

**Department of Pediatrics Spring Research Day
Abstracts
Friday, April 13, 2012
Health Sciences Learning Center**

**Department of Pediatrics Spring Research Day
Abstract Booklet
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Resident Abstracts

Oral Presentations

The ACGME, RRC and You: Understanding the Alphabet Soup

Cathy Lee-Miller, MD

As the resident member on the pediatrics Residency Review Committee, I have learned immense amounts about the accreditation process for residency programs. Herein presented is what every resident should know about the ACGME, its role and what the new accreditation process will mean for residency training. This is not strictly "research" but is a large part of the scholarly activity I have done during residency. Thus, I chose to present this information for the benefit of the residency program.

Poster Presentations

**PAS Poster Presentation

Screening for abnormal glucose tolerance in adolescents with polycystic ovary syndrome (PCOS)

Judith Nir MD, M. Tracy Bekx MD, Ellen Connor, MD

Background: Polycystic ovary syndrome (PCOS) is a common endocrinopathy affecting 5-10 % of women. Adults with PCOS are at high risk for type 2 diabetes mellitus (DM2), with a prevalence of 10% by the fourth decade (1). The few studies evaluating prevalence of DM2 and prediabetes in adolescents with PCOS report rates of 3% and 30% respectively (2,3). This study assesses the prevalence of prediabetes (impaired fasting glucose (IFG) or impaired glucose tolerance (IGT)) and DM2 in a multidisciplinary clinic for adolescents with PCOS, and evaluates associated risk factors.

Methods: Review of database from 2005 to 2010. 168 patients diagnosed with PCOS based on the Rotterdam criteria. Eight presented with known diabetes leaving 160 eligible for screening. This study was approved by the University of Wisconsin Internal Review Board. **Results:** Mean age: 16.1 years (11.5-22), 93.4% Caucasian, 4.7% African American, 2.3% Hispanic. BMI assessment: 12.6 % BMI <85th percentile, 74 % >95th percentile, and 25% \geq 40 kg/m². Eight patients presented with known diabetes (3 with type 1, 5 with type 2). Oral glucose tolerance test was recommended for all new patients and completed by 95 (59%), single fasting glucose +/- insulin by 45 (28%). No data found on 20 patients, although labs ordered on most. Of 126 patients with both a fasting glucose and insulin recorded, 73 (58%) had glucose to insulin ratio < 4.5 (4).

Conclusion: Adolescents with PCOS have increased risk for DM2, supported by the higher than previously reported prevalence. Half were asymptomatic and diagnosed through screening, emphasizing the importance of testing. There were no significant differences between common risk factors, likely secondary to the large prevalence of these factors in both groups. While most did not have overt DM2, over half had insulin resistance as determined by a low glucose/insulin ratio. This offers an opportunity for intervention before disease in this high-risk population.

References: 1) Ehrmann et al. Diabetes Care, 1999 2) Palmert et al, J Clin Endocrinol Metab 2002 3) Huang J, et al. Reproductive Biology and Endocrinology 2010 4) Legro RS, et al J Clin Endocrinol Metab 1998.

PAS DATE/TIME/LOCATION: April 29, 2012; 4:15PM – 7:30PM; Exhibit Halls A/B (Hynes Convention Center)

****PAS Poster Presentation**

An Evaluation of Sources of Stress in the Current Education of Pediatric Residents: A Qualitative Study

M Peters, M Cercone, M Moreno

INTRODUCTION: In the past 10 years, rules regarding medical resident work restrictions have changed substantially. This shift in training necessitated a change in mentality, but most studies on this topic reported modest to no improvement in number of hours worked per week, number of hours of sleep per night, and the amount of exhaustion while on call. However, as new duty hour restrictions go into effect, how have existing rules affected sources of stress in resident life? The purpose of this study was to explore residents' thoughts on the stress associated with their training.

METHODS: Focus groups of pediatric residents were assembled by convenience sampling, and questions included sources of stress in residents' educational experiences. Discussions were audio recorded and transcribed. Transcriptions were read by 3 readers who discussed common themes that arose in each group.

RESULTS: Four focus groups of 15 pediatric residents including all years of residency training were conducted. Residents cited new responsibilities and uncertainty with their new roles as physicians as major stressors in their training. They expressed feelings of pressure to master their craft in a brief period of time. Residents stated they struggle with the paradoxical nature of taking care of sick children while not always tending to their own health. Balancing obligations between family, friends, and the workplace provided another described source of stress.

DISCUSSION: These themes of resident stress discussed here are recurrent in the literature despite changes in work hours. Despite measures taken by the Accreditation Council for Graduate Medical Education (ACGME) in part to improve physician well-being, residents still identify a high number of stressors as inherent in their training. Though hours spent on the job have decreased, medical training is by its nature mentally and physically demanding. Future policies and investigations should incorporate strategies to improving resident life and well-being rather than focusing solely on number of hours worked. Qualitative changes in residency training may have a broader impact on resident well-being than quantitative changes.

PAS DATE/TIME/LOCATION April 30, 2012; 4:15 – 7:30 PM Exhibit Halls A/B (Hynes Convention Center)

Pulse Oximetry Screening for Congenital Heart Disease in Wisconsin

Daniel J Beissel, MD, Elizabeth M Goetz, MD, John S Hokanson, MD American Family Children's Hospital, University of Wisconsin School of Medicine and Public Health, Madison, WI

Purpose: Pulse oximetry can be used as a screening tool to detect congenital heart disease (CHD) in neonates prior to hospital discharge and the development of symptoms. Newborns suspected of having CCHD based on pulse oximetry screening must have the diagnosis excluded or confirmed with echocardiography. However, echocardiography is not immediately available in all settings in which newborns are delivered and the best course of action in these settings remains to be determined. The purpose of this study was to evaluate the resources available to diagnose and treat newborns with CHD born in the state of Wisconsin.

Methods: We surveyed the nurse managers or administrators of all facilities in which babies are routinely delivered in the state of Wisconsin. A telephone survey of the 99 Wisconsin hospitals that deliver babies was performed in February and March 2011. The number of births per facility was estimated from the most recent available data (2010).

Results: There were 66,179 total births occurring in 106 hospitals in the state of Wisconsin in 2009, with 99 hospitals routinely delivering newborns. Surveys were completed in 88/99 (88.9%), representing 95% of the state's in-hospital births. All responding hospitals had pulse oximetry available in the nursery. 25/88 (28.4%) of responding hospitals routinely use pulse oximetry to screen for CHD and 35.2% of births in surveyed hospitals occurred in those hospitals routinely using pulse oximetry screening. Same-

day neonatal echocardiography was available at 33/88 (37.5%) of the responding hospitals, and 74.4% of births in surveyed hospitals occurred in these hospitals with neonatal echocardiography. Blood pressure measurements were routinely performed in 41/88 (46.6%) of responding hospitals and performed as a designated screening for CHD in 15/88 (17%). 55/88 (62.5%) of responding hospitals do not have same-day neonatal echocardiography available, with 25.6% of births in surveyed hospitals occurring in a facility where same-day neonatal echocardiography is not available. The average distance to the higher-level care facility of choice from the hospitals without neonatal echocardiography is 53.1 miles. 78.2% of responding hospitals without neonatal echocardiography have adult echocardiography available. 21.6% of responding hospitals transfer neonates out of the state to obtain a higher-level care with 13.6% of births in surveyed hospitals occurring in these hospitals.

Conclusion: Pulse oximetry is universally available in Wisconsin newborn nurseries and pulse oximetry screening for CHD is currently being performed for many of Wisconsin's newborns. The majority of births in Wisconsin occur in hospitals where same-day neonatal echocardiography is available for confirmatory diagnosis of CHD when necessary. Although only a minority of the state's births occur at facilities where neonatal echocardiography is not available, transfer of these children to higher-level care facilities may require relatively long journeys.

Predictors of Cost in the Pediatric Cardiac Intensive Care Population: Relationship to the Pediatric Risk of Mortality Score

Beissel DJ, Hsu BS, Brazelton III TB.

Introduction:

US healthcare expenditure is rapidly expanding with end of life costs representing 10-12% of the total healthcare budget and up to 27% of the Medicare budget. However, a relationship between expenditure and mortality has not been examined in the pediatric cardiac intensive care population.

Methods:

PRISM (Pediatric Risk of Mortality) III scores, clinical and demographic data from a division database were cross-referenced with cost and charge data from hospital and physician billing databases for all cardiology and cardiothoracic patients hospitalized between 01/01/09 and 12/31/09. Statistical analysis was conducted using Stata IC/11.1.

Results:

57 patients were identified. 3 patients (5.3%) were excluded due to lack of cost data. Mean values of the remaining 54 patients were: age – 6.4 years, length of stay (LOS) – 8.6 days, PRISM III scores – 6.74, total hospital costs and physician charges - \$74,099.1. Linear regression of log-transformed costs/charges against PRISM III scores shows a positive (coefficient of 0.04) but non-significant relationship ($p=0.07$) and poor fit of model (adjusted $r^2 = 0.043$). Multiple regression analysis of log-transformed costs/charges versus PRISM III scores, LOS, and service type (surgical versus medical) shows an adjusted r^2 value of 0.579.

Conclusions:

Severity of illness (PRISM III score) does not independently predict costs for the pediatric cardiac intensive care population. However, when combined with service type and LOS, PRISM III scores become moderately predictive of costs in cardiac intensive care patients.

References:

Emanuel EJ. Cost savings at the end of life. What do the data show? *JAMA*. 1996 Jun 26;275(24):1907-14.

Ski and Snowboard Injury Patterns on Wisconsin Ski Hills

Anju I. Bradford, MD and Gregory Rebella, MD

Background: Current studies on skiing/snowboarding injuries are based on data from large ski resorts. Very few studies have examined injury patterns at smaller ski resorts and hills, such as the ski hills found in Wisconsin. Injuries sustained on local ski hills may be different from those sustained at mountain resorts due to differences in difficulty of ski and snowboard runs, snow conditions, as well as skier/snowboarder variables. Wisconsin has a large number of ski hill resorts, which provides an opportunity to examine these injury patterns.

Objectives:

1. Describe injury patterns (mechanism and diagnosis) sustained by skiers and snowboarders on Wisconsin ski hills.
2. Describe epidemiologic characteristics of injured skiers and snowboarders.

Study Design: Descriptive epidemiological study.

Methods: This was a retrospective chart review of 93 patients seen at University of Wisconsin Emergency Department for snowboarding or ski injuries that occurred from November 1, 2010 through March 30, 2011.

Results: There were 41 injuries diagnosed in 29 skiers and 68 injuries sustained by 63 snowboarders. The mean ages of skiers and snowboarders did not differ significantly. Injuries were more commonly observed in males for both ski (66%) and snowboard (84%) participants. This trend was statistically more pronounced in snowboarders with injured participants 5.4 times more likely to be male than female. Head injuries are the most common injury diagnoses in both skiers (28.9%) and snowboarders (21.9%). Upper extremity injuries, particularly radius and ulna fractures are common (20% of injuries) among snowboarders. Nearly 50% of head-injured skiers and snowboarders were not wearing a helmet. 100% of all intracranial hemorrhages occurred in participants who were not wearing a helmet.

Conclusion: Injury patterns in skiers and snowboarders at local ski hills demonstrate a preponderance of traumatic head injuries. Furthermore, while helmet use among these participants is common, it is not yet universal. In agreement with studies on resort-level mountain, upper extremity trauma, particularly forearm and wrist fractures, are common among injured snowboarders.

Recommendations: Physicians should advocate for the universal use of protective headgear among skiers and snowboarders. Additional protective equipment, such as wrist guards, should be encouraged in snowboarders. Pediatricians should incorporate discussion of such gear into the anticipatory guidance of active adolescents and children. Given the prevalence of concussions among injured snowboarders and skiers, acute care medical providers must be aware of the most up-to-date recommendations for step-wise return to academics and physical activities.

Elastic Band Injury Mistaken for Abuse

Abbie Byrom, MD, Barbara L Knox, MD

Six case reports of children with similar skin lesions are described. Initially concerning for nonaccidental ligature marks or dry contact burns, further evaluation by child abuse specialists led to the diagnosis of accidental elastic band constriction injury. Careful review of the patient, history, evaluation of the child, environment and complete physical exam are important in such cases to avoid misdiagnosis.

Association of Clinical Assessment of Jaundice with Serum Bilirubin: A Meta-Analysis.

David G. Ingram, MD

Background: Accurate assessment of hyperbilirubinemia is a common and significant clinical problem in newborn care. While some advocate for universal serum bilirubin screening prior to discharge, others feel that clinical assessment is adequate. Previous studies do not agree on the extent to which clinical assessment of jaundice correlates with serum bilirubin. Therefore, the purpose of the current study was to conduct a meta-analysis to assess the strength of association between clinical assessment of jaundice and serum bilirubin.

Method: Studies were selected based on a search of pubmed articles, and those articles found were also examined for referenced studies. All studies with reported correlation coefficients were included in analysis. All analyses were performed in R.

Results: Fourteen studies were included in analysis, performed between the years 1997-2009. Sample sizes ranged from 12 to 3,532. Observers included nurses, physicians, and parents. Some samples included preterm infants, while others only included term infants. The overall correlation found between clinical assessment of jaundice and serum bilirubin was $r = 0.58$ (95% CI 0.49-0.66, $p < 0.001$). There did appear to be a fair amount of systematic variation between study effect size ($I^2 = 93\%$). Moderation analysis revealed a significant effect of observer type (parents were more accurate than physicians or nurses) but not sample type (term vs preterm). Analysis searching for publication bias revealed that there would need to be 551 missing studies for every observed study included for the overall effect to be nullified.

Conclusions: Clinical assessment of jaundice is moderately correlated with serum bilirubin level, and the strength of this association is moderated by observer type. Future studies will need to examine other potential moderating factors.

Is the Metabolic Syndrome Associated with Allergen-Specific IgE Levels and Allergy Symptoms in Children and Adolescents?

David G Ingram, MD

Background: The prevalence of both the metabolic syndrome and allergies have increased in the pediatric population. Indeed, recent studies have documented a significant association between obesity and allergies, as well as asthma and the metabolic syndrome. Therefore, the purpose of the current study was to examine the relationship between the metabolic syndrome and allergies.

Method: Data were obtained from the National Health and Nutrition Examination Survey (NHANES), 2005-2006 wave. Potential participants were 12-19 years old, and 763 of those had data for all required variables. The International Diabetes Foundation definition of metabolic syndrome was utilized, and allergies were assessed by symptom questionnaire and allergen-specific IgE levels. Covariates included in analysis included age, gender, ethnicity, household education level, poverty-income ratio, household smoking, and physical activity. Both univariate and multivariate associations were examined. All analyses were performed in R.

Results: Of the participants included in analysis, 7% met criteria for metabolic syndrome, 37% had at least one allergy symptom, and 54% had at least one positive allergen-specific IgE level. In multivariate analysis, metabolic syndrome was not significantly associated with overall allergy symptoms or allergen-specific IgE levels. In contrast, analysis of specific metabolic syndrome criteria did reveal that those with hypertension had increased rates of eczema, those with low HDL had significantly higher rates of multiple allergen-specific IgE levels, and those with hyperglycemia had lower rates of elevated dust-mite IgE levels.

Conclusions: Metabolic syndrome was not significantly associated with any examined measure of atopy after adjusting for confounders. However, HDL, hypertension, and hyperglycemia were significantly associated with measures of allergy.

Incidental Finding of Intracardiac Masses in a Patient with New Diagnosis AML

Cathy A Lee-Miller, Ken DeSantes, Amy Peterson

Case Report: A healthy 13 year old girl presented to her primary care physician (PCP) with chief complaints of cough, low grade fever, and left chest wall pain on inspiration. She was diagnosed with bronchitis and started on oral antibiotics and prednisone. Over the next two weeks, her symptoms persisted and she developed abdominal, leg and back pain. She returned to her PCP for further evaluation. Chest x-ray was normal, but complete blood count revealed white blood cell count of 123,000 with 85% blasts, hemoglobin of 13.8 and a platelet count of 43,000. After transfer to our children's hospital, she was diagnosed with acute myelogenous leukemia (AML), M4 subtype, by flow cytometry. She was started on Children's Oncology Group protocol AAML0531. Routine pre-chemotherapy echocardiogram revealed normal cardiac function with two large pedunculated masses attached to the right ventricular septum. Neither lesion was obstructive. The next day, a cardiac MRI confirmed the presence of two right ventricular masses, most consistent with thrombus. Chemotherapy was started that evening, with rapid response from her white blood cell count. She was started on anticoagulation four days later, when her risk of severe hemorrhage had diminished. Serial follow-up echocardiograms showed the masses did not embolize. The masses initially showed some central clearing, then slowly became smaller and more organized in appearance. Seven weeks after initial diagnosis, the patient was found to have a third mass in her right ventricular apex and was continued on low molecular weight heparin. She initially went into remission following chemotherapy, however, several months later was found to have central nervous system (CNS) relapse with blasts in her cerebrospinal fluid. Four months after initial diagnosis she continues to be asymptomatic regarding the masses in her heart and she is undergoing chemotherapy and radiation therapy for her CNS relapse.

Discussion Case reports of intracardiac masses are sparse in the pediatric literature, especially with an underlying diagnosis of AML. The initial differential diagnosis for this patient included vegetation, thrombus or chloroma. Vegetation was deemed unlikely given her lack of risk factors for endocarditis. We would have expected a dramatic response to chemotherapy had they been chloromas. Therefore, our working hypothesis is that these masses are organized clots, however we cannot exclude the possibility of viable tumor persisting within the masses. Due to concerns for poor surgical risk, possible mass recurrence, and the subsequent delay in chemotherapy required for post-operative healing, surgical excision was not attempted. Managing the patient's anticoagulation has been challenging, given the need for a balance between appropriate anticoagulation and thrombocytopenia.

Poster Presentation originally at American Academy of Pediatrics National Conference and Exhibition, October 2011

AAP CPTI Modules: Implementation and Validation

Cathy A Lee-Miller and Dipesh Navsaria

Objective To study the efficacy of the AAP's Advocacy Teaching Modules, in changing the knowledge, attitude and values of pediatric residents, with respect to legislative advocacy.

Hypothesis It is our belief that following the administration of these legislative advocacy modules, residents will endorse greater knowledge and comfort with legislative advocacy as well as a greater desire to be involved in legislative advocacy at some point in their careers. These changes will correlate with the number of modules attended by each resident.

Design/Methods This study in its entirety was performed with the consent of pediatric residents at the University of Wisconsin. A pre-module survey of pediatric residents was, administered electronically. Four of the five modules were then, conducted at noon conferences over the subsequent two weeks. (Due to time constraints, the fifth module was omitted). After each individual module, residents were encouraged to give qualitative feedback anonymously on that specific module. After the modules' completion, a post-module survey was distributed, electronically as well as a six-month follow-up survey. The entire, survey was approved by the University of Wisconsin IRB.

Results The pre-module survey response rate was 71% (27 of 38 eligible pediatric, residents). The immediate post-module response rate was 66% (25 of 38). The 6 month follow-up response rate was 50% (19 of 38). Sixty percent of residents who completed the surveys were able to, attend at least one module. Of the questions asked, the areas in which pediatric residents showed the most change were within the realms of understanding legislative, advocacy and the pediatrician's role therein. This area was the only area that showed a statistically significant positive correlation, increasing from 3.56 to 5.31 following the modules and staying high at 5.33 after 6 months (on a scale of 1 to 10 with 1 meaning no knowledge and 10 meaning extremely knowledgeable). Of those residents who were able to attend at least one module, the post-module mean was 5.71, showing an even greater increase from baseline. In fact, those who attended at least one module showed a statistically significant difference in their self-identified understanding of legislative advocacy as compared to those who did not attend any modules ($p=0.05$). This value becomes even more significant according to how many modules the resident attended.

Conclusions The AAP Legislative Advocacy Training modules were indeed successful in bringing advocacy to the forefront of residents' minds and concerns. Having protected learning time to think about legislative advocacy and having modules designed specifically for legislative advocacy were important in creating a sense of importance and value around the topic. As all parts of advocacy continue to be emphasized in pediatric residency training, modules such as these created by the AAP may become more important to provide a standardized way to teach these curricula.

Poster Presentation originally presented at MWSPP, Fall 2011

Clerkship Orientation: Assessing Current Practices and Medical Student Needs

Kirstin AM Nackers MD and Gwen C McIntosh M

Transition to the clinical years of medical school is stressful and M3s report the highest rates of anxiety and depression in medical school. Orientation can ease this transition, increase perceived preparedness and yield learners with more favorable views of a specialty. Orientations are common at the start of clerkships but vary widely. Limited information exists defining useful content for clerkship orientation. To determine how supervising physicians orient medical students to the inpatient pediatric clerkship and define the most helpful/important orientation information for learners. Students and supervising physicians (resident, fellow, and attending) were surveyed about orientation preferences and practices on the inpatient portion of the required third year pediatric clerkship. Students completed pre- and post-clerkship surveys; supervising physicians completed a single online survey. Survey data included rank lists of most helpful (student) or most important (physician) orientation information. Physicians also indicated how often they provide formal orientation or “on the fly” tips. To date, 19 medical students (79% response rate) and 22 supervising physicians (45% attendings) completed surveys. Students received and physicians provided orientation to an average of 7 items (range 5-9) and 7 items (range 3-9), respectively. The orientation items ranked as most important were the daily routine (ranked 1st by 8 students and 8 physicians) and rounding/patient presentations (ranked 1st by 4 students and 9 physicians). Students received “on-the-fly” tips 97% of the time, but only 58% received a formal orientation from a supervising physician at the start of the rotation. This is consistent with supervising physician self-report of providing on-the-fly tips 80% of the time and formal orientation 59% of the time. Students report orientation provided by supervising physicians as the single most helpful source of orientation (80%). Early data suggests that students value orientation given by supervising physicians on the wards. Students and supervising physicians both prioritize orientation to the daily routine and rounding practices. Additional data is needed to determine if student preferences change over the course of the academic year. Further data will inform improved orientation practices.

Title

O’Brian, Amy

Asthma exacerbations requiring oral corticosteroids (OCS) have been linked to a decline in lung function in older children and adults, but it is unknown if this is true in preschool children.

METHODS: A total of 225 children from the Childhood Origins of ASThma (COAST) study were followed prospectively from birth and completed spirometry at school age. The number and severity of viral respiratory illnesses were tracked during the first 3 years of life. The cohort was divided into 4 groups: no wheezing illnesses (n=111), wheezing without OCS (n=69), wheezing with OCS one time (n=23), severe wheezing episodes requiring OCS ≥ 2 times (n=22), and pre-/post-bronchodilator spirometry was obtained at ages 5-8 years.

RESULTS: Children with a history of recurrent severe wheezing exacerbations during the first 3 years of life had significantly reduced pre-bronchodilator FEV₁ at school age (1.26 (95% CI 1.19-1.34) liters (L)) when compared to children with no wheezing (1.37 (1.32-1.41) L, p= 0.01), mild to moderate wheezing only (1.34 (1.30-1.39) L, p= 0.05) and only 1 severe episode requiring OCS (1.38 (1.31-1.45) L, p=0.02). Post-bronchodilator differences in FEV₁ between children with histories of recurrent severe wheezing exacerbations and the other 3 groups of children were not statistically significant.

CONCLUSIONS: Severe wheezing exacerbations during the preschool years, a critical time in lung growth and development, may lead to airway damage and remodeling. Our study linked these events to a partially reversible reduction in lung function present at school age.

Facial Bruising as a Precursor to Abusive Head Trauma

Hillary W. Petska, MD, Lynn K. Sheets, MD, Barbara L. Knox, MD

Three pre-cruising infants with diagnoses of abusive head trauma are described. In each case, the infant had previously presented to their pediatrician with facial bruising that was unexplained or reported to be self-inflicted. Failure to recognize and report these sentinel injuries as concerning for abuse led to further injury or death.

Association of Residing in Multiple Households with Young Child's Glycemic Control

S. C. Strouse, MD, E. L. Connor, MD, K. W. Hansen, K. E. Stiles, PhD, J. C. Eickhoff, PhD, E. D. Cox, MD

Background: Many children with type 1 diabetes (T1DM) reside in more than one household, creating potential challenges in communication and inconsistencies around the child's disease management. Inconsistencies in management could affect glycemic control as measured by HgbA1c. HgbA1c has been correlated with long-term risk of diabetes complications. Therefore, assessing HgbA1c differences due to residing in one or multiple households is important in a pediatric diabetes patients.

Objective: We examined glycemic control of children with T1DM living in one or multiple households. It was hypothesized that children residing in multiple household have higher HgbA1c levels than children living in single households.

Methods: We performed a cross sectional analysis of survey data from the parents of 167 children less than 12 years of age who had been diagnosed with T1DM \geq 12 months, attending routine follow up visits at our children's diabetes center clinics from Nov 2010 through May 2011. The survey included questions regarding the number of households in which the child regularly resided and the education level of caregivers in each household. HgbA1c data was abstracted from the child's medical record. Analysis of variance was conducted to evaluate the association between highest parent education in household(s) (college degree vs. no college degree), age (<6 years vs. \geq 6 years) and whether children resided in multiple or single households.

Results: Most children (137 or 82%) resided in one household. A significant interaction between highest education level of the parents and whether children resided in multiple households was detected ($P = 0.0476$). For children who lived in homes where the highest educated parent had at least a college degree, HgbA1C levels were significantly higher in those who resided in multiple household vs. those who resided in a single household (mean A1c 7.79 ± 0.81 vs. 8.25 ± 0.54), respectively; $P = 0.038$, one-sided).

Conclusion: There is an association of poorer glycemic control for children less than 12 years of age living in multiple households whose parents have at least a college degree. This association may be due to multiple factors which should be explored in future studies to look for opportunities to change clinical practice to help these families improve glycemic control.

**PAS Poster Presentation - 2011

Social Networking Sites and Global Health Electives: A Recipe For Disaster or An Opportunity For Education

Erin L. Turner, MD Sabrina M. Wagner, MD

Background: During the same period of time that Web 2.0 has been blossoming, interest in participating in global health electives by health professionals and trainees has grown. While institutions have increased the availability of global health experiences for learners, there is an urgent need to create best practices for global health education and formalize preparatory training.

Objective: To characterize the perceptions and use of social networking sites among trainees participating in global health electives, determine whether these can be modified via a targeted educational intervention and describe how trainees' actual practices during global health field

experiences differ from their previously stated plans.

Design/Methods: We surveyed medical and pharmacy students and residents planning global health electives about their knowledge, attitudes and behaviors related to social networking sites (Facebook, blogs, photo sites). We repeated the survey after an educational intervention discussing the implications of public postings while participating in global health work and again following completion of a global health field experience. **Results:** Data from 63 participants suggests the use of Web 2.0 technology is widespread (91% use Facebook and post photos online and 87% are familiar with blogs). While about 50% of participants initially planned to communicate via Facebook postings, data collected after the educational intervention revealed significant ($p < 0.05$) differences in planned practices during upcoming trips, including being less likely to post photos online (18% down from 54%) and about half as likely to post updates to Facebook. This effect persisted; most participants chose to communicate via email or phone during their elective and no one reported using blogs.

Conclusions: With the advent of online social networking forums and the expanse of global health experiences at the professional school level, it is imperative we begin asking how these two intersect. It is inevitable that information shared via the internet is seen by a global community and that a single inappropriate post has the potential to undermine global partnerships and have devastating long-term consequences. Challenging trainees to critically examine their preconceived notions regarding ethics in global health work and initiating change in their behavior is vitally important and may be as simple as starting the discussion through education.

Fellow Abstracts

**PAS ORAL PRESENTATION

In Non-Obese Middle School Girls, Ethnic Differences in Fat deposition and Metabolic Consequences Are Already Present

Peter M Wolfgram, Ellen L Connor, Jennifer L Rehm, Amruta M Dattawadkar, Jens C Eickhoff, Aziz H Poonawalla, Scott B Reeder and David B Allen

Background: Adipose tissue distribution and severity of insulin resistance(IR) and inflammation differ among racial and ethnic groups when obesity is established. Whether these differences are present prior to development of obesity in children is unknown. **Objective:** Assess IR, inflammatory markers, and visceral(VAT) and total(TAT) abdominal adipose tissue volume in non-obese Hispanic(H) and non-Hispanic(NH) Caucasian girls. **Design/Methods:** Cross-sectional study of 19 girls (9 H, 10 NH) of similar BMI Z-scores(BMI-Z), age, and pubertal development. BMI and waist circumference(WC) were obtained. Fasting blood sample for glucose, insulin, sex hormone binding globulin(SHBG), highly sensitive CRP(hsCRP), TNF, and estradiol were drawn and HOMA-IR calculated. MRI performed on 3T scanner by quantitative water-fat method. TAT and VAT measured by fat masking/semi-automated segmentation. **Results:** Hispanic girls had a significantly stronger correlation of BMI-Z with VAT, WC, HOMA-IR, insulin, and lower SHBG. However, when WC was used as the adiposity indicator, ethnicity-related differences in correlations with fasting insulin and HOMA-IR were not seen. No significant ethnic differences in correlations of BMI-Z with TAT and inflammatory markers were found.

Conclusions: Non-obese Hispanic girls preferentially deposit fat within visceral sites, leading to a stronger correlation of BMI with VAT in this particular group and consequently, an earlier tendency toward IR than non-Hispanic girls with similar BMIs. In non-obese Hispanic girls evidence for emerging IR is seen prior to a rise in inflammatory markers. These data reveal, in non-obese children, ethnicity-entrained variations in adipose organ development that predict later differences in obesity-induced metabolic consequences.

PAS DATE/TIME/LOCATION April 29, 2012; 11:30AM; Independence West (Sheraton)

**PAS Poster Presentation

Localized Visceral Adipose Determination is a Good Predictor of NAFLD and Metabolic Syndrome in Adolescents

Jennifer L Rehm, MD, Ellen L Connor, MD, Scott B Reeder, MD, Jens Eickhoff, PhD, Aziz H Poonawalla, PhD, Amruta M Dattawadkar, MS and, David B Allen, MD .

Background: Prevalence of non-alcoholic fatty liver disease (NAFLD) ranges from 28-38% in overweight children. BMI alone does not predict risk for NAFLD & ultrasound and liver enzyme assessment miss early disease. Since distribution of adipose tissue into visceral (VAT) & subcutaneous (SCAT) compartments influences risk for both NAFLD & metabolic syndrome, accurate and feasible determination of VAT would improve risk assessment. **Objective:** To assess the relationship between adipose tissue distribution and NAFLD in adolescent girls & compare correlations with BMI, waist circumference (WC) & fasting insulin.

Design/Methods: Cross-sectional study of 24 post-menarchal girls. BMI, WC & BP measured. Fasting serum analyzed for glucose, insulin, lipids, ALT & AST. MRI performed on a 3T scanner using water-fat separation. Visceral adipose tissue (VATL4) measured at the L4 vertebral level. Additional VAT measures over the entire abdomen with manual (mVAT) & semi-automated (saVAT) segmentation in a subset of ten.

Results: NAFLD (HFF > 5.6%) seen in 25% of subjects. Whole abdomen mVAT & saVAT correlated strongly with each other ($r=0.95$, $p<0.01$), but neither was significantly correlated with VATL4. However, VATL4 correlated with HFF and metabolic markers while whole abdomen VAT measurements did not.

Conclusions: As an indicator of NAFLD and insulin resistance, VATL4 measurement is superior to BMI. Total VAT, measured thus far, correlated strongly with WC and BMI but not with liver fat or insulin resistance. These preliminary results suggest VAT at specific locations (e.g. at umbilicus/L4) is particularly detrimental to metabolic health, strengthening the importance of assessing WC as a clinical indicator of adiposity rather than BMI.

Mean Values	All Subjects	Non-Hispanic African American	Hispanic Caucasian	Non-Hispanic Caucasian
Age	14.74 ± 2.27	14.07 ± 1.82	13.91 ± 1.87	14.22 ± 2.31
BMI	30.6 ± 6.80	34.34 ± 5.90	27.47 ± 5.84	29.50 ± 6.70
Waist Circumference	98.14 ± 14.55	103.96 ± 14.26	96.96 ± 14.40	94.59 ± 14.20
Fasting Insulin	29.31 ± 19.69	30.14 ± 13.30	38.10 ± 25.56	28.27 ± 12.40
Fasting Glucose	83.07 ± 7.23	81.64 ± 3.90	87.36 ± 7.85	79.45 ± 8.17
ALT	29.02 ± 19.12	21.64 ± 6.82	41.00 ± 31.78	28.41 ± 10.56
Hepatic Fat Fraction	6.31 ± 8.22	3.4 ± 2.2	10.49 ± 11.45	5.70 ± 3.74
Percent with Hepatic Steatosis	28% (11/40)	14% (2/14)	55% (6/11)	20% (3/15)

Table 1: No statistical difference between subject ages or BMI-Z scores. Higher ALT and HFF in HC subjects is not statistically different given large standard deviation and small sample size.

	All Subjects	Non-Hispanic African American	Hispanic Caucasian	Non-Hispanic Caucasian
BMI Z-score	$r = 0.44^*$	$r = 0.59^*$	NS	NS
Waist Circumference	$r = 0.36^*$	NS	NS	NS
ALT	NS	NS	NS	NS
Fasting Glucose	$r = 0.55^{**}$	NS	$r = 0.87^{**}$	NS
Fasting Insulin	$r = 0.54^{**}$	NS	$r = 0.89^{**}$	NS
Free Androgen Index	$r = 0.49^{**}$	NS	NS	NS

Table 2: Looking at all subjects together, a number of metabolic risk factors correlate with HFF. Fasting glucose, fasting insulin and FIA show the strongest correlations. However, within individual racial and ethnic groups, the only significant correlations are BMI-Z score in NH-AA and markers of insulin resistance in the H-C subjects. * $p < 0.05$, ** $p < 0.005$, # r values represent Spearman's rank correlation coefficients.

Acknowledgements: NIH (R01 DK083380, R01 DK088925, RC1 EB010384 T32 DK077586-01), Genentech Center for Clinical Research, Endocrine Fellows Foundation, and Pediatric Endocrine Society (PAS)
 PAS DATE/TIME/LOCATION: April 28, 2012; 1:00 PM - 4:00 PM; Exhibit Halls A/B (Hynes Convention Center)

Selected to receive special acknowledgment at the Presidential Poster Reception on Friday, April 27, 2012; 7:00 PM - 9:00 PM; Boston Sheraton Grand Ballroom

***PAS Poster Presentation**

Diagnosis of PCOS May Increase Hepatic Steatosis in Insulin Resistant Obese Adolescent Females

Jennifer L Rehm, MD, Ellen L Connor, MD, Scott B Reeder, MD, PhD, Aziz H Poonawalla, PhD, Jens C Eickhoff, PhD, Amruta M Dattawadkar, MS, David B Allen, MD

Introduction: Polycystic ovary syndrome (PCOS) in adult women connotes increased risk for metabolic syndrome and non-alcoholic fatty liver disease (NAFLD) compared to obesity without PCOS. Specifically, NAFLD is up to 3 times more common in women with PCOS compared to obese women without PCOS, a difference attributed to elevated androgens¹. Insulin resistance (IR), which is common in PCOS, has been strongly associated with NAFLD. It is unclear whether a diagnosis of PCOS in adolescents infers increased risk for metabolic syndrome and NAFLD compared to that associated with obesity itself.

Methods: Subjects: This is a cross-sectional study involving 15 girls with PCOS diagnosed using Androgen Excess Society (AES) criteria² compared to 14 post-menarchal controls with regular menses. Subjects were recruited through a local middle-school and pediatric clinics and were of similar race and ethnicity. Anthropometric and Laboratory Measures: A fasting blood was collected on the same day as imaging, for assays of total testosterone, SHBG, glucose, insulin, lipids (total cholesterol, HDL, LDL, and triglycerides), ALT and AST. Height, weight, waist circumference and blood pressure were measured. Imaging: Imaging was performed on a clinical 3T scanner (MR750, GE Healthcare, Waukesha, WI) using an investigational version of a chemical shift based water-fat separation method (3D-IDEAL-SPGR) and a 32-channel phased array body coil. An investigational version of a quantitative chemical shift based MRI method (IDEAL) was acquired over the liver using the following parameters: FOV = 44x40cm, first TE/TR = 1.2/8.6ms, echo spacing = 2.0ms, echo train length = 6 (2 shots of 3 echoes), BW = ± 111 kHz, flip = 30 to minimize T1 bias, 8mm slices, 28 slices, and 256x160 matrix. 2D parallel imaging (ARC) with R=2.86 was used to reduce total imaging time to a 23 second breath-hold. An on-line reconstruction algorithm was used to perform T2* correction, spectral modeling and eddy current correction to create quantitative proton density fat-fraction maps over the entire liver. Fat-fraction measurements were made from PDFF maps obtained in 9 Couinaud segments over the liver and averaged³. Hepatic steatosis defined as an average hepatic fat fraction (HFF) >5.64. Statistics: Multivariate correlation analysis conducted to evaluate the association between all outcome variables and HFF, after adjusting for age and BMI Z-score. A two-sided p-value of <0.05 was regarded as significant.

Results: Hepatic steatosis was found in 5/15 (33%) PCOS, 2/14 Controls (14%) and the range of hepatic fraction in PCOS subjects was large (1.4 - 33.2 %) compared to controls (2.4-10.3) In contrast, prevalence of IR and other metabolic risk factors was similar in subjects with and without. Both gonadal and adrenal androgen measures - including Total Testosterone, Free Testosterone, Free Androgen Index (FAI) and DHEAS were higher in the PCOS group. In PCOS subjects BMI-Z score, WC, ALT, Fasting Insulin and FAI were strongly correlated with HFF. However, in controls, only markers of insulin resistance (SHBG, TG, and fasting glucose) correlated with HFF.

Conclusions: Quantitative MR allows for early detection of NAFLD in overweight adolescents and a diagnosis of PCOS appears to increase risk for fatty liver disease compared to obesity without PCOS. Additionally, anthropomorphic measures, insulin resistance, liver enzymes and elevated free androgen index correlated with the presence of fatty liver in the PCOS subjects but were generally poor predictors of fatty liver in controls with similar metabolic profiles. Given that androgen levels were the only significant laboratory differences between PCOS subjects and controls, these data suggest that NAFLD may be more likely to develop in overweight, insulin resistance adolescents with PCOS and that the presence of hyperandrogenemia may contribute to the pathophysiology of NAFLD in this population. Future work will include genetic testing for polymorphisms in the liver and evaluation of visceral versus subcutaneous fat in this population, particular in non-obese adolescents with PCOS.

Table 1: Descriptive comparison of metabolic risk factors, androgens, and hepatic fat fraction in PCOS and control subjects					
	BMI-Z score	WC* (cm)	Fasting Insulin	Total Testosterone	HFF (%)
PCOS	1.57±1.45	97.7±12.49	32.8±25.6	54.36±24.0	8.4±11.1
Control	1.56±0.93	97.8±18.3	24.6 ±15.2	36.1±16.0	3.7±2.6
Comparison #	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>p=0.02</i>	<i>p¹=0.03</i> <i>p²=0.11</i>

Table 1: #Comparisons adjusted for age and BMI. No significant difference between BMI or metabolic risk factors. HFF was significantly higher in the PCOS group without adjusting for age (p^1) and approached significance adjusted for age (p^2). WC=Waist Circumference, **FAI = Free Androgen Index, calculated using SHBG and Total Testosterone

Table 2: Comparison correlations of HFF with metabolic risk factors and androgens in PCOS and control subjects					
	BMI-Z score	WC* (cm)	Fasting Glucose	FAI	ALT
PCOS HFF	<i>r = 0.76**</i>	<i>r = 0.64*</i>	<i>r = 0.56*</i>	<i>r = 0.72**</i>	<i>r = 0.74**</i>
Control HFF	<i>r = 0.30 NS</i>	<i>r 0.27 NS</i>	<i>r = 0.56**</i>	<i>r = 0.39 NS</i>	<i>r = 0.06 NS</i>

Table 2: Metabolic risk factors, androgens, and liver enzymes correlated strongly with HFF in PCOS patients but only glucoses correlated in controls. * $p < 0.05$, ** $p < 0.005$

Acknowledgements: NIH (R01 DK083380, R01 DK088925, RC1 EB010384 T32 DK077586-01), Genentech Center for Clinical Research, Endocrine Fellows Foundation, and Pediatric Endocrine Society. PAS DATE/TIME/LOCATION April 29, 2012; 4:15PM - 7:30PM; Exhibit Halls A/B (Hynes Convention Center)

****PAS POSTER PRESENTATION**

Early Menarche Is Associated with Early Adverse Childhood Experiences and Childhood Sexual Assault
Kimberly L Richards, MD, Dennis Styne, MD, Naomi Saito, Miller Elizabeth, MD, PhD and Joshua Breslau, PhD, ScD.

Background: Early menarche, which has increased in prevalence in recent birth cohorts, is associated with multiple poor medical and mental health outcomes in adulthood.

Objective: To examine the association of adverse childhood experiences with early menarche in a nationally representative sample.

Design/Methods: Structured interviews from the National Comorbidity Survey Replication (NCS-R) assessed 11 childhood adversities, including the presence of non-biologically related males in the home, and age at first menstrual period in women 18 years and older (n= 3288). A series of discrete time survival models were constructed to examine the joint predictive effects of these childhood adversities on early menarche, while controlling for socio-demographic factors.

Results: Bivariate analyses examining the association of individual adverse childhood experiences with early menarche identified several specific childhood adversities that predict early menarche, including: physical abuse (OR 1.81, CI 1.32-2.48, $p < 0.001$), sexual abuse (OR 2.19, CI 1.54-3.12, $p < 0.001$), parent mental illness (OR 1.36, CI 1.078-1.71, $p = 0.007$), and exposure to family violence (OR 1.40, CI 1.93-1.89, $p = 0.026$). In multivariate analyses, with statistical adjustment for adult BMI, age and race/ethnicity, childhood sexual abuse (AOR 1.77, CI 1.21-2.6, $p = 0.0025$) remained a statistically significant predictor of early menarche. The presence of three or more co-occurring adversities increased the odds of early menarche over two-fold (AOR 2.3, CI 1.58-3.35).

Conclusions: The findings are consistent with prior studies suggesting that childhood adversities, particularly those indicative of dysfunctional family environments, have physiologic effects on endocrine development. Childhood sexual assault is a novel, independent adversity associated with early

menarche. Otherwise, these associations emerge only at relatively high levels of family dysfunction, where multiple adversities co-occur. Endocrine development may be an important pathway linking childhood environment with later behavior and health in adulthood.

PAS DATE/TIME/LOCATION April 29, 2012; 4:15PM - 7:30PM; Exhibit Halls A/B (Hynes Convention Center)

****PAS POSTER PRESENTATION**

Update On Pediatric Global Health Education: Correlation of Websites and Curricula

Yaeger JP, Wagner SM, Conway JH, Howard CR, Moreno MA

In 1999, the American Academy of Pediatrics developed Consensus Guidelines for International Child Health Electives. By 2006, approximately half of pediatric residency programs offered global health (GH) electives. Program websites are an initial source of information for prospective applicants, but their GH content has never been assessed. This study aimed to compare GH education information on websites with data from interviews of pediatric residency programs regarding GH curricula offered.

The Fellowship and Residency Electronic Interactive Database was used to assess all pediatric residency programs' websites in the US for GH education. Each program was contacted by phone and e-mail over a four-week period to confirm website findings. Chi squared statistics were used to compare data on websites with interviews. This study was approved by the University of Wisconsin Internal Review Board.

Of 194 total programs, 177 had operational websites and 98 of these programs participated in the interview (55%). 93 of 177 programs (53%) reported GH education on websites. During interviews, 80 of the 98 programs (82%) reported GH education ($p=0.00$). Among programs interviewed that offered GH electives ($n=80$), only 24% had a GH curriculum ($n=23$). Other evaluated content included: provision of resident salaries during GH elective (website 5% vs. interview 98%, $p=0.00$), capability to not use vacation during GH elective (28% vs. 90%, $p=0.00$), mandatory training sessions prior to GH elective (8% vs. 20%, $p=.02$), presence of curriculum for GH elective (24% vs. 75%, $p=0.00$), mandatory availability of local contact (23% vs. 33%, $p=.18$), and post-experience de-briefing (16% vs. 29%, $p=.053$).

Findings indicate an increase of GH electives among programs from 52% in 2006 to 82%. There are significant differences in data representation between websites and interviews for many factors, including the provision of salary, pre-elective training and GH curriculum. Post-experience de-briefing, although uncommonly provided, was well represented on websites. Finally, findings illustrate that Consensus Guidelines for curricula have not been adopted. More transparent representation of GH opportunities may allow for more informed decision-making for prospective applicants, increasing accountability of training programs and creating more effective educational experiences in global health.

PAS DATE/TIME/LOCATION April 29, 2012; 4:15PM - 7:30PM; Exhibit Halls A/B (Hynes Convention Center)

Differences in Adiposity Influence Vitamin D Levels in Adolescents with PCOS Compared to Overweight Controls

Jennifer L. Rehm, MD, David B. Allen, MD, Jens C. Eickhoff, MD, Ellen L. Connor, MD

Background: Both vitamin D and polycystic ovary syndrome have been associated with metabolic syndrome in adolescents and adults, and there is evidence that adult women that vitamin D deficiency may influence insulin resistance. However, in pediatric PCOS, the role of vitamin D deficiency remains unclear. Therefore it is vital of evaluate relationship of vitamin D to metabolic risk factors in adolescents and young women with PCOS.

Methods: Cross-sectional study of 15 adolescents and young women diagnosed with PCOS based on the Androgen Excess Society Criteria (mean BMI Z-score 1.84, mean age 16) and 15 non-PCOS controls

(mean BMI Z-score 1.97, mean age 15). Fasting blood samples were analyzed for glucose, insulin, lipids, ALT & AST. BMI. Hip & waist circumference and BP were measured.

Results: Vitamin D deficiency and features of metabolic syndrome were common in both groups (87% of girls in both groups had 25(OH)D less than 30ng/mL). BMI Z-score and free androgen index were negatively correlated with 25(OH)D levels in the controls but not the PCOS group. Waist to Hip Ratio correlated positively with 25(OH)D levels in PCOS but correlated negatively in controls.

Conclusion: While low 25-OH vitamin D levels were very common in adolescents with PCOS, it does not appear distinct from other features of metabolic syndrome such as elevated BMI and insulin resistance. However, the difference in vitamin D correlation with waist to hip ratio between the PCOS group and controls suggest that adipose distribution may be different in these groups. Waist to Hip ratio has been used a surrogate measure of visceral adiposity. Therefore, the difference in correlation may represent difference in vitamin D sequestration in visceral versus subcutaneous fat in adolescents with PCOS.

Presenting at: *Annual Clinical Meeting of the North American Society for Pediatric and Adolescent Gynecology (NASPAG), which will take place April 19-21, 2012, at the Fontainebleau Miami Beach Hotel in Miami, Florida.*

Oral Presentations/Workshops

****PAS Platform Presentation Abstract**

Analysis of Maternal Risk Factors Associated with Congenital Vertebral Malformations

Jennifer Hesemann, MS¹, Emily Lauer, MS¹, Stephen Ziska², Kenneth Noonan, MD¹, Blaise Nemeth, MD¹, Jessica Scott-Schworer, MD¹, Catherine McCarty, MD⁴, Kristen Rasmussen, MS³, Sarah Sund, MT¹, Jens Eickhoff, PhD¹, Cathleen Raggio, MD² and Philip Giampietro, MD, PhD¹. ¹UW Madison, Madison, WI/53792, United States; ²Hospital for Special Surgery, New York, NY/11553, United States; ³Marshfield Clinic, Marshfield, WI, United States and ⁴Essentia Institute of Rural Health, Duluth, MN/55805, United States.

Background: Congenital vertebral malformations (CVM) represent defects in formation and segmentation of somites occurring with an estimated incidence of between 0.13-0.50 per 1000 livebirths. CVM may be associated with congenital scoliosis, Klippel-Feil syndrome, hemifacial microsomia and VACTERL syndromes, and represent significant morbidity due to pain and cosmetic disfigurement. Prior studies have identified CVM associated with various maternal exposures during pregnancy.

Objective: The objective was to determine the relative contribution of maternal environmental factors (MEFs) during pregnancy including maternal insulin dependent diabetes mellitus, valproic acid, phenytoin, alcohol, smoking hyperthermia, twin gestation, assisted reproductive technology, in-vitro fertilization and maternal clomiphene usage to CVM development.

Design/Methods: A multicenter retrospective chart review of 227 male and female cases with CVM and 269 controls with normal spine morphology between the ages of 1-50 years was performed in order to obtain the odds ratio (OR) of MEFs related to CVM among cases vs. controls. CVM due to an underlying syndrome associated with a known gene mutation or chromosome etiology were excluded. An imputed analysis was performed in which subjects with no documentation of MEF history were treated as “no maternal exposure”.

Results: Of the 227 total cases, 103 cases had single or multiple CVM without additional congenital malformations (CM) (Group 1) and 124 cases had single or multiple CVM and additional CM (Group 2). Eighteen percent of Group 1 cases had an identified MEF. For isolated or multiple CVM without birth defects the OR (95% CI) was 3.58 (1.03,12.46). The OR for MEF history in Group 2 was 3.95 (95%CI) (1.35, 11.7). Logistic regression using numbers of risk factors (0,1→2) revealed a dose response with respect to MEF in Group 2 (p=0.039).

Conclusions: To our knowledge this study represents the first analysis of MEFs associated with CVM. These results support a hypothesis for an association between the above MEFs during pregnancy and CVM and have implications for development of prevention strategies. Further prospective studies are needed to quantify association between CVM and specific MEFs.

DATE/TIME/LOCATION April 30, 2012; 10:30 am – 12:30 pm; 208 Hynes Convention Center

Web 2.0

PAS Workshop

Dipesh Navsaria, MD

April 28, 2012; 8:30am -1130am; Room 105.

Obtaining High-Quality Evidence for Use in Practice and Teaching

PAS Workshop

Leader: Jonathan E. Fliegel, Co-Leaders: John Frohna, Dawn Ebach, Angela Veessenmeyer

Saturday, April 28, 2012; Sheraton Boston Hotel ~ Republic A

You Got EBM In My QI Process! No, You Got QI In My EBM Process: Two Great Processes that Integrate Together

PAS Workshop

Leader: Hans B. Kersten, Co-Leaders: John G. Frohna, E. Douglas Thompson, David Cooperberg, Erin S. Giudice, Rani Gereige

Tuesday, May 1, 2012; Hynes Convention Center ~ 107

Does the Development of Extreme Pediatric Morbid Obesity Constitute a Form of Medical Neglect? The Case For and Against Legal Intervention

Pediatric Endocrine Society Meeting Workshop

Norm Fost, MD

PAS Poster Presentations

**PAS Poster Presentation

Internet Safety Education in the Clinic Setting: A Pilot Intervention

Kaitlin Bare and Megan Moreno, MD, MEd, MPH

Background: Today's youth are vulnerable to the risks of online activity, including cyberbullying and predation. Little research has examined the use of intervention materials in the clinic setting to promote discussions between parents and their children about internet safety.

Objective: The purpose of this pilot intervention was to determine the feasibility of distributing an educational booklet for children within a general pediatrics clinic and whether it impacted parent-child discussions about internet safety.

Design/Methods: A children's internet safety booklet was developed through a review of scientific literature and an examination of currently available educational materials. Marketing principles were applied to enhance appeal and readability. Parent participants were recruited from a general pediatric clinic if they had a child aged 7-12 years. All child participants received the booklet. Parents completed a baseline survey at the clinic and a follow-up survey two weeks later about the frequency and content of internet safety discussions with their child. Descriptive statistics were calculated.

Results: A total of 30 parent-child dyads were recruited. At baseline, 83% (n=25) of parents reported previous discussions with their child about internet safety, and most (n=14) reported that conversations occurred monthly or more. Parents with a child between the ages of 9 and 12 years discussed internet safety more often with their child than parents with children younger than 9 years ($p<.05$). Privacy protection, predators, and surfing safety were the most commonly discussed topics. A majority of parents reported consulting the internet (50%) for this safety information. The follow-up survey was completed by 20 parents and all reported they kept the educational booklet. Of these parents, 85% had at least one internet safety conversation after the visit. Of the dyads with no previous discussions at baseline, 75% reported at least one conversation following the visit. The booklet was viewed by other children in 40% of households. Suggestions for improvement included making content easier to read (20%), however 55% felt that no improvements were necessary.

Conclusions: Distributing a children's booklet within the pediatric visit is feasible, could improve the internet safety education children receive, and may extend to other children not present at the visit. Improvements should be made to the booklet based on feedback and additional studies should be conducted with larger sample sizes.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

Does Parent Need to Watch Over Inpatient Care Reflect Hospital Safety Climate?

Cox, Elizabeth D., Pascale Carayon, Kristofer W. Hansen, Victoria P. Rajamanickam, Roger L. Brown, Paul J. Rathouz, Lori L. DuBenske, Michelle M. Kelly, and Linda A. Buel

Background: To improve safety, family engagement in the care of hospitalized children is recommended. In a prior study, most parents (>60%) agreed with needing to watch over the child's care to ensure mistakes aren't made. It is unclear whether this need reflects parent perceptions of the hospital's safety climate including the values, competencies, and patterns of behavior reflecting proficiency with and commitment to safety.

Objective: To inform patient safety efforts, we sought to understand whether parents' perceived need to watch over care is similar at our institution and if this need is related to parent perceptions of our hospital safety climate.

Design/Methods: Parents of 172 children were surveyed within 24 hours of admission and at discharge about their perceived need to watch over care (single item) and perceptions of hospital safety climate (14 items representing 4 domains overall perceptions of safety, both staff and parent communication

openness, and handoffs and transitions). Confirmatory factor analysis (CFA) of admission survey data was used to validate safety climate domain measures. Logistic regression was used to relate discharge measures of parent need to watch over care to safety climate, adjusting for parent, child, and hospitalization characteristics.

Results: Thirty-nine percent of parents agreed or strongly agreed they needed to watch over care. CFA indicated good model fit for safety climate domains (2/degrees of freedom = 2.06, root mean square error of approximation=0.08, comparative fit index=0.97, Tucker-Lewis index=0.96, weighted root mean square residual=0.86). In adjusted models, parent need to watch over care was significantly related to overall perceptions of safety (odd ratio=0.20, 95% confidence interval 0.11-0.37) and to handoffs and transitions (0.24, 0.13-0.44), but not to staff (0.66, 0.39-1.13) or parent (0.86, 0.49-1.51) communication openness. **Conclusions:** Parent need to watch over care varies by institution and by perceptions of hospital safety climate. Findings suggest targeting overall perceptions of the safety climate as well as handoffs and transitions to reduce parents' perceived burden for error prevention.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

Strategies for Enhancing Family Engagement During Family-Centered Rounds

Kelly, Michelle M., Anping Xie, Pascale Carayon, Lori L. DuBenske, and Elizabeth D. Cox

Purpose/Objective: To identify strategies to enhance family engagement on Family Centered Rounds (FCR) using a human factors engineering approach. These strategies target both barriers in the system surrounding the FCR process and address the work system context in which they will be implemented.

Design/Methods: The study was conducted on four inpatient services at a Wisconsin children's hospital. Stimulated recall interviews were conducted with 8 attending physicians, 6 resident physicians, 6 medical students, 3 nurses, 1 pharmacist, 12 parents and 5 children using videotaped rounding sessions. Upon review of their rounding session, participants were asked to provide strategies that would increase family engagement on FCR. Qualitative content analysis of interview transcripts was performed in an iterative process to create a node structure of system-wide strategies.

Results: Strategies enhancing family engagement on FCR were suggested on 338 occasions. These instances were coded and grouped into 21 categories. Most categories (14) addressed the process of rounding itself including activities involved immediately before (e.g. preparation of the healthcare team and family), during, and after rounding (e.g. following up with the family). A majority of strategies related to activities during rounds including explaining rounds, actively involving the nurse, communicating with the family, and managing distractions. The other seven categories addressed the surrounding work system including timing, scheduling and location of rounds, computer use during rounds, and healthcare team composition, positioning in the patient room, role definition and training.

Conclusions/Discussion: We identified a range of strategies for enhancing family engagement during FCR addressing both the rounding process and surrounding work system. An intervention consisting of a bundle of high-impact, feasible and sustainable strategies will be developed, implemented and evaluated.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

Parent-Initiated Dialogue about Medications during Family Centered Rounds

Jessica M Benjamin, BS, Philip J Trapskin, PharmD, Rachel E Pearson, BA, Holly L Weber, Pascale Carayon, PhD, Nicole L Lokker, PharmD and Elizabeth D Cox, MD PhD

Background: Experts suggest engaging parents in the care of their hospitalized child to improve medication safety. Family centered rounds (FCR) provide an opportunity for parents to initiate dialogue about medications. Understanding and anticipating common parent-initiated dialogue around medications could facilitate effective FCR.

Objective: To describe and quantify medication-related dialogue initiated by parents during FCR and healthcare team responses to such dialogue.

Design/Methods: Three trained coders analyzed a total of 81 FCR videos for 49 families of children on our hospitalist, oncology, and pulmonary services. Pairs of coders identified and sorted parent-initiated medication dialogue into mutually exclusive descriptive categories for 1) type of order (new order, active order, missing medication, or home medication), 2) medication therapeutic class, and 3) a topic descriptor (e.g., frequency and duration or the drug indication). Coding of the healthcare team responses included 1) response type (e.g., deferring a response or providing information) and 2) action taken (e.g., changing the treatment plan). Discrepancies were resolved by consensus.

Results: Of the 81 FCR videos, 62 (77%) contained parent-initiated medication dialogue. Within these 62 videos, 144 parent-initiated medication topics were raised. Parents most often initiated dialogue about active medication orders the child was already receiving (n=72 or 50%), while home medications, new orders, and missing medications comprised 24%, 22%, and 3% of the order types raised, respectively. Anti-infectives and analgesics were the most common medication classes raised by parents (41% and 29%, respectively). Topics often raised by parents included medication frequency or duration (23%), indication (12%), or route (11%). The healthcare team responded to 69% of the parent-initiated medication topics by providing information for the family, deferred the discussion for 4% of the topics and failed to respond to 1%. Of all the parent-initiated medication dialogue, 9% resulted in a change in the treatment plan.

Conclusions: Parent-initiated dialogue about medications occurs in most FCR sessions and can influence treatment plans. Preparing the FCR team to address medication use at home and specific types of issues (e.g. frequency or duration) for commonly discussed medications such as anti-infectives and analgesics could facilitate these discussions.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

A Screen of TLR Polymorphisms in a Cohort of Term Infants Reveals Differences in Allele Frequencies Compared to Published Frequencies.

Sara A Tokarz, PhD, Jessica A Devalk, MS, Steven J Schrodi, PhD, Mei W Baker, MD, De-Ann M Pillers, MD, PhD

Background: Toll-like receptors (TLRs) are present in many cell types and serve as the first point of defense in the innate immune system by initiating the inflammatory cascade in response to infectious microorganisms. DNA sequence variations called single nucleotide polymorphisms (SNPs) are present in many TLR genes. Those SNPs have been shown to be associated with a disruption in the innate immune and inflammation responses. Many disorders associated with pre-term birth including, bronchopulmonary dysplasia (BPD), necrotizing enterocolitis, and pre-term labor itself, are associated with chronic, dysregulated inflammation. We screened a cohort of full-term infants, selected at random, for a subset of TLR SNPs associated with inflammation to determine the frequencies in a Wisconsin population.

Objective: Screen a large, diverse population of Wisconsin full-term newborns for TLR SNPs and determine the allele population frequency.

Design/Methods: Anonymized DNA samples from 376 term (37 weeks of gestational age) infants were obtained from the Wisconsin State Laboratory of Hygiene. SNP assays were purchased from Applied Biosystems Inc. (ABI) and performed on the ABI StepOnePlus system. Data were analyzed using ABI StepOne Software. Expected allele frequencies were derived from the NCBI SNP database (www.ncbi.nlm.nih.gov/projects/SNP).

Results: The observed allele population frequencies are shown in Table 1.

Table 1: TLR SNP Allele Frequency

TLR SNP	Expected (NCBI)	Observed
TLR1	N 16.7-90.7, S 9.3-	N 62.9,S
TLR2	P 50-97.3, H 2.7-50	P 98.9, H 1.1
TLR2	Q 90-96.7, R 3.3-10	Q 99.2, R .8
TLR4	D 84.5-97.5, G 2.5-	D 95.0, G 5.0
TLR4 T399I	T 89.7-97.9, I 2.1-10.3	T 96.7, I 3.3

Conclusions: In this population of infants, both TLR2 P631H and TLR2 Q753R showed a lower frequency of the H and R alleles, respectively, compared to the frequencies reported in the NCBI SNP database (Table 1). In addition, while the allele frequencies for TLR1 N248S were similar to published results, our data show that there is a decrease in homozygous N/N genotypes and an increase in both N/S and S/S genotypes. Our results underscore the importance of defining the content of the population being studied because even a subtle demographic change can alter the values and affect the interpretation of any relationship between SNPs and disease phenotypes.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

A Gene Expression Screen on A549 Lung Epithelial Cells Exposed to LPS Reveals Upregulation of Cytokines Known to be Involved in Tissue Morphogenesis.

Sara A Tokarz, PhD, Wenxiang Luo, PhD, Ryan M Spott, and De-Ann M Pillers, MD

Background: Bronchopulmonary Displasia (BPD) is a major cause of morbidity and mortality in the pre-term infant. Chronic inflammation in the neonatal lung may lead to scar tissue formation, a form of tissue remodeling, which leads to decreased lung function. Tissue remodeling causes a loss of the functional lung epithelium, which is responsible for gas exchange and proper lung function. In addition, there is a concurrent accumulation of fibroblasts which reduces the elasticity of the lung. The cytokine profile that we have discovered in LPS-treated lung cells suggests that this LPS-induced inflammation may promote tissue remodeling and contribute to the lung scarring associated with BPD. **Objective:** We sought to determine the differential cytokine response of lung epithelial cells exposed to LPS to identify potential inflammation mechanisms that we hypothesize may be involved in a tissue remodeling contribution to BPD.

Design/Methods: A549 cells (ATCC, type II human pneumocytes) were exposed to 20ug/ml of the E. coli endotoxin, Lipopolysaccharide (LPS), for 12hrs. mRNA was isolated using Magnetight Oligo(dT) beads (Novagen) and cDNA was synthesized using Superscript III RT (Invitrogen). Inflammation was studied by analyzing the change in gene expression of key molecules in the cellular inflammation pathway by using the RT2 Profiler PCR Human Common Cytokine Array (Qiagen). Experiments were done in triplicate and values were analyzed using the RT2 Profiler PCR Array Data Analysis suite v3.4. Genes with a 1.5 fold difference (p .05) either up or down when compared to untreated cells were considered significant.

Results: Up-regulated genes included IL6 (9.0-fold), IL8 (4.2-fold), CSF2 (5.9-fold), Lymphotoxin (LTB, 11.2-fold), TNF (6.5-fold), and TNFSF14 (2.3-fold). In addition, IL22 was down-regulated 0.45-fold and BMP 0.6-fold.

Conclusions: In a cultured cell model of lung inflammation, exposure to LPS induced a notable pro-inflammatory cytokine response as indicated by strong IL6 and IL8 up-regulation. Initiation of LTB and TNF family signaling pathways have been implicated in the airway tissue remodeling associated with asthma and may also provide a novel pathway of interest in the development of BPD.

PAS DATE/TIME/LOCATION April 28, 2012; 1:00 pm-4:00 pm; Exhibit Halls A/B (Hynes Convention Center)

Pearls of Wisdom: Impact of a New Block Conference on Pediatric Residents' Attendance, Satisfaction and Learning

Megan A Moreno, MD, MSED, MPH, Rajitha Kota, BS, Gwen C McIntosh, MD, MPH, and John G Frohna, MD

Background: Didactic conferences are a fundamental part of residency education, but attendance and participation in these sessions are often limited due to demands on residents' time and attention. In 2010 the UW Pediatric residency program eliminated all noon conferences and implemented a new block format, titled Pediatric Education and Active Resident Learning (PEARL). The bi-monthly PEARL conferences provide residents a protected half-day to engage in faculty-led didactics.

Objective: To assess whether changes in a conference structure improved resident attendance, distractibility, satisfaction, perception of clinical relevance and participation.

Design/Methods: Pediatric residents were surveyed to compare experiences in two different conference structures. Pediatric residents from the 2008-2010 classes were surveyed about noon conference experiences and 2009-2011 classes were surveyed about block conference experiences. Surveys measured attendance, distractibility during conference, resident satisfaction, perception of clinical relevance and resident participation. Chi squared and t tests were used to compare differences in these measures between the two samples.

Results: Participants included 32 residents in the 2010 pre survey and 36 in the 2011 post survey (78% and 83% response rates respectively). The total sample of 66 residents included 90% females and all residency classes. All measures of attendance, distractibility and satisfaction showed dramatic positive changes in the 2011 survey. For example, the average proportion of conferences attended was 72.7% with noon conferences and 97.8% with PEARL ($p=0.00$). However, measures of perceived clinical relevance and resident participation did not change significantly. For example, on average 46.9% of residents reported contributing comments to a noon conference, whereas 55.7% of residents reported contributing in a block conference ($p=0.2$)

Conclusions: PEARL conference significantly improved resident attendance, lowered distractibility and improved resident satisfaction. These findings show promise as conferences are the primary didactic teaching opportunities in residency. However, these structural changes did not lead to changes in perceived clinical relevance of what was learned or resident participation. Thus further changes to content or faculty teaching strategies should be considered.

PAS DATE/TIME/LOCATION April 30, 2012; 4:30 pm-7:30 pm; Exhibit Halls A/B (Hynes Convention Center)

Evaluation Including Retention of Gains of a Pediatric Otolaryngology Curriculum

Caroline Paul, MD, Craig Gjerde, PhD, Gwen McIntosh, MD, Lori Weber, PhD

Background: Gaining competency in pediatric otolaryngology should begin in medical school.

Objective: We aim to evaluate a curriculum for third year medical students and determine whether knowledge and skills could be retained.

Design/Methods: A curriculum was developed and implemented during the pediatric clerkship from 2009-11. An intervention group (IG) of 100 students received a lab, which included demonstration of a skills checklist and allowed for the students to practice skills on each other and mannequins with facilitated feedback. Pre-intervention (pre-I) and post-intervention (post-I) written tests assessed gains in knowledge and skills for the IG and a non-intervention group (NIG) of 30 students. The NIG and subset

of 53 students in the IG performed ear exams on real clinic patients. Their preceptors used the lab checklist to assess them before and after the lab. At the end of their fourth year, 79 students in the 2009-2010 IG received a retention test containing the same items they received during the curriculum and were queried with a survey. Paired t-tests were used to compare pre-I, post-I, and retention scores. ANCOVA tests were used to compare differences between the IG and NIG.

Results: Pre-I scores for the written test and checklist were similar ($p=0.45-0.88$) for both groups (IG and NIG mean=12.9 for test and IG mean=11.0 and NIG mean=10.9 for checklist). Post-I scores were significantly higher ($p<0.001$) for the IG (mean=22.5 and 19.1 for test and mean=19.1 for checklist) than the NIG (mean=13.9 for test and mean=11.0 for checklist). Gain scores were also significantly higher ($p<0.001$) for the IG (mean=9.6 for test and mean=8.1 for checklist) than in NIG (mean=1.0 for test and mean=-0.1 for checklist). There was a significant decrease ($p<0.001$) from the post-I scores to the retention scores (mean=-6.88) but a significant increase ($p<0.001$) from the pre-I score to the retention score (mean overall gain=2.6). 60% and 68% of students respectively reported no further knowledge or skill gain after their clerkship. 82% desired preceptor observation of their otoscopy skills. 87% rated their otoscopy skills at or above average.

Conclusions: Measures including those using real patients indicate that this curriculum effectively translated mini-lab learning into short-term bedside learning. Yet gains were not fully sustained. It is imperative to recognize that gains attained during clerkships need to be reinforced and reassessed continually especially for critically required skills.

PAS DATE/TIME/LOCATION April 30, 2012; 4:30 pm-7:30 pm; Exhibit Halls A/B (Hynes Convention Center) Also, platform presentation for COMSEP in March 2012.

Multi-Modal Assessment to Develop a Competency Based Pediatric Otoscopy Curriculum

Caroline R Paul, MD, Meg G Keeley, MD and Gregory S Rebella, MD

Background: Pediatric otoscopy education is critical to the diagnosis of Acute Otitis Media. Yet, no standardized or recognized competencies for residents exist.

Objective: We aim to develop a competency-based curriculum for Pediatric residency interns (PI) and Emergency Medicine residency interns (EMI).

Design/Methods: A preliminary assessment of all PI ($n=14$) and all EMI ($n=6$) was performed early in training. Assessment centered on knowledge and skills expected of a graduating intern. Instruments included a written test (33 points) containing validated images (ePROM- Pediatrics, 124:714-720, 2009) and an OSCE (42 points) focusing on technique, cerumen removal, and pneumatic otoscopy (PO) using a validated ear simulator (Nasco, Inc. Fort Atkinson, WI). A subset of PI was also assessed with real patients in continuity clinic (CC) with a developed checklist (24 points). Minimum passing levels (MPL) were set prior to implementation. Two-sample t-tests were used to compare mean scores and MPL for PI and EMI with $p<0.05$ being considered statistically significant.

Results: There was no significant difference ($p=0.66$) in mean scores between PI and EMI (19.9 vs. 21.0) for the written test. 7% of PI and 17% of EMI reached the MPL with no significant differences ($p=0.51$) between groups. There was also no significant difference ($p=0.25$) in mean scores between PI and EMI (21.4 vs. 24.0) for the OSCE. The percentage of residents who reached the MPL for technique, cerumen removal, and (PO) use was 7%, 0%, and 0% respectively for PI and 0%, 0%, and 0% for EMI with no significant difference ($p=0.54-1.00$) between groups. Nine of 14 (64%) PI were assessed with the CC checklist for technique, 5 of 14 (36%) for cerumen removal, and 4 of 14 (29%) for (PO) use. 44%, 20%, and 50% of PI evaluated reached the MPL for technique, cerumen removal, and (PO) respectively. 3 of the 9 preceptors using the CC checklist could not assess for (PO) use since they did not routinely use it. There were no significant gender differences ($p=0.50-0.96$) in mean scores or MPL for all measures in both groups.

Conclusions: Multiple evaluation instruments were successfully implemented for 2 residency groups.

The strikingly similar baseline results for the 2 groups stress that competency cannot be assumed per learner type. The developed curriculum will require learning interventions in all areas of otoscopy, broader applicability to various residency groups and inclusion for faculty development.

PAS DATE/TIME/LOCATION April 30, 2012; 4:30 pm-7:30 pm; Exhibit Halls A/B (Hynes Convention Center)

****AWARD WINNER****

Attention Deficit Hyperactivity Disorder and Problematic Internet Use in Older Adolescents: An Experience Sampling Approach

Lauren A Jelenchick, BS, Jens Eickhoff, PhD, Megan A Moreno, MS, MEd, MPH

Background: Attention deficit hyperactivity disorder (ADHD) is prevalent among adolescents, and may persist into adulthood. ADHD has been identified as a significant predictor of Problematic Internet Use (PIU), an emerging health concern among adolescents. Despite their proposed relationship, little is known regarding the mechanisms linking these two disorders.

Objective: This study explored associations between ADHD symptoms and both PIU symptoms and general Internet use behaviors.

Methods: Older adolescents ages 18-25 years were recruited from one university. A cross-sectional survey included the Adult Self-Report Screener (ASRS) and the Internet Addiction Test (IAT) to assess ADHD and PIU symptoms, respectively. The survey was followed by an Experience Sampling Method (ESM) data collection period, during which participants responded to a total of 43 text message surveys randomly dispersed over 7 days. ESM surveys assessed 1) whether participants were currently online, 2) for how long and 3) online applications in use. A multilevel modeling approach that captured both within-subject and between-subject variation was used to estimate participants' average daily Internet use. A linear mixed effects model was used to test the association between Internet use and ADHD symptoms. Nonparametric tests were used to assess differences in percentage of time spent on individual Internet applications.

Results: 273 participants (73% response rate) completed the online survey, of which 193 completed the ESM procedures. Participants were 63% female, 90% Caucasian, and had an average age of 18.8 (SD=0.9) years. 20% of participants reported an ASRS score consistent with ADHD, and 36% scored in the IAT's problematic user category. Those with ADHD symptoms were more than twice as likely to report symptoms of PIU (OR=2.5, 95% CI: 1.2, 5.3). Estimated mean daily Internet use was 86.1 minutes (SD=144.2); the most frequently reported online application was social networking sites (52.9%, 95% CI: 48.8, 57.0). No associations were seen between ADHD symptoms and overall time online, or percentage of time on different applications.

Conclusions: Participants with ADHD symptoms were found to be at greater risk for PIU. However, neither duration nor content of Internet use varied with the presence of ADHD symptoms. Findings suggest that the mechanisms linking ADHD and PIU may not be based in quantitative differences in Internet use behaviors.

PAS DATE/TIME/LOCATION April 30, 2012; 4:30 pm-7:30 pm; Exhibit Halls A/B (Hynes Convention Center)
Received travel grants from the UW Master of Public Health program and UW Holtz Center for Science and Technology Studies to support traveling to PAS to present this abstract.

The Impact of Erythropoietin on Iron Transport and Transferrin Receptor in Newborn Rats

AT Quilling, CA Pittner-Smith, MY Sun, SE Blohowiak, PJ Kling.

The iron transport protein, transferrin (Tf) is found in the mammalian milk and transferrin receptor (TfR) in small intestine. In erythropoietic cells, erythropoietin (Epo) upregulates expression of Tf and TfR. Epo has also been found in mammalian milk, resulting in locally high duodenal levels. In neonates, parenteral Epo does not appear to impact duodenal iron absorption. To examine whether enteral Epo improves iron absorption in newborn rats, we hypothesized that duodenal TfR, plasma Tf, plasma ferritin and liver iron levels would be greater in rats fed milk-borne Epo. Both control (Dam) and iron-deficient (IDA) Sprague-Dawley rats were fed either enteral Epo or vehicle from postnatal day (P)4-P12. IDA was induced by iron-deficient artificial formula via gastrotomy. Blood and tissues were harvested. Body and liver iron contents were measured, and plasma levels of Tf, iron, Tf saturation and ferritin were assayed. Iron distribution in duodenum and liver was measured with PBR (Fe³⁺) and enhanced (Fe^{2+/3+}) PBR. Intestinal TfR localization was assessed by IHC and expression was measured by Western blot. Photomicrographs were used for quantitative image analysis. Dam-fed rats had higher body iron than IDA, with intermediate levels in IDA+Epo. Liver iron concentration was higher in both IDA groups, with enhanced PBR staining in a central vein distribution. Duodenum had no PBR staining. Plasma levels of Tf, iron and Tf saturation were similar between groups, but plasma ferritin levels were higher in both Dam groups compared to IDA, with intermediate results in IDA+Epo. Duodenal TfR expression was higher in IDA+Epo than other groups and was localized to the apical surface of villus enterocytes. Enteral Epo increases iron absorption and plasma ferritin (reflecting body iron stores) in a fashion similar to erythrocyte precursors, by increasing enterocyte TfR levels. Newborns differ from adults, with TfR playing a major role in enteral iron transport. Although enteral Epo has potential as an adjunct treatment for iron-deficient neonates, it was unexpected to find that liver iron concentrations were higher in IDA rats, supporting blockade in iron trafficking out of liver into blood, perhaps due to immaturity of the master regulator of iron metabolism, hepcidin. Further examination of the regulation of iron transport into and out of liver in the neonate is necessary.

PAS DATE/TIME/LOCATION May 1, 2012; 12:30pm – 2:00pm; Exhibit Halls A/B (Hynes Convention Center)

Posters Other Spring Meetings

****Award Winner****

Brucella Melitensis Induces the Unfolded Protein Response in Macrophages

Mike Khan, Diogo M. Magnani, Jerome Harms, Yi-Ping Liu, Gary A. Splitter, Judith A. Smith

Brucella melitensis is a facultative intracellular bacterium that causes brucellosis, the most prevalent zoonosis worldwide. As no current vaccine is available, and current therapy suboptimal, a better understanding of how *Brucella* establishes an intracellular replicative niche is necessary. *Brucella* fuses with the endoplasmic reticulum (ER) in order to replicate, and thus may provoke an ER stress response called the Unfolded Protein Response (UPR). In this study, we found upregulation of the UPR target genes BiP and CHOP, as well as XBP1 mRNA splicing in both RAW 264.7 murine macrophages and bone marrow macrophages infected with *B. melitensis*. These data indicate activation of all 3 major axes of the UPR. BiP and CHOP upregulation was MyD88 independent. Furthermore, upregulation of BiP, CHOP and the XBP1 target ERdj4 was ablated in the heat killed and VirB (ER fusion) *Brucella* mutant. Finally, taurodeoxycholic acid, a UPR inhibitor, significantly impaired *Brucella* replication. The JNK inhibitor SP600125 also suppressed replication, consistent with previous reports implicating the IRE-1-dependent UPR pathway. Together, these results suggest *Brucella* induces the UPR to aid in its intracellular replication, and that the UPR could be a novel therapeutic target for treatment of brucellosis

American Association of Immunology Annual Meeting, May 4, 2012

Recipient of both Early Faculty and student travel awards.

Correlations Between Chest X-ray Scores and Chest CT Scores Up To 5 Years Apart

Sanders DB, Li Z, Collins J, Brody A, Farrell P

Background: We recently demonstrated that: (1) the Wisconsin x-ray scoring system (WCXR) is highly sensitive to chest CT abnormalities for chest x-rays obtained within one year of the CT; (2) WCXR scores are strongly predictive of WCXR and FEV1 severity 5-7 years later. In this study, we hypothesize that WCXR scores obtained up to 5 years before and after a chest CT would be correlated with the Brody CT score.

Methods: In 2000, 81 subjects in the Wisconsin Randomized Control Trial of CF Newborn Screening obtained a high-resolution chest CT at their clinical baseline. Chest x-rays and spirometry were performed annually. The sensitivity, ROC, and correlation between the 2000 Brody CT score and annual WCXR and FEV1 % predicted obtained between 5 years before and 5 years after the chest CT were calculated.

Results: In 2000, the mean (range) age was 11.6 (6.6-17.6) years. During the 10-year study period, the mean (SD) WCXR worsened from 10.2 (9.6) to 23.4 (14.5); the mean (SD) FEV1 % predicted remained stable: 91.8 (23.4) in the first year and 92.3 (18.3) in the last year. The correlation between WCXR scores and the CT score ranged from 0.72 to 0.84. In contrast, the correlation between FEV1 and CT scores ranged from -0.49 to -0.76. The WCXR correlation was statistically significantly better than the FEV1 correlation in the 4 years before the CT and years 2-4 after.

Conclusion: There is a strong correlation between annual WCXR scores and chest CT score for a period up to 5 years before and 5 years after the CT. Over a 10-year period, longitudinal WCXR scores compare favorably with chest CT and provide more prognostic information on lung disease progression than does FEV1.

35th European Cystic Fibrosis Conference, June 9, 2012

Sex-related Differences in Atopic Phenotype Expression and Immune Responses in Childhood

A Thomas, MD, DJ Jackson, MD, CJ Tisler, MT, V Rajamanickam, RE Gangnon, PhD, JE Gern, MD, RF Lemanske, Jr., MD

Rationale: Gender differences among children with asthma and allergic disease have been observed clinically, with males having a higher prevalence of asthma prior to puberty. We hypothesized that boys aged 6-9 would continue to have greater atopy and cytokine responses to PHA stimulation compared to girls.

Methods: 289 subjects were enrolled during the prenatal period into the Childhood Origins Asthma (COAST) study with at least one parent with respiratory allergies and/or physician diagnosed asthma, and 234 subjects were enrolled at year 9. Blood was collected annually and mononuclear cells were stimulated with phytohemagglutinin (PHA). Levels of IFN- γ , IL-5, IL-10, IL-13 in supernatants were evaluated using the Luminex[®] multiplex immunoassay. Total and allergen-specific IgE were measured using Immucap[®]; values of ≥ 0.35 KU/L were considered positive.

Results: Boys had increased rates of positive in vitro IgE to any allergy at year 9 (61% vs 44%, $p=0.04$). Boys had higher levels of total IgE at year 6 (median, 56 vs 28 KU/L; $p=.01$) and year 9 (median, 63 vs 45.2 KU/L; $p=0.04$). Median PHA-induced IFN- γ responses were higher in boys when compared to girls at year 6 (median, 1131 vs 777; $p=.005$). PHA-induced IL-5 and IL-10 responses were also greater in boys at year 6 (median, 289 vs 236; [$p=.029$] and median, 1040 vs 920; [$p=.034$], respectively).

Conclusions: There are gender differences in atopic phenotype expression and in vitro immune responses between boys and girls during the pre-pubertal school age years.

American Academy of Allergy Asthma and Immunology 2012 Annual Meeting; March 3, 2012

Increased Anti-melanoma Efficacy of hu14.18K322A by Combining with α CD40 + CpG

Kory L. Alderson, Mitchell Luangrath, Megan Elsenheimer, Stephen D. Gillies, Fariba Navid, Alexander L. Rakhmilevich, Paul M. Sondel

Targeted monoclonal antibodies (mAb) can be used therapeutically for tumors with identifiable antigens. One example is ganglioside-D2 (GD2), expressed on neuroblastoma and melanoma. α GD2 mAbs have been clinically successful in patients with neuroblastoma. An important mechanism of mAb therapy is Antibody Dependent Cellular Cytotoxicity (ADCC). Combinatorial therapeutic strategies can dramatically increase the anti-tumor response elicited by mAbs. We combined a novel α GD2 mAb, hu14.18K322A, with an immunostimulatory regimen of agonist CD40 mAb and a class B CpG-containing oligonucleotide. This combination immunotherapy produced a synergistic anti-tumor response in a model of minimal melanoma burden, producing long-term cure of melanoma bearing mice. NK depletion in B6 mice showed NK cells were required for the anti-tumor effect. Long-term cure could also be achieved by treating tumor-bearing SCID/beige mice; thus NK cell cytotoxicity was not essential. Interrogation of the myeloid population in the peritoneal cavity showed an increase in neutrophils and monocytes with high Fc receptor expression after treatment with α CD40+ CpG. Furthermore, plastic adherent peritoneal cells inhibited tumor cells in vitro in an antibody-dependent manner. These data highlight the importance of myeloid cells as potential effectors in immunotherapy regimens utilizing tumor-specific mAb and suggest further studies are needed to investigate the therapeutic potential of activated myeloid cells.

American Association of Immunologists, May 4, 2012

Developing, Implementing, and Evaluating a Hospitalist-Facilitated Night Teaching Curriculum

Ehlenbach, Mary L; Mallon, Daniel P; Romero, Hilgenberg, Sarah L; Romero, Holly M

Purpose: With more time spent working night shifts due to ACGME duty hour requirements, the development of a formal night teaching curriculum is imperative to enhancing the education of pediatric residents. Hospitalists working in-house night shifts have both expertise and enthusiasm for teaching. We aimed to develop a night teaching curriculum for pediatric and visiting residents facilitated by hospitalists working in-house night shifts.

Methods: IRB approval was obtained. Pediatric residents were given a design survey about interest in participation, content, facilitator preference, and format. Based on those results, a night teaching curriculum was developed. Four months after implementation, residents were given an evaluation survey assessing participation, time spent on educational activities at night, value of individual night teaching sessions, and interest in future topics.

Results: Based on the design survey, most residents indicated feeling very or somewhat interested in participating in structured night teaching sessions. Acute management of inpatient problems and visual diagnosis/pediatric trivia were the two most common content preferences. Most residents indicated that an R3 or Hospitalist should facilitate the teaching. The majority of residents preferred a case-based format. Based on these responses, a night teaching curriculum of hospitalist-facilitated case-based discussions of acute inpatient management issues was created. The initial eight topics were acute gastrointestinal bleed, altered mental status, respiratory distress, seizure with airway compromise, allergic reaction/anaphylaxis, tachycardia, hyperkalemia, and chest x-ray interpretation. The sessions occurred at 01:30 Mondays through Thursdays in a private dining room. 83 of 92 (92%) residents in the program responded to the evaluation survey, and 48 of 83 (58%) had attended at least one night teaching session. The mean attendance rate for residents attending one week of sessions was 46% (1.85/4). Residents indicated that they spent an increased amount of time participating in discussions with the overnight hospitalist compared to before implementation, while participation in other forms of education remained unchanged. Most residents indicated that the individual night teaching sessions were somewhat or very valuable. Residents indicated interest in development of future cases on topics including electrocardiography interpretation/telemetry, abnormal sodium, hypertensive urgency, diabetic ketoacidosis, transfusion reactions, acute abdomen, and others.

Conclusions: Residents expressed interest in participating in structured night teaching sessions. Resident participation was consistent but left room for improvement. Residents spent more time in discussions with the hospitalist after implementation of the night teaching curriculum, and participation in other educational activities remained stable. Residents found the sessions valuable and indicated interest in development of future cases.

AAP NCE, Section on Hospital Medicine poster presentation, October 17, 2011

Bestrophin Mutation Associated with Best's Disease Causes Altered Chloride Conductance

Bikash R. Pattnaik, Patrick Halbach, Simran Brar, Sara Tokarz, David M. Gamm, De-Ann M. Pillers

Purpose: Macular degeneration in Best Vitelliform Macular Dystrophy (BVMD), is a serious pediatric problem. BVMD is caused by dominantly-inherited mutations of bestrophin, a protein localized to the basolateral membrane of retinal pigment epithelial (RPE) cells. Bestrophin proteins form Cl⁻ channels, an important contributor to RPE cell function. We sought to determine the effect of a novel disease associated mutation, located within the Ca²⁺-binding domain of bestrophin on the bestrophinopathy.

Methods: Using site-directed mutagenesis, we introduced the novel N296H genetic mutation associated with BVMD into a vector containing PIRE5, GFP, and human bestrophin 1 (hBest1). The vector was sequenced to verify that the mutation was present. The hBest1 wildtype (WT) and hBest1 N296H mutant were introduced into cultured Chinese Hamster Ovary (CHO-M1) cells and transiently expressed. Ionic flux due to the two clones was measured as current-amplitude using either the whole-cell or

perforated patch configurations of patch-clamp electrophysiology. For the cells recorded in perforated patch mode, we used 100 μ M carbachol to stimulate G-protein coupled receptor-induced physiological changes in intracellular Ca^{2+} .

Results: GFP-positive cells confirmed the ectopic expression of WT hBest1 and hBest1 N296H in CHO cells. Under conditions of high intracellular Ca^{2+} , Cl^- current due to hBest1 exhibited both inward and outward current depending on the membrane potential. The corresponding current-amplitude plot was linear with resting membrane potential close to 0 mV. Substitution of bath Cl^- with HCO_3^- positively shifted the I-V plot by ~ 23 mV without much change in conductance, which matched the previously published characteristic of bestrophin Cl^- channel current. In comparison, mutant hBest1 N296H transfected cells had significantly reduced current amplitudes and also preference for other anions. Physiological alteration of intracellular Ca^{2+} through the activation of muscarinic receptors resulted only in the activation of current due to the wildtype but not the mutant channel. / **Conclusions:** These results demonstrate a direct relationship between the Ca^{2+} binding site mutation and altered Cl^- conductance. The absence of Cl^- conductance in the N296H mutant therefore supports the hypothesis that hBest1 is a Ca^{2+} -activated Cl^- channel.

Association for Research in Vision and Ophthalmology; May 6, 2012

Comparison of Internet Distraction Among College Students With and Without ADHD

Natalie Goniou, Megan Moreno, MD, MPH, MEd

The number of college students using the Internet has dramatically increased over the past decade. The numerous websites available to students may be distracting, especially for individuals with undiagnosed attention-deficit hyperactivity disorder (ADHD). The purpose of our study was to determine whether individuals with undiagnosed ADHD are more distracted by the Internet than individuals without ADHD. We distributed a survey to college students at a large state university containing questions regarding their Internet use, whether they feel distracted by the Internet, and whether they have been diagnosed with ADHD. Thus far, we have distributed 68 surveys. No participants have reported being diagnosed with ADHD, but 14 have been classified as "at-risk" for ADHD based on their responses to an Adult ADHD Self-Report Scale. Of the 14, only 3 believe they have ADHD. 65 participants have said they feel distracted by the Internet, 13 of which were at-risk for ADHD. Final analysis will be completed by the time of the Pediatric Department Research Day.

Will be presented at the UW System Symposium in Kenosha, WI on April 27, 2012

Also at the Undergraduate Research Symposium in Madison, WI on April 18, 2012

Attitude Changes toward Tobacco and Marijuana in Students' First Year of College

Mara Stewart, Megan Moreno, MD, MPH, MEd

Nearly one-third of students have tried tobacco and over one-third have tried marijuana before college. The purpose of this study was to understand how students' attitudes toward tobacco and marijuana shift after entering college. 339 participants from two universities were interviewed the summer before college and 109 had follow-up interviews during their first semester. Attitude was measured on a 1 to 5 scale with 5=most positive. Results showed that participants' attitudes towards tobacco did not change (1.4 to 1.6) but their attitudes towards marijuana became more positive (2.51 to 2.73). Overall, Wisconsin students had more positive attitudes towards both substances (tobacco=1.13 marijuana=1.97) than Washington participants (tobacco=0.70 marijuana=1.83). These results suggest that students' attitudes towards marijuana change in college but their attitudes towards tobacco do not.

The Endocrine Regulation of Retinal Pigment Epithelium Cell Function

P. Halbach, MP Asuma, W. Luo, D. M. Pillers, B. R. Pattnaik

Purpose: The retinal pigment epithelium (RPE) positively contributes to vision. Most of its functions are tightly regulated by the intracellular second messenger, Ca^{2+} , which in turn, is controlled by the G-protein coupled receptor (GPCR) signal transduction pathway. The Oxytocin receptor (OTR) is associated with intracellular Ca^{2+} ($[Ca^{2+}]_i$) regulation. Since oxytocin (OT) is localized to the posterior retina and has circadian regulation, we were interested in how RPE may be regulated by OT.

Methods: Cultured human RPE (hRPE) single cells were recorded by whole-cell patch clamp electrophysiology to verify hRPE phenotype. After electrophysiology, the cytoplasmic content of the cells were harvested and analyzed for OTR transcripts using single-cell RT-PCR. Post mortem human eye tissue was processed for testing PCR-based expression of OTR in the RPE and retina. $[Ca^{2+}]_i$ mobilization in response to OT and ATP was conducted via live-cell FURA-2 fluorescence imaging.

Results: Cultured hRPE cells exhibited characteristic RPE phenotype and expressed OTR, as well as other typical RPE transcripts. Human RPE and retina showed evidence of OTR expression. Cultured hRPE cells when stimulated by OT, exhibited robust $[Ca^{2+}]_i$ response similar to that of ATP, though it had distinct kinetics.

Conclusions: The discovery of OTR in the RPE is a novel finding. The increase in $[Ca^{2+}]_i$ in response to OT stimulation, as well as the circadian regulation of the RPE, suggests that RPE utilizes oxytocinergic signaling and perhaps other endocrine regulations.

April 12, 2012 Endocrinology and Reproductive Physiology Program – Fluno Center

May 6-10, 2012 The Association for Research in Vision and Ophthalmology – Fort Lauderdale, Florida

Fed up with Facebook: An Exploration of Why College Students Deactivate Their Accounts

Bradley Kerr, Megan Moreno

Introduction: Given that over 90% of college students have Facebook profiles, the decision to deactivate, or temporarily delete, one's account warrants consideration. Deactivation could reflect social, academic, or other problems which suggest a need for attention. This exploratory study aims to identify factors that may contribute to the college student's decision to deactivate Facebook.

Methods: Freshmen from the Universities of Wisconsin-Madison and Washington who are participants in an ongoing longitudinal study were noted to have deactivated their Facebook accounts. All "deactivators" completed phone interviews regarding this decision, and responses were coded into themes. Deactivators' profiles were evaluated for status update totals and friend counts in the month before deactivation. For comparison, each deactivator was matched to a non-deactivator control group from the same ongoing study whose profiles were evaluated in the same time period.

Results: Participants included 7 deactivators (3 male) and 332 control participants (145 male). Participants identified gaining time and avoiding negative experiences, including privacy concerns, as reasons for deactivation, and most (5) indicated that there were no drawbacks. Compared to control groups, deactivator status update totals tended to be lower, and friend counts tended to be higher.

Conclusion: Because this study only evaluated Facebook use in the time period before deactivation, lower deactivator Facebook use may not represent long-term patterns. Findings may reflect the end of a gradual, intentional reduction in Facebook use to gain time for schoolwork. Future research should continue to explore whether this behavior reflects social, academic, or other needs.