition is beneficial in reducing several complications of prematurity. Often during establishment of lactation, OMM production does not meet the needs for rapidly increasing intakes. When OMM is unavailable, the question remains whether there is an advantage in early feeding of VLBW infants with donor-banked milk (DBM), in spite of its known lower nutritional density. This study is unique in that BC Women's Hospital (BCWH) had the only functioning Breast Milk Bank in Canada during the time of this study. **Objectives:** We hypothesize that introducing a standardized early feeding protocol with DBM when OMM is not available would be beneficial in decreasing TPN days, length of stay in a tertiary NICU and increasing the number of mothers still feeding OMM upon discharge. **Methods:** In a quality control retrospective study, we used the BCWH NICU database to compare nutritional outcomes before and after introducing a standardized feeding protocol using DBM. Inclusion criteria: babies with birth weight<1500 grams admitted between Dec. 1, 2008 and Dec. 1, 2010. Exclusion criteria: babies with congenital GI malformations, incomplete TPN data and those that died. Descriptive statistics were performed after stratification into 6 birth weight categories. **Results:** Data from 148 patients before and 111 after protocol introduction were included. Birth weight and severity of illness scores were similar across groups. Following protocol introduction, there was a trend towards increased TPN days (median (95% CI)): 13 (15–19) vs 16 (18–23) and longer NICU stay (days): 33 (37–49) vs 48 (51–70). The percentage of mothers feeding OMM at discharge was unchanged (72% vs 74%). **Conclusions:** Contrary to published evidence, we failed to show an improvement in nutritional outcome variables following introduction of an early feeding protocol using OMM and DBM. To account for results trending in this unanticipated direction, we report on compliance with the new protocol, nutritional intake in the first week of life and rates of necrotizing enterocolitis (NEC). Given the resurgence of interest in breast milk banking, this report provides background information for any future RCT on the use of DBM for early feeding of VLBW infants.

ABSTRACT #6 **SPEAKER: Dr. Bahar Torabi** **Resident Year 3** **Resident Paper #3**

BULLYING IN CHILDREN AND ADOLESCENTS WITH FOOD ALLERGY IN BRITISH COLUMBIA

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Introduction: Food allergy is increasingly common in children and adolescents. Along with the known side effects of food- allergic reactions, there are psychosocial and quality of life concerns in pediatric and adolescent patients and their parents. They experience anxiety, depression, stress, and recent studies reported that bullying, teasing, and harassment of children with food allergy seems to be common, frequent, and repetitive. There have been no studies to characterize these occurrences in Canada. And no study to date has explored the extent and effect of bullying on the management of food allergy, including wearing medical identification. **Objectives:** The purpose of our study was to determine the presence and characteristics of bullying, teasing, or harassment in food-allergic children due to their food allergy and comparing them to children without food allergy. This study also investigated the role of bullying, teasing, and harassment on the decision to wear medical identification in children with food allergy. **Methods:** Questionnaires were completed by patients and parents of children with food allergy during their visit at the Pediatric Allergy Clinic, and by control subjects during their visit at the General Pediatrics Clinic. **Results:** Of the 110 questionnaires completed by children and adolescents with food allergy and by parents of children with food allergy, 20% reported being bullied, teased, or harassed. Of those who were being bullied, teased, or harassed, 77% reported more than one incident. Fourteen of the 27 (52%) control subjects without a food allergy reported bullying, teasing, or harassment. Only 27 of the 110 children and adolescents with food allergy wear medical identification. 16% of respondents reported fear of being "labeled" for bullying as a reason not to wear medical identification. Non physical acts occurred more often than physical acts, of which 71% were purposefully touched by the allergen or had the allergen waived in their face. There was one report of an allergic reaction. 64% of children and adolescents with food allergy who were bullied, teased, or harassed; reported also being bullied, teased, or harassed for reasons other than food allergy. **Conclusions:** Bullying, teasing, and harassment are a concern in children and adolescents with food allergy, as well as those without food allergy. They cause emotional and physical distress, as well as potentially dangerous situations such as an allergic reaction or not wearing medical identification. This issue needs to be addressed and prevented in all children and adolescents at risk of bullying, teasing, and harassment.

ABSTRACT #7 **SPEAKER: Dr. Manish Sadarangani** **Infectious Diseases & Immunology** **Fellow Paper #1**

THE IMPACT OF THE SEROGROUP C MENINGOCOCCAL VACCINE IN CANADA OVER THE LAST 10 YEARS.

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Division of Infectious and Immunological Diseases - The Canadian Immunization Monitoring Program, ACTive (IMPACT)

Background: There are approximately 200 cases of invasive meningococcal disease (IMD) in Canada each year, caused predominantly by organisms from four serogroups: B, C, Y and W-135. Before 2001 the incidence of IMD in Canada was up to 1.0 per 100,000 per year, with approximately 40% caused by serogroup C organisms. Between 2001 and 2005 all provinces introduced the serogroup C meningococcal conjugate vaccine (MenC) into their routine infant immunization schedule, with a variety of dosing schedules being used. **Methods:** Active, population-based surveillance of IMD in children and adults was conducted by the Canadian Immunization Monitoring Program, ACTive (IMPACT) during 2002-2011, covering an area which included over 50% of the country's population and approximately 90% of the pediatric tertiary care beds. Inclusion criteria for the study were admission to hospital and the identification of Neisseria meningitidis by culture or polymerase chain reaction from a sterile site. Details of clinical presentation, treatment and outcome were collected and isolates were characterized by serogroup, serotype and serosubtype by the National Microbiology Laboratory in Winnipeg. Incidence was estimated using population census data from Statistics Canada. **Results:** Prior to the introduction of MenC, the incidence of serogroup C disease was 0.16 per 100,000 per year overall, with the highest rates in British Columbia (0.24 per 100,000 per year) and Nova Scotia (0.25 per 100,000 per year). Following vaccine introduction, serogroup C disease decreased to <0.05 per 100,000 per year in all provinces. The largest decrease in serogroup C incidence occurred in the 15-24y age group. There was no impact on the incidence of non-serogroup C disease over the same period. Eight children with serogroup C disease had previously received the conjugate vaccine – three had missed their 12-month booster, and five had been immunized with a single dose according to their local schedule. **Conclusions:** MenC has significantly reduced the incidence of serogroup C IMD in Canada. This was due to direct and indirect effects, with the biggest impact in the 15-24y age group, who were not specifically targeted during vaccine introduction in all provinces. Maintaining the current low rates of serogroup C disease requires systems to ensure children receive all recommended doses and ongoing surveillance to confirm that appropriate vaccine schedules are in place.

ABSTRACT #8 **SPEAKER: Dr. Kathy Lee-Son** **Nephrology** **Fellow Paper #2**

CARDIAC ASSOCIATED ACUTE KIDNEY INJURY IN NEONATES AND INFANTS

Kathy Lee-Son, S Gandhi, AI Campbell, PS Skippen, V Sahraei, C Mammen Division of Nephrology

Purpose of Study: Acute Kidney Injury (AKI) post cardiac surgery is associated with poor outcomes. AKI definition for infants remain uncertain; the utility of urine output change (U/O) and maximum to baseline serum creatinine ratio (ΔSCr) is unclear. Our aim was to determine the strength of agreement between ΔSCr and U/O for defining AKI. **Methods Used:** In this single center prospective cohort study, infants and neonates requiring cardiac surgery from Mar – Dec 2012 were eligible. We recorded post-operative hourly U/O > 24h and ΔSCr for > 2d. The Acute Kidney Injury Network (AKIN) staging was used. Stage 1: ΔSCr > 1.5 or U/O < 0.5mL/kg/h for 6h; Stage 2: ΔSCr > 2 or U/O < 0.5mL/kg/h for 12h; Stage 3: ΔSCr > 3 or U/O < 0.3mL/kg/h for 24h. Agreement was assessed using the kappa statistic. **Summary of Results:** 81 patients were enrolled with the following characteristics: mean age of surgery was 4.6 months for infants, and 4.7 days for neonates; most common diagnosis was septal defects in infants (33%) and transpositional of the great arteries in neonates (38%); mean Aristotle Basic Complexity Score was 7.6 in infants, and 8.9 in neonates; 100% of neonates and 97% of infants had post-op diuretics; mortality 2.5%. Median baseline SCr was 29.4 μmol/L and 51.5 μmol/L, while ΔSCr was 1.8 and 1.3 for infants and neonates, respectively. U/O criteria identified 77% of infants, and 89% of neonates with any stage of AKIN. ΔSCr identified 91% of infants and only 44% of neonates with any stage of AKIN. However, U/O and ΔSCr severity criteria agreement level was poor for infants (K=0.2 95% CI 0.02-

0.38) and neonates (K=0.47, 95% CI 0.06-0.88). **Conclusion:** There is lack of agreement between the ΔSCr and U/O criteria in diagnosing AKI severity. Most notably, ΔSCr performs poorly at diagnosing AKI in neonates. Further study is needed to determine if the AKIN criteria requires modification for this population, especially the neonates.

Infants N=60 **(Neonates N=21)**	**U/O No AKI**	**U/O Stage 1**	**U/O Stage 2**	**U/O Stage 3**
ΔSCr No AKI	25 **(12)**	2 **(3)**	1 **(1)**	0 **(0)**
ΔSCr Stage 1	1 **(1)**	0 **(1)**	3 **(0)**	0 **(0)**
ΔSCr Stage 2	1 **(0)**	12 **(0)**	2 **(0)**	0 **(0)**
ΔSCr Stage 3	6 **(0)**	5 **(0)**	2 **(0)**	0 **(0)**

ABSTRACT #9 SPEAKER: Dr. Karine Khatchadourian Endocrinology & Diabetes Fellow Paper #3

CLINICAL MANAGEMENT OF YOUTH WITH GENDER DYSPHORIA IN VANCOUVER: OVER 10 YEARS' EXPERIENCE

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Background/Aim: To describe patient characteristics at presentation, treatment and response to treatment in youth with gender dysphoria. Methods: A retrospective chart review of 84 youth with a diagnosis of gender dysphoria seen at BC Children's Hospital from 1998–2011. **Results:** Of the 84 patients, 45 (57%) identified as female-to-male (FtM), 37 (44%) as male-to-female (MtF), and 2 (2%) natal males were undecided. Median age of presentation was 16.9 years (range 11.4–19.8 years) and 16.6 years (range 12.3–22.5 years) for FtM youth and MtF youth, respectively. GnRHa treatment was prescribed in 27 (32%) patients and of these, 44% received their first dose at their first visit. One FtM patient developed sterile abscesses with Lupron Depot® therapy and was switched to Decapeptyl® CR. Another FtM patient stopped Lupron Depot® 2 months after initiating treatment due to estrogen-withdrawal symptoms. Cross-sex hormones were prescribed in 63/84 patients (39 FtM vs. 24 MtF, $p<0.02$). Median age of initiation of testosterone injections in FtM patients was 17.3 years (range 13.7–19.8 years). Median age of initiation of estrogen therapy in MtF patients was 17.9 years (range 13.3–22.3 years). Three patients stopped cross-sex hormones temporarily for reasons not related to transitioning, but due to psychiatric co-morbidities (2 FtM) or testosterone effects causing androgenic alopecia (1 FTM). No severe complications were noted in patients treated with testosterone or estrogen. **Conclusion:** Treatment with GnRHa and/or cross-sex hormones in collaboration with transgender-competent mental health care professionals is an appropriate intervention in carefully selected youth with gender dysphoria. Long-term follow-up studies are needed to determine the safety of these treatments in this age group.

ABSTRACT #10 SPEAKER: Dr. Vikram Sabhaney Emergency Medicine Fellow Paper #4

THE EFFECT OF BODY MASS INDEX ON THE RISK OF FRACTURES IN CHILDREN

Sabhaney V. K Boutis, G Yang, Q Doan Division of Emergency Medicine

Objective: To determine the relationship between body mass index (BMI) and the risk of bone fracture. We hypothesize that obese children will have a significantly higher odds of fracture than non-obese children. **Subjects and Methods:** Children 2 to 17 years old presenting to the emergency department (ED) at BC Children's Hospital or the Hospital for Sick Children with a blunt extremity injury were recruited. Exclusion criteria were 1) previous enrolment for the same injury, 2) risk of pathological fractures, 3) severe poly-trauma, 4) refused consent, or 5) an insurmountable language barrier.
Study subjects' height and weight were measured to calculate BMI, and were classified as overweight, obese, or non-overweight/non-obese. Demographic information, activity level, mechanism of trauma and household income were collected. Radiographic imaging was used to determine the presence or absence of a fracture. Subjects were contacted by phone two weeks post-ED visit if no diagnostic imaging was performed, to verify final diagnosis.
Bivariate and multivariate logistic regressions were used to estimate the odds of fracture by BMI category. **Results:** The recruitment phase of the study is complete, with 1925 patients enrolled. Data has been analyzed for 657 subjects (359 with fractures). Logistical regression after adjusting for age, sex, activity level, mechanism of injury and income level, did not show an increased risk of acute fracture amongst obese OR=0.792 [0.496, 1.265] or overweight OR=1.316 [0.830, 2.087] children. **Conclusions:** This study did not find an increased risk of fracture amongst obese children who have sustained a blunt extremity injury as compared to non-overweight/non-obese children. The statistically non-significant increased risk of fractures amongst overweight children may become significant pending analysis of the complete data set.