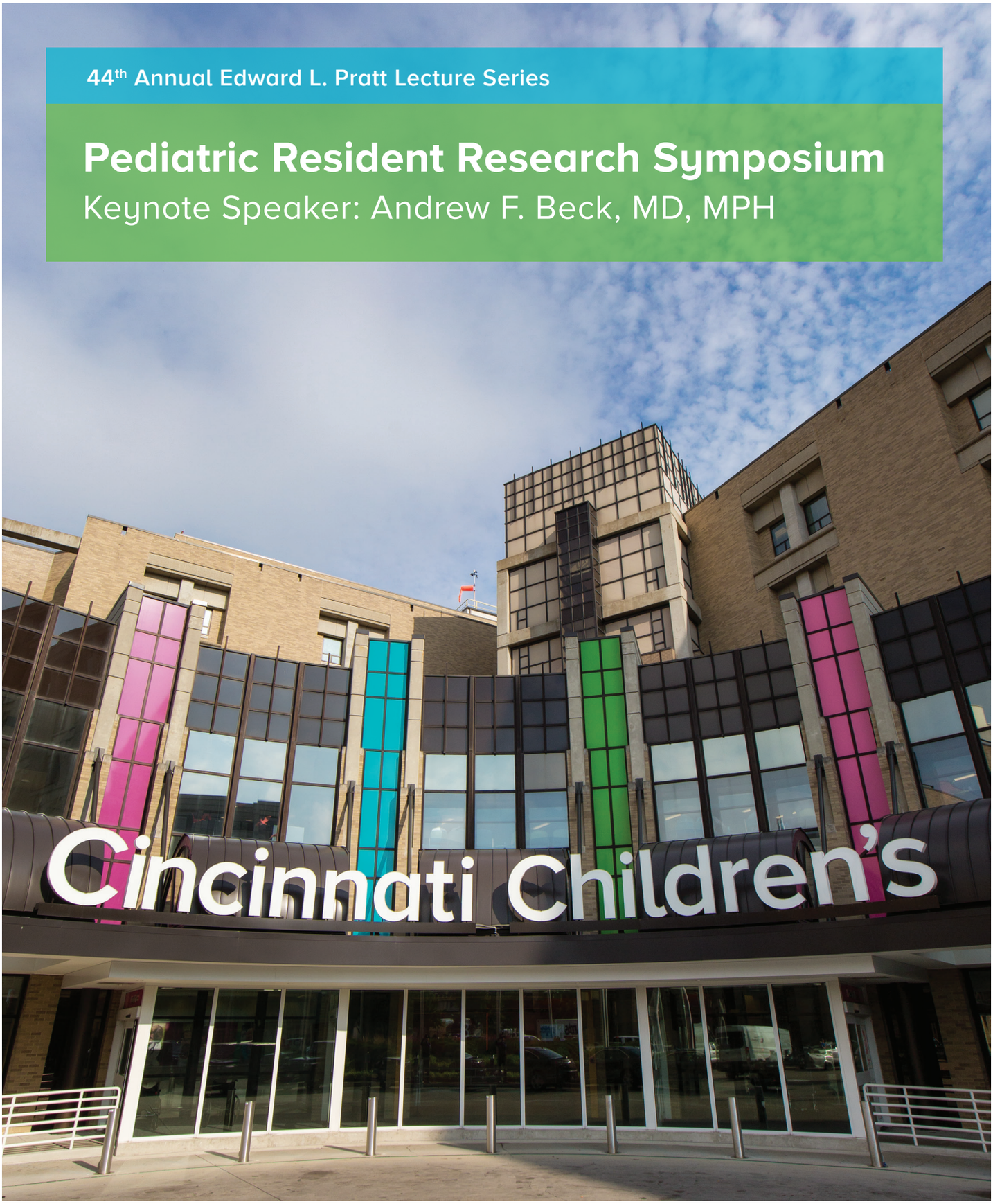
44th Annual Edward L. Pratt Lecture Series

Pediatric Resident Research Symposium

Keynote Speaker: Andrew F. Beck, MD, MPH



Cincinnati Children's®
changing the outcome together

Wednesday, May 14, 2025
noon–4 pm

44th Annual Edward L. Pratt Lectures

Agenda | Wednesday, May 14, 2025

noon–12:10 pm	**Introduction of Keynote Speaker** Kristen Peterson, MD | Pediatric Chief Resident 2024–2025
12:10–1 pm	**Keynote Address: Finding My Place — Making the Pursuit of Population Health Equity Personal** Andrew F. Beck, MD, MPH Professor, Divisions of General & Community Pediatrics, Hospital Medicine, and the Anderson Center at Cincinnati Children's and the University of Cincinnati College of Medicine Director, Population Health / Health Equity Research and Innovation, Office of Population Health and Michael Fisher Child Health Equity Center
1–1:15 pm	**Break**
1:15–1:30 pm	**Assessing Care for Kisumu's Pediatric Sickle Cell Warriors: A Vital Step Toward Improvement** Megan Harris, MD, MPH | Medicine/Pediatrics, PGY-4
1:30–1:45 pm	**Improving Time to Antibiotic Administration in Open Fractures** Fiona Fimmel, MD | Categorical Pediatrics, PGY-2
1:45–2 pm	**PPARγ Single Nucleotide Polymorphism Associated with Pediatric Septic Shock Mortality Risk and Differential Response to Corticosteroids** Valentina Bonnefil, DO | Categorical Pediatrics, PGY-3
2–2:15 pm	**Bronchopulmonary Dysplasia Associated Neurodevelopmental Impairments in Preterm Infants are Partially Mediated Via Early Corpus Callosum Microstructural Development** Kylan Nelson, MD | Categorical Pediatrics, PGY-2
2:15–2:45 pm	**Poster Session and Break**
2:45–3 pm	**Improving Continuity of Care in a Pediatric Residency Clinic: An Analysis of Well-Child Visit Scheduling** Abigail Rossman, MD | Categorical Pediatrics, PGY-3
3–3:15 pm	**Asthma Support in Structurally Disadvantaged Neighborhoods** Elaine Bognar, MD | Categorical Pediatrics, PGY-3
3:15–3:30 pm	**PENFS Improves Gastrointestinal and Psychological Outcomes in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder and Disorders of Gut-Brain Interaction** Umber Waheed, MD | Categorical Pediatrics, PGY-3
3:30–3:45 pm	**Percutaneous vs. Endoscopic Ultrasound Guided Liver Biopsies in Pediatric MASLD** Talia Schwartz, MD | Categorical Pediatrics, PGY-3

Poster Submissions: **prattlectures.com**

IN MEMORY OF

Edward L. Pratt, MD
1913–1988

Dr. Pratt fostered the spirit of intellectual curiosity, critical thinking, perseverance, and independent research in the minds of his students.

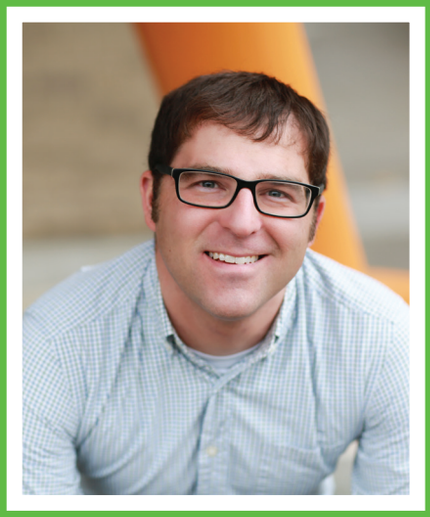
It is a pleasure to honor Dr. Edward L. Pratt with the 44th annual Edward L. Pratt Lecture series.

Edward L. Pratt, MD, was professor and chairman of the Department of Pediatrics at University of Cincinnati College of Medicine from 1963 until his retirement in 1979; he continued as professor emeritus of pediatrics until his death in 1988.

Dr. Pratt graduated from Harvard Medical School in 1940, followed by pediatric residency and chief residency at Boston Children's Hospital and research training at Yale University and Cambridge University. He was associate professor of pediatrics at New York University College of Medicine from 1949–1954. In 1954, he was named chairman and professor of the Department of Pediatrics at University of Texas Southwestern Medical School, chief of staff at Children's Medical Center in Dallas, and chief of pediatric service at Parkland Memorial Hospital in Dallas. Dr. Pratt joined Cincinnati Children's Hospital Medical Center and the UC College of Medicine as the B.K. Rachford Professor of Pediatrics in 1963. At that time, he also was named director of the Children's Hospital Research Foundation and chief of staff of Cincinnati Children's.

Together with the Board of Trustees, Dr. Pratt led the effort to centralize child health care services in Cincinnati by bringing together the six health care programs that form Cincinnati Children's. He encouraged pediatric research and fostered the careers of many young investigators, both in the clinical and basic science arenas. Dr. Pratt taught that pediatric research is the best and most inexpensive way of combating childhood disorders. His own research in nutrition and fluid and electrolyte metabolism forms the basis of current knowledge and much of the current practice in these areas.

Established by their peers and teachers, the Pratt lectures allow pediatric residents to present results of their research in an open forum for critical analysis.



KEYNOTE SPEAKER

Andrew F. Beck, MD, MPH

Finding My Place—Making the Pursuit of Population Health Equity Personal

Andrew Beck, MD, MPH, is a Professor in the Divisions of General & Community Pediatrics, Hospital Medicine, and the Anderson Center at Cincinnati Children's and the University of Cincinnati College of Medicine. He is Director of Population Health / Health Equity Research and Innovation in the Fisher Child Health Equity Center and Office of Population Health. He is board certified in Pediatrics and Pediatric Hospital Medicine.

I have long been interested in the impact place has on health and well-being. A tight-knit community in Rochester, New York provided me (and my family) with intense support during challenging times. That place will always hold a special place in my heart, showing me that place matters—for good or ill. As a college student studying anthropology at Yale University, I recall walking the few blocks from our idyllic campus to the run-down campus of a New Haven middle school. As we worked with students on science projects, we got a glimpse into their lives, the day-to-day challenges influencing their ability to learn, develop, and grow. Similar experiences at the University of Pittsburgh School of Medicine, from providing clinical care to the homeless on downtown city streets to an international trip in rural Honduras, brought me closer to families and communities, underscore the importance of social, economic, and environmental context.

I moved to Cincinnati Children's in 2006 to start a pediatrics residency with my wife, Dr. Karen Jerardi. Residency introduced me to patients and families from neighborhoods right around the corner and from countries that were thousands of miles away. Rotations from Avondale to Eswatini underscored the importance of place to each patient, that geographic context can greatly affect health outcomes in both positive and negative ways. Residency also introduced me to countless friends and colleagues, many still here at Cincinnati Children's. I also connected with mentors, including Drs. Rob Kahn, Melissa Klein, Jeff Simmons, Mia Mallory, Anita Brentley, and so many others, individuals who helped me see that academics and advocacy, research and clinical care can be complementary, strengthening one another in meaningful, impactful ways.

This realization prompted me to pursue general academic pediatrics fellowship at Cincinnati Children's and public health training at Harvard, developing my research skills, improving my academic rigor, and enhancing my ability to advocate for and lead change. This further training helped me build a foundation for a career that has since spanned research, clinical care, teaching, and advocacy.

I have been on the faculty since 2012. The 3–6 year planned adventure Karen and I envisioned for Cincinnati has become 18+ years. I love that our hospital serves as both a world-class referral center as well as the hospital for children in our city, those just down the street. I fully believe that we can achieve excellent and equitable child health outcomes, and that we can do so via meaningful clinical-community partnership. The many twists and turns of life, personal and professional, have pushed me to pursue such a goal, to maintain an unwavering movement toward population social and health justice.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Assessing Care for Kisumu's Pediatric Sickle Cell Warriors: A Vital Step Toward Improvement

Megan Harris, MD, MPH; Beason Soita, CO; Nancy Waliaula, HRIO; Pauline Damiana, MD; Joy Ogingo, CO; Daniel Lichtenstein, MD; Joy Muyonga, MD, MMed Pediatrics

****

Background: Despite advances in care, an estimated 50–90% of children with sickle cell disease (SCD) in Sub-Saharan Africa die before the age of five. Data collection - essential for tracking health trends, shaping policy, and supporting informed clinical decision-making - remains particularly challenging in settings without robust health information systems. At Obama Children's Hospital in Kisumu, Kenya, pediatricians report high morbidity and mortality due to SCD but lack empirical disease burden characterization. Recognizing that problem characterization may enhance resource allocation to their patients, they chose to begin by assessing the quality of their current practices.

Objective: To perform quality assessment of outpatient pediatric SCD management at Obama Children's, as compared to the Kenya National Guidelines for Care of Patients with SCD, with a goal of identifying targets for future quality improvement (QI) initiatives.

Methods: Retrospective chart review was conducted on patients seen at SCD clinic between May 2022 – May 2023. Non-standardized paper documentation was transcribed to a standardized format in REDCap. Demographic, diagnostic, treatment, prophylaxis, morbidity, and laboratory data relevant to Kenyan SCD guidelines were obtained for comparative analysis.

Results: 220 patients were included in analysis. 51% were male, median age 5 years (range 0-17), with mean number of clinic visits 4.4 (SD 3.6). Comparative analysis investigated: % confirmed diagnosis, % immunized, % on proper hydroxyurea (HU) management, % with baseline labs, and % on malaria prophylaxis, among other relevant information. Multiple discrepancies were found between documented care and nationally recommended guidance. For example, 66% (N=145) of patients were on HU therapy. Of the 68% (N=84) patients on HU with weight/dose/frequency all recorded, 38% were found to be >10% below or above target dose range. Of recommended baseline labs for initiation of HU therapy, >80% did not have renal or hepatic panels on file and 48% did not have fetal hemoglobin.

Conclusions: Multiple gaps in pediatric SCD outpatient care at Obama Children's have been identified. These may contribute to the morbidity and mortality reported by local pediatricians. This information will facilitate the design of QI initiatives targeted at aligning care with the evidence-based recommendations in the national guidelines.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Improving Time to Antibiotic Administration in Open Fractures

Fiona Fimmel, MD; Emily Rheaume, MBA, BSN; Kelly Falcone, DNP, RN, APRN;
Adam Vukovic, MD, MEd; Sean Bartlett, MSN; Laurie Johnson, MD; Vincent, Alexander, MD, MS

****

Background: Delayed antibiotic treatment for pediatric open long-bone fractures is associated with increased risk of infection. National guidelines recommend the administration of intravenous (IV) antibiotics within 60 minutes of an open fracture patient presenting to the Emergency Department (ED). Our level 1 pediatric trauma center has historically not met this benchmark.

Objective: To improve time to antibiotic administration in pediatric open long-bone fractures in a level I pediatric ED from a baseline of 114 minutes to 60 minutes or less over a 9 month intervention.

Methods: A multidisciplinary team used serial Plan-Do-Study-Act cycles to implement new programs and refine existing ED policies, operationalizing prompt administration of antibiotics for patients with open fractures. We solicited information from ED stakeholders about barriers to antibiotic administration and provided education to key members of the ED team (Fig. 1). We revised existing criteria for evaluation of long-bone fractures and introduced a fracture order set with standardized recommendations for antibiotic administration and information about practice guidelines. Cases of open fractures were evaluated on a biweekly basis, and members of the treating ED team were emailed to solicit their feedback. Data were analyzed using X-MR control charts, with standards for interpretation of control charts employed to identify any signals of change.

Our primary endpoint was time to appropriate antibiotic administration after arrival to the ED. As a process measure, we tracked utilization of the new order set. As a balancing measure we also tracked time to fracture reduction.

Results: Data collected from 9/2020 to 10/2024 included 97 patients, 21 of whom were seen in the 10 months after the intervention began. We note an improvement in time to antibiotic administration from a baseline of 114 minutes to 36 minutes (Fig. 2). Time to fracture reduction was not negatively impacted by the study intervention. There was a modest improvement in the antibiotic order set usage to 29%.

Conclusions: Use of an iterative multimodal quality improvement package can improve adherence to evidence-based protocols for the initial treatment of pediatric open long-bone fractures. This improvement is sustained, and further work remains to be done to assess secondary outcomes and to sustain improvement.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

PPARγ Single Nucleotide Polymorphism Associated with Pediatric Septic Shock Mortality Risk and Differential Response to Corticosteroids

Valentina Bonnefil, DO; Stephen Standage, MD; Andrew J. Lautz, MD; Jennifer Kaplan, MD; Basilia Zingarelli, MD, PhD; and Mihir Atreya, MD, MPH

****

Background: Pediatric septic shock remains a major public health issue despite extensive research, with therapeutic options limited to antibiotics and intensive care. The role of corticosteroids remains controversial. Incomplete understanding of disease pathobiology and patient heterogeneity complicates scientific progress. Peroxisome proliferator-activated receptors (PPARs) are nuclear receptors that regulate transcription, playing critical roles in inflammation and metabolism. Specific enhancer polymorphisms, such as rs10865710, have been linked to sepsis risk in trauma patients, suggesting targeted modulation of the PPARγ pathway could offer new therapeutic avenues for improving sepsis outcomes.

Objective: We hypothesized that PPARγ SNPs would be independently associated with increased risk of mortality among children with septic shock.

Methods: We utilized biobanked human whole-blood derived DNA from a multi-center, prospective observational cohort of pediatric patients with septic shock within 24h of meeting pediatric-specific consensus criteria for septic shock. TaqMan genotyping of 381 patients assessed single nucleotide polymorphism (SNP) of PPARγ (rs10865710), with a minor allele frequency >5%. Logistic regression analyses with backward elimination were conducted to examine the association between SNP and 28-day survival, adjusting for age, comorbidity, and PRISM III scores. Kaplan-Meier survival curves were generated to test the effect of SNP, as well as SNP and corticosteroid interaction on PICU survival time.

Results: PPARγ SNP (rs10865710) was in Hardy-Weinberg equilibrium ($\chi^2 = 0.592$). No significant differences were observed between patients with and without mutant alleles regarding age, race, comorbidities, baseline illness severity, immunosuppression, or receipt of steroids. However, carrying at least one mutant allele was associated with an adjusted odds ratio of 3.75 (95% CI: 1.53–9.20) for 28-day mortality. Patients with the mutant allele had a significantly lower 28-day survival probability compared to no mutation ($p = 0.0145$). Among patients with mutant alleles, those who received steroids had a significantly lower 28-day survival probability ($p = 0.0099$) compared to those who did not receive steroids, or wild-type.

Conclusions: Our findings suggest that PPARγ SNP (rs10865710) is associated with increased mortality in pediatric septic shock, especially in patients who received corticosteroids. Pending mechanistic validation, our results suggest that patients biologically predisposed to detrimental effects of corticosteroids may benefit from alternative therapies like PPARγ agonists.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Bronchopulmonary Dysplasia Associated Neurodevelopmental Impairments in Preterm Infants are Partially Mediated Via Early Corpus Callosum Microstructural Development

Kylan Nelson, MD; Katsuaki Kojima, MD, PhD, MPH; Anoosha Sri; Julia Kline, PhD; Mekibib Altaye, PhD; Beth Kline-Fath, MD; Nehal Parikh, DO, MS

****

Background: Preterm infants with bronchopulmonary dysplasia (BPD) experience worse neurodevelopmental outcomes. It is unclear whether infants with BPD exhibit distinct white matter microstructure abnormalities in the corpus callosum (CC) and if these differences influence developmental outcomes.

Objective: To investigate differences in CC and subsegment microstructure, as well as Bayley-III scores, among preterm infants with varying BPD severity. We hypothesized that higher BPD severity would be associated with lower Bayley scores and this relationship would be indirectly mediated via decreased fractional anisotropy (FA) in CC microstructure.

Methods: This prospective cohort study includes 395 infants born at or below 32 weeks' gestation from five NICUs in a major metropolitan area. Diffusion tensor imaging (DTI) scans were acquired at 39-44 weeks postmenstrual age (PMA) on a single 3T scanner. We used TractSeg software to segment and calculate FA values of the CC and its seven subsegments. BPD severity was graded based on the respiratory support at 36 weeks PMA per Jensen et al. (2019). At two years corrected age, participants underwent Bayley-III developmental assessments. Confounders were selected based on literature review. Multivariable linear regression models were used to examine associations between BPD severity and mean FA of each CC subsegment, adjusting for confounders, and to assess the relationship between BPD severity and Bayley scores. Mediation analysis was performed to determine the extent to which CC microstructural development mediated the effects of BPD on developmental scores.

Results: Of the 395 infants, 392 were eligible for 2-year follow-up and 338 (86%) had complete data. After adjusting for confounders, infants with higher BPD grades had significantly lower Cognitive scores ($p = 0.023$), Motor scores ($p = 0.008$), and mean FA values for the CC posterior midbody ($p = 0.003$). Mediation analysis revealed that CC posterior midbody FA values indirectly mediated 17% of the adverse effects of BPD on both Bayley Cognitive and Motor scores ($p < 0.001$).

Conclusions: In this cohort, higher BPD severity was significantly associated with worse scores on the 2-year Bayley-III assessment, and this effect was partially mediated by worse microstructural development of the posterior midbody of the CC through term-corrected age.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Improving Continuity of Care in a Pediatric Residency Clinic: An Analysis of Well-Child Visit Scheduling

Abigail Rossman, MD; Alexandra M. S. Corley, MD, MPH, FAAP; Lauren Lipps, MA; Margaret Jones MD, MS

****

Background: Continuity of care is a cornerstone of pediatric primary care, linked to improved health outcomes and higher patient satisfaction. However, maintaining continuity is challenging in residency clinics. Cincinnati Children's Pediatric Primary Care Center (PPC) began efforts to improve continuity in 2023; such efforts included schedulers asking families about continuity preferences and documenting these preferences in the electronic health record appointment notes.

Objectives: To assess the frequency and content of appointment notes entered by schedulers during well-child visits for children under 2 years of age and to evaluate the effectiveness of using provider names in these notes to convey continuity preferences to PPC staff.

Methods: A retrospective review was conducted of 1,969 well-child check appointments for children under 2 years of age seen between June 1, 2023, and November 30, 2023. Appointment notes in the electronic health record, entered by schedulers, were analyzed for mentions of continuity, preferences for specific providers, and the success of scheduling appointments in line with continuity preferences.

Results: The average age of children in the study was 9.5 months. Of the 1,969 appointments reviewed, 1,951 (99.1%) had notes entered by schedulers, while 18 (0.9%) lacked comments. Continuity was mentioned in 408 (20.7%) of the notes, with 347 (85.0%) indicating a preference for continuity with a specific provider. Among the notes mentioning continuity, 61 (15.0%) stated no preference. Of the 347 families expressing a preference for continuity with a specific provider, 287 (82.7%) successfully scheduled their next appointment with the requested provider.

Conclusions: Patient and family preferences for continuity were inconsistently documented during well-child check scheduling.A large majority of those with documentation preferred continuity with a consistent provider. When preferences were recorded, most were honored despite the challenges posed by a partially resident-driven provider population. These findings highlight the importance of incorporating continuity into scheduling practices to improve patient-centered care and satisfaction. Further research is needed to explore barriers to achieving continuity and to develop interventions that assist with scheduler inquiry regarding preferred continuity providers.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Asthma Support in Structurally Disadvantaged Neighborhoods

Elaine Bognar, MD; Ndidi Unaka, MD, MEd; Andrew Beck, MD, MPH

****

Background: Greater Cincinnati continues to be characterized by rates of asthma morbidity and inequity far greater than the national average. Evidence suggests that the magnitude of the asthma burden in our region is driven in large part by social and structural determinants of health. Through the Asthma Learning Health System (ALHS), we aim to enhance social need responses, address root causes of asthma morbidity, and build relationships and trust with individuals who reside in Cincinnati's most structurally disadvantaged neighborhoods, the same neighborhoods that bear a disproportionate burden of asthma morbidity. To do so, ALHS includes quarterly educational and community-engagement programming – Controlling Asthma Together (CAT): Community Educational Events.

Objective: To evaluate the impact of CAT events on asthma-related medical knowledge, awareness of resources among caregivers who attend, and trust and engagement with the "asthma medical home" as measured by surveys conducted prior the event, immediately following the event, and 3-6 months after the event.

Methods: We used a pre-post survey quantitative design to evaluate the impact of educational programming. Our de novo survey questions were adapted from other validated surveys. The pre and post surveys were printed and shared with participants at registration. Future analyses will evaluate the impact at 3-6 months post CAT events.

Results: Seventeen caregivers completed the surveys. Several measures showed positive improvements following the event, including caregivers' confidence in preventing asthma attacks, preventing asthma attacks from worsening, and explaining what well-controlled asthma looks like. However, some measures remained unchanged, such as confidence in identifying asthma attack symptoms or triggers. This was, in part, because baseline levels were quite high. All respondents enjoyed the events, appreciated the speakers and resource fair, and expressed interest in attending similar events in the future.

Conclusions: The CAT events demonstrated positive impacts on caregivers' confidence in managing asthma and recognizing well-controlled asthma. Participant feedback reflected high satisfaction with events and a desire for continued engagement. These findings support the potential of educational programs like CAT to foster trust, improve asthma outcomes, and promote equity in structurally disadvantaged communities within Greater Cincinnati.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

PENFS Improves Gastrointestinal and Psychological Outcomes in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder and Disorders of Gut-Brain Interaction

Umber Waheed, MD; Neha Santucci, MD; Khalil El-Chammas, MD; Sherif Mansi, MD; Kahleb Graham, MD; Lauren Hartman, MD; Jennifer Hardy; Megan Miller, PhD; Rashmi Sahay, MD, MS

****

Background: Attention-deficit/hyperactivity disorder (ADHD) is often seen within pediatric populations with disorder of the gut-brain interaction (DGBI). Percutaneous Electrical Nerve Field Stimulation (PENFS) is a minimally invasive non-pharmacologic approach that has been shown to improve abdominal pain, nausea, and psychological functioning pediatric DGBI patients.

Objective: We aimed to analyze gastrointestinal and psychological outcomes in children with both DGBI and ADHD and compare them to those without ADHD.

Methods: We retrospectively reviewed charts of DGBI patients (met Rome IV criteria) aged 9-28y diagnosed with ADHD who underwent PENFS. We included demographics, anthropometrics, medical history, and validated questionnaire responses routinely used during the 4 weeks of treatment and at follow-up: Abdominal Pain Index (API), Nausea Severity Scale (NSS), Pain Catastrophizing Scale - Children (PCS-C), Functional Disability Inventory (FDI), Pediatric Insomnia Severity Index (PISI), Patient-Reported Outcomes Measurement Information System - Anxiety (PROMIS – Anxiety), Patient Health Questionnaire (PHQ-9) Depression Scale, and Children's Somatization Inventory (CSI). We analyzed outcomes of those with ADHD compared to those without ADHD as well as stimulant use.

Results: 72 patients with ADHD (mean age 16.4 ± 2.9y) and at least one DGBI were identified. 72% of patients were females and 89% were Caucasian. API, NSS, PCS-C, FDI, PHQ-9 and CSI scores significantly improved after PENFS in the DGBI and ADHD group and sustained at 3-month follow-up ($p \leq 0.05$). Patients with ADHD had significantly more nausea, anxiety, depression, post-traumatic stress disorder ($p \leq 0.05$). When comparing DGBI patients with ADHD to DGBI patients without ADHD, FDI, PISI, and PROMIS – Anxiety scores significantly improved after PENFS completion ($p \leq 0.05$). Weight improved at 4 weeks in DGBI patients with ADHD compared to DGBI patients without ADHD ($p=0.01$). There was a trend for improvement in BMI ($p=0.06$) as well. Symptom response of patients with and without stimulants did not differ ($p>0.05$).

Conclusions: PENFS improves gastrointestinal and psychological outcomes of DGBI patients with ADHD. It notably improved functional disability, insomnia, and anxiety in patients with both DGBI and ADHD compared to DGBI patients without ADHD. ADHD patients also had increased weight gain at treatment completion compared to those without ADHD. PENFS may be an effective treatment for DGBI patients with ADHD, and it can specifically be helpful to alleviate certain psychological symptoms and optimize growth.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER
Cincinnati, Ohio

EDWARD L. PRATT LECTURE

Percutaneous vs. Endoscopic Ultrasound Guided Liver Biopsies in Pediatric MASLD

Talia Schwartz, MD; Marialena Mouzaki, MD, MSc; Lara Berklite, MD; Oscar Lopez-Nunez, MD; Alexander Miethke, MD; Stavra Xanthakos, MD, MS; David Vitale, MD

****

Background: Endoscopic ultrasound (EUS) is emerging as a useful alternative to percutaneous approach in obtaining liver biopsies in children. With the rise of metabolic dysfunction-associated steatotic liver disease (MASLD) in the pediatric population, the need for liver biopsies for diagnosis and staging has concurrently increased. The aim of this study was to compare safety and sample quality of liver biopsies obtained by interventional radiology (IR) percutaneously (IR-LB) versus via EUS-LB.

Methods: This was a retrospective study of all patients at a single institution ≤21 years old undergoing liver biopsy for the diagnosis and/or staging of MASLD from March 2020 to April 2023. Demographics, lab values, sample information, and adverse events were recorded. All patients were monitored inpatient for minimum 6 hours post biopsy, per institutional protocol. Liver biopsy histology was independently reviewed by one of two expert pathologists (LB, OLN). Per the American Association for the Study of Liver Diseases (AASLD), adequate samples were defined as total specimen length (TSL) of ≥ 2.0 cm and ≥ 11 complete portal tracts (CPT).

Results: A total of 100 patients were included, of whom 41 had undergone EUS-LB and 59 IR-LB. Age was similar between the groups (Table 1); however, in the EUS-LB cohort there were more females (46% vs. 20%; $p<0.01$) and fewer patients of Hispanic ethnicity (24% vs 52%; $p<0.01$). BMI, percent body fat, International Normalized Ratio (INR) and platelet count were not different between the groups.

All biopsies achieved technical and diagnostic success (Table 2), however EUS-LB had longer mean intact specimen lengths and total specimen lengths than IR-LB (4.0 vs. 2.7 cm, $p< 0.01$ and 8.3 vs. 5.1 cm, $p<0.01$; respectively). Additionally, the number of CPTs per specimen was higher with EUS-LB (23 vs. 14; $p<0.01$), as was the proportion of biopsies obtained from both liver lobes ($p<0.01$). AASLD criteria for sampling adequacy were met in 93% of EUS-LB vs 73% of the percutaneous biopsies ($p=0.02$). Two patients with EUS-LB had findings that differed between lobes. There was no statistical difference in reported adverse events between EUS-LB and percutaneous approach (7% vs. 17%, respectively; $p=0.23$), with 2 patients in the EUS-LB cohort and 9 patients who underwent IR-LB with transient abdominal pain. Other adverse events included one small gastric hematoma in the EUS cohort and self-limited external site bleeding in the IR-LB group.

Conclusion: The quality of samples obtained via EUS-LB was higher than those obtained via IR-LB in this pediatric cohort with MASLD with similar rates of adverse events. EUS-LB also allowed sampling of both lobes, which is crucial for a patchy disease process such as MASLD. Thus, EUS-LB should be highly considered in a patient requiring biopsy, especially if an EGD is clinically indicated.

Poster Abstracts

IN ALPHABETICAL ORDER BY RESIDENT AUTHOR(S)

Celiac Disease Prevalence in Turner Syndrome and Association with HLA Typing
Rosario Alarcon, MD — Categorical Pediatrics, PGY-3

Use of Clinical Decision Support to Reduce CLABSI Risk in High-Risk Patients
Dustin Armstrong, MD — Categorical Pediatrics, PGY-2

Improving Rates of Delayed Umbilical Cord Clamping for Premature Infants
Sarah Bowman, MD — Categorical Pediatrics, PGY-3

Parental Self-Efficacy, Parental Investment and Early Child Development in an urban setting in Peru
Leslie Cabrera Toribio, MD — Categorical Pediatrics, PGY-2

Understanding Physician Interaction with Automated Sepsis Alerts in the Pediatric Emergency Department
Emma Clark, MD — Categorical Pediatrics, PGY-2

Utility of Matrix Metalloproteinase-7 as a Biomarker in Cholestatic Infants with Congenital Heart Disease
Bradley Conant, MD — Categorical Pediatrics, PGY-3

Bivalirudin Monitoring by Dilute Thrombin Time is Cost-Efficient in Pediatric ECMO Patients
Lisa Dorn, MD, PhD — Categorical Pediatrics, PGY-2

Impact of New Criteria for Gonadotoxic Risk Stratification on an Oncology Population in a Pediatric Hospital
Alejandra Dumenigo, MD, MS — Categorical Pediatrics, PGY-1

Temporal Transcriptomic Profiling of Pediatric Septic Shock Patients Based Upon PERSEVERE-II Risk Strata Identifies a Conserved Network of Cell Cycle Genes in High-Risk Patients
Leland Dunwoodie, MD — Categorical Pediatrics, PGY-3

Temporal Changes in Osmolality of Fortified Human Milk with Contemporary Human Milk Fortifiers
Abigail Gardiner, MD — Categorical Pediatrics, PGY-3

Community Respiratory Viruses Are Well-Tolerated in Hematopoietic Stem Cell Transplant Recipients: A Brief report from the TRANSPIRE Study
Meghan Haney, MD, PhD — Categorical Pediatrics, PGY-3

Navigating School with Cystic Fibrosis: Barriers and Support Strategies
Katelyn Heimbruch, MD, PhD — Categorical Pediatrics, PGY-2

Vitamin D Deficiency is Prevalent and Resistant to Correction in Patients with Hemophagocytic Lymphohistiocytosis (HLH)
Jennifer Jess, MD — Categorical Pediatrics, PGY-3

Elevated Alpha-Fetoprotein Levels in Children with Metabolic Dysfunction Associated Liver Disease
Jamie Klein, MD — Categorical Pediatrics, PGY-3

Food Insecurity in Pediatric Celiac Disease
Andrew Krueger, MD — Categorical Pediatrics, PGY-2

2`-Fucosyllactose Directly Modulates Macrophages in An IPSC Model of Crohn's Disease
Tal Marshanski, MD — Categorical Pediatrics, PGY-3

Lung Mesenchymal Cells Undergo Transcriptional Reprogramming After Dysbiosis and Streptococcus Pneumoniae Infection
Odemaris Narváez del Pilar, MD, PhD — Categorical Pediatrics, PGY-3

Human Milk Macronutrient Loss Differs Between Enteral Tube Feeding Systems
Anna Paschall, MD, MHSc — Categorical Pediatrics, PGY-2

Association Between Language, Medical Complexity, and PICU Admission in Acute Respiratory Illness
Zachary Pitkowsky MD, MPH — Categorical Pediatrics, PGY-3

The Impact of Social Determinants of Health on Preventable and Urgent Readmissions in Pediatric Acute Care Cardiology
Katherine Price, MD — Categorical Pediatrics, PGY-2

The Relationship of Handgrip to Body Composition, Cardiopulmonary Fitness, and Functional Status in Children and Adults with Congenital Heart Disease
Carter Richardson, MD — Categorical Pediatrics, PGY-3

Systems Analysis of Influenza Vaccine Response in Chronic Dialysis Patients Reveals Altered Immunometabolism
Carol Rowley, MD, PhD — Categorical Pediatrics, PGY-3

The Implementation of Reach Out and Read in a NICU Follow-Up Clinic: Increasing Word Exposure for High-Risk Children
Madilyn Sass, MD — Categorical Pediatrics, PGY-2

Etiology Derives Outcomes During and After the First Episode of Acute Pancreatitis: An Observational Cohort Study
Samuel Schriever, MD — Categorical Pediatrics, PGY-3

Long-Read Sequencing and Optical Genome Mapping Identify Causative Gene Disruptions in Noncoding Sequence in Two Patients with Neurologic Disease and Known Chromosome Abnormalities
Ethan Sperry, MD, PhD — Pediatrics/Medical Genetics, PGY-3

Impact of Routine Pulmonary Medications on Rescued CFTR in Cystic Fibrosis Cells
Matthew Wleklinski, MD, PhD — Categorical Pediatrics, PGY-2

Celiac Disease Prevalence in Turner Syndrome and Association with HLA Typing

Rosario Alarcon, MD; Daniel Mallon, MD; Iris Gutmark-Little, MD

****

Background: Patients with Turner Syndrome (TS) are 2-5 times higher risk to develop Celiac Disease (CD) compared to the general population. However, there is limited evidence regarding CD onset and risk factors in patients with TS. HLA typing has been previously utilized as an accurate first-line screen for CD in high-risk groups, but its utility has not been previously studied in pediatric patients with TS in the United States. **Objective:** Evaluate for the prevalence and age of onset of CD in TS. Identify other risk factors and investigate the association between HLA typing and CD in patients with TS. **Methods:** Retrospective study using the TS database and EMR chart review. Data evaluated included: TTG IgA levels, HLA allele testing (DQ2, DQ8 status), endoscopy results, clinical gastroenterology (GI) and endocrinology documentation. **Results:** The TS database included 448 individuals, 19 with confirmed CD, making the prevalence 4.2%. The age of diagnosis ranged from 5 to 55 years, with most diagnosed at age 20 or younger, and two at age 33 and 55 years. Excluding the age 33 and 55, the mean and median ages of diagnosis were 11 and 12 years of age. Nine individuals had previously had HLA typing, two of which were diagnosed with CD. HLA typing in the CD individuals showed DQ8 homozygosity and DQ2/DQ8 heterozygosity. Both had GI symptoms, and one had an additional autoimmune disease. HLA typing in the seven patients without CD consisted of five DQ2/DQ8 negative, one DQ8 heterozygous, and one DQ2 heterozygous. Three had elevations in TTG IgA prior to HLA typing. In the remaining four, HLA typing was obtained in one due to growth failure (DQ2-/DQ8-), and in three due to GI symptoms (DQ2-/DQ8- in two, DQ2 heterozygous in one). Of these three, two underwent EGD and had normal biopsies (both DQ2-/DQ8-). **Conclusions:** In our TS population, prevalence of CD was 4.2%, with disease onset mostly older than 10 years and none diagnosed under the age of 5. Those with CD had DQ8 homozygosity or both DQ2/DQ8 alleles. In contrast, those without CD were either negative or heterozygous for either DQ2 or DQ8.

Use of Clinical Decision Support to Reduce CLABSI Risk in High-Risk Patients

Dustin Armstrong, MD; Melanie Cole, PT, DPT; Kaitlyn Marks, MD; Eunsun Yook, MS; Matt Molloy, MD, MPH; Maya Dewan, MD, MPH

****

Background: Central line-associated blood stream infections (CLABSI) are an inherent risk for all pediatric ICU (PICU) patients with a central line. Despite all the efforts focused on CLABSI prevention, CLABSI remain a source of increased morbidity and mortality. In the Cincinnati Children's PICU, there is a clinical decision support (CDS) tool that stratifies patient's CLABSI risk. For patients categorized as high-risk, an automated best practice alert (BPA) tool was implemented to trigger filing of a progress note with targeted, evidence-based prevention strategies to improve situational awareness (SA) and allow for immediate action to aid in CLABSI reduction. **Objective:** To assess the saliency of a CDS tool for patients identified to be at high-risk for CLABSI. **Methods:** We conducted a retrospective analysis of 150 CLABSI Risk Tool notes filed on Cincinnati Children's PICU patients with a high-risk CLABSI score from December 2023 to December 2024. Saliency was defined as the number of notes that contained plans to reduce lab frequency and line access; adhere to predetermined blood culture criteria; consult infectious disease (ID); or remove the central line. **Results:** 150 BPA episodes were analyzed during the study period. The overall saliency was 51%. 18% noted an effort to reduce lab frequency and line access with a third of those leading to actual reductions in line access. 29% of episodes had blood cultures drawn with 56% of those complying with the outlined culture criteria. Only two episodes noted ID consultation with one consult placed. Lastly, only three episodes discussed line removal. It should be noted that one patient accounted for 48 of the 150 entries. **Conclusions:** This analysis demonstrates that an evidence-based CLABSI risk CDS tool had effective saliency when it came to adaptive prevention measures to help mitigate CLABSI risk in high-risk patients. Developing a culture of SA surrounding CLABSI takes time, and a larger cohort would aid in determining if this tool was associated with decreased CLABSI rates.

Improving Rates of Delayed Umbilical Cord Clamping for Premature Infants

Sarah Bowman, MD; Janani Rajkumar, MD; Stephanie Zhang, MD; Andrew Bowyer, BSN RN;
Patricia Manning, APRN; Carrie Hallett-Voss, BSN, RN; Tanvi Rana, MD; Laura Whitmore, MD;
Samantha Mullan, MD; Prasoon Verma, MD; Jennifer Brady, MD MEd; Morgan Hill, MD

****

Background: Delayed umbilical cord clamping (DCC) reduces neonatal morbidity and mortality, especially in preterm infants. DCC has been linked to several significant benefits in the preterm population, including improved neonatal transition to extrauterine life, reduced use of inotropes in the first 24 hours of life, decreased need for blood transfusions, lower rates of necrotizing enterocolitis and intraventricular hemorrhage, improved developmental outcomes, and higher rates of survival to discharge. Despite few absolute contraindications to DCC, there remains room for optimization in the rate of DCC in preterm infants born at Good Samaritan Hospital (GSH). **Objective:** Our SMART aim is to increase the rate of DCC (defined as 30-60 seconds) for all preterm infants (gestational age 22 weeks to 35 weeks + 6 days) delivered at and admitted to the GSH NICU from 61% in November 2024 to ≥80% by October 2025. **Methods**: A multidisciplinary and interprofessional team developed a key driver diagram with proposed interventions including an update of unit guidelines, educational sessions for OB-GYN and NICU teams, standardization of cord clamp planning in delivery room huddles, improved documentation of cord clamping, and implementation of frequent reminders for the delivery room team on service. The primary outcome measure was the rate of delayed cord clamping in all preterm infants born at GSH and admitted to the NICU. Balancing measures included delivery room intubation rates and infant admission temperature. **Results**: Preliminary data collected from 84 infants born between November 1st, 2024 and January 31st, 2025 demonstrated a successful increase in the rate of DCC from the baseline of 61% to 79%. This increase in DCC co-occurred with improvement in the balancing measures of hypothermia (18% from 23%) and delivery room intubation (15% from 17%) in this cohort of infants. **Conclusions**: The targeted interventions implemented have already demonstrated an improvement in DCC rates without negatively impacting balancing measures. Our multidisciplinary and interprofessional approach which has been integral to the creation and implementation of our interventions is replicable in other healthcare settings and will remain critical to further local improvement towards the goal of DCC in 80% of preterm infants.

Parental Self-Efficacy, Parental Investment and Early Child Development in an urban setting in Peru

Leslie Cabrera Toribio, MD; Eduardo Perez-Roca Quinteros, MD; Roxana Diaz Subauste, MD;
Giancarlo Alvarado-Gamarra, MD; Kelly I. Kamimura-Nishimura, MD, MS

****

Background: Brain architecture and functioning undergo rapid development in the first three years of age, with multiple factors involved in a complex interplay. In low-middle income countries (LMICs), 39% of children under 5 years of age are at risk of not achieving their developmental potential. Parental self-efficacy (PSE) and parental investment (PI) are factors that independently could influence in early child development (ECD) and represent potential targets for improving developmental outcomes in LMICs. **Objective:** To assess the association between PSE, PI and ECD in an urban setting of a LMIC. **Methods:** A cross-sectional study conducted among caregivers of children aged 9-24 months who were cared for at three urban health centers in Lima, Peru, 2024. Four surveys assessing sociodemographic characteristics, developmental milestones (Survey of Well-being of Young Children), parental self-efficacy (Early Intervention Parenting Self-Efficacy Scale) and parental investment (Family Care Indicators) were applied. We used Spearman's Rho to evaluate correlations, the Area Under the Curve (AUC) from the ROC curves to identify adequate ECD, and both crude and adjusted prevalence ratios (PR), with 95% confidence intervals (CI), to assess associations. We applied generalized linear models (Poisson family) for this analysis. For the adjusted model, variables with a p-value < 0.2 in the crude analysis were included. We obtained informed consent and received IRB approval. **Results:** A total of 104 caregivers of children (median age of 14.5 months, IQR: 11-19 months) were included in the study. The majority were term infants with normal birth weight, and their caregivers had an adequate educational level. Among them, 53.84% demonstrated adequate ECD. The correlation between PSE and PI scores with ECD scores was weak. Additionally, the AUC for both separate and combined tests was regular. Higher PSE scores were associated with adequate ECD (adjusted PR 1.63; 95% CI 1.01-2.62; p=0.045) compared to lower scores, after adjusting for PI scores, mother's age, and primary caregiver. **Conclusions:** The PSE test was associated with adequate ECD. It is necessary to confirm this finding in larger prospective cohorts, particularly in urban-marginal settings within LMICs. Interventions aimed at fostering PSE can be valuable in promoting adequate ECD.

Understanding Physician Interaction with Automated Sepsis Alerts in the Pediatric Emergency Department

Emma Clark, MD; Lisa Vaughn, PhD; Nancy Clemens, MD; Jenna Goldthwait, MSN; Michelle Eckerle, MD

****

Background: Timely sepsis identification in children is challenging in the pediatric emergency department (PED). Automated electronic health record alerts are utilized in PEDs across the country to facilitate early recognition of sepsis. Use of these alerts has increased sepsis recognition and treatment compared to physician judgement alone. However, the physician must decide to either accept or reject the alert. Understanding of how physicians interact with automated alerts in the PED is limited. **Objective:** We aimed to understand what factors impacted the physician response to sepsis alerts in the PED and whether those factors changed over the course of the patient encounter. **Methods:** This was a qualitative study using "pulse interviews," where reflections are recorded in the clinical environment at the point of interest. From July to October of 2018 in a tertiary PED, research coordinators interviewed a convenience sample of pediatric emergency medicine physicians evaluating patients who triggered a sepsis alert. The first interview occurred after the physician exited the room following the initial sepsis huddle and the second 1-2 hours later, when possible. Recordings were thematically analyzed by three researchers using an inductive approach with thematic coding and a subsequent iterative process for further clarification of themes. **Results:** We conducted 125 interviews for 72 patient encounters. Three primary themes were identified (1) prioritization of the cardiovascular assessment when determining risk for sepsis (2) significance of patient medical complexity on decision making, and (3) impact of change over time (response to treatment, evolution of vital signs) in the course of the patient encounter (Table 1). **Conclusions:** We identified the specific factors impacting physician concern for sepsis in the PED. While physicians appropriately assess for perfusion derangements when evaluating possible sepsis, they also prioritize medical complexity and observe the clinical course to increase or decrease suspicion. Further studies are needed to understand the accuracy of physician assessment of possible sepsis in the first hours of PED presentation.

Utility of Matrix Metalloproteinase-7 as a Biomarker in Cholestatic Infants with Congenital Heart Disease

Bradley Conant, MD; Nicolas Noriega, BS; Sindhu Pandurangi, MD, MS; Michael Kim, DO, MEd; JangDong Seo, PhD; Anna L. Peters, MD, PhD; Andrew Misfeldt, MD, PhD; Meghan Chlebowski, MD, MHPE

****

Background: Matrix metalloproteinase-7 (MMP-7) is a novel biomarker for diagnosis of biliary atresia (BA), the most common cholestatic liver disease in infancy. Infants with CHD can present with both BA (CHD-BA) and non-BA cholestasis (CHD-C), and there is a pressing need to determine the utility of MMP-7 levels in infants with CHD to avoid unnecessary invasive diagnostic procedures in this high-risk population. Data in older children and adults suggest MMPs may be associated with pulmonary hypertension (PH) and pulmonary arterial stiffness, but data in infants is lacking. **Objective:** To investigate the utility of MMP-7 in discriminating BA from non-BA cholestasis in infants with CHD and whether MMP-7 elevation is present in infants requiring treatment for clinically significant PH. **Methods**: This is a single-center cross-sectional study including infants <180 days old with cholestasis and serum MMP-7 levels collected from 2019-2023. Demographic data and descriptive statistics were summarized with medians with interquartile ranges and frequencies with percentages. Median MMP-7 levels were assessed via Wilcoxon rank-sum test. **Results:** The study included 149 patients who were divided into subgroups based on BA and CHD status. Patients with CHD had significantly elevated MMP-7 levels relative to the non-CHD cohort (50 ng/mL (IQR 38,95 ng/mL) vs. 34 ng/mL (IQR 23,79 ng/mL), p=0.009). There was no significant difference in median MMP-7 levels between BA and CHD-BA cohorts, though the two patients with CHD-BA both had MMP-7 levels above the standard cut-off (≥52.8 ng/mL). Sub-analysis comparing infants with and without PH revealed significantly elevated median MMP-7 levels in those with clinically significant PH (125 ng/mL (IQR 81-217 ng/mL) vs. 39 ng/mL (IQR 25-77 ng/mL), p=0.010). CHD patients (CHD-BA and CHD-C) with PH had greater median MMP-7 compared to CHD patients without PH (154 ng/mL (IQR 76-238 ng/mL) vs 43 ng/mL (IQR 37-81 ng/mL), p=0.028). **Conclusions:** Serum MMP-7 levels in infants with CHD-C were significantly elevated compared to those with cholestasis alone. Median levels in CHD-C were below standard cut-offs for BA. MMP-7 may also help identify non-BA cholestatic infants who have concurrent clinically significant pulmonary hypertension. Larger, prospective studies are needed to validate this finding and establish CHD-specific MMP-7 cutoffs.

Bivalirudin Monitoring by Dilute Thrombin Time is Cost-Efficient in Pediatric ECMO Patients

Lisa Dorn, MD, PhD; Elissa Engel, MD; Tanya Perry, DO; Lori Luchtman-Jones, MD

****

Background: Bivalirudin, a direct thrombin inhibitor, is used for pediatric patients requiring mechanical circulatory support because of its reported favorable safety and efficacy outcomes, compared to unfractionated heparin (UFH). Recent publications document favorable or equivalent costs for patients on MCS who are anticoagulated with bivalirudin vs UFH, however these publications use the activated partial thromboplastin time (aPTT) to monitor bivalirudin. Our group has demonstrated that the aPTT is an unreliable marker of bivalirudin's anticoagulant effect in extracorporeal membrane oxygenation (ECMO) patients; the dilute thrombin time (dTT) provides superior reliability, but concern remains that the dTT is largely unavailable for use due to access and cost issues. Here, we report a cost analysis of monitoring ECMO patients anticoagulated with bivalirudin versus UFH. **Method:** As part of a larger retrospective clinical study, we collected clinical and laboratory data for children admitted to ICUs at CCHMC on ECMO and anticoagulated with UFH (n=47) or bivalirudin (n=30) between 1/2018 and 8/2023. We analyzed cost by identifying the total number of laboratory tests (CBC, PT, aPTT, AT3, fibrinogen, UFH, dTT, and plasma free Hgb) obtained at various time points while on ECMO (day 5, 7, 10, 14, 21) and used 2024 institutional prices for each test. **Results:** The number of laboratory tests (specifically (CBC, PT, aPTT, fibrinogen, AT3) drawn in the bivalirudin group were decreased compared with the UFH group. The average total number of monitoring labs drawn in the bivalirudin group versus the UFH group was significantly decreased across all time points. Average daily monitoring cost was significantly decreased in the bivalirudin group (day 5 $2163/day bivalirudin vs $3225/day UFH, $p<0.001$; day 21 $1823/day bivalirudin vs $3526/day UFH, $p<0.001$). **Discussion:** Bivalirudin monitoring by dTT in ECMO is cost-efficient for the main laboratory parameters tested compared with aPTT, which continues to be used by many institutions. Previous studies have reported decreased need for blood product transfusions and circuit changes with bivalirudin, with favorable or equivalent total costs in ECMO patients. This work demonstrates that dTT monitoring of bivalirudin in pediatric patients throughout ECMO support is cost-efficient and potentially reduces total laboratory test/blood volume sampling.

Impact of New Criteria for Gonadotoxic Risk Stratification on an Oncology Population in a Pediatric Hospital

Alejandra Dumenigo, MD, MS; Olivia Frias, MSN; Karen Burns, MD, MS; Julie Rios, MD

****

Background: In 2020, new criteria were published for gonadotoxic risk stratification in pediatric patients receiving chemotherapy or radiation. The changes may impact fertility preservation (FP) counseling as some options for FP are experimental and only offered to those with high-risk stratification under current IRB protocols. **Objective:** We describe the population affected by the change in criteria and how it impacted FP counseling. **Methods:** 241 charts within the Cincinnati Children's Hospital Medical Center (CCHMC) fertility registry were reviewed for gonadotoxic treatment dosing at the time of FP consultation. Risk assessments were completed with the new criteria. Descriptive statistics were used to analyze data. **Results:** Of 241 patients, 5.4% (n=13) had a change in risk stratification. Six patients would have been eligible for an experimental FP option by the new criteria. More of the eligible patients were male sex, had lymphoma, and had a risk change from intermediate to high risk (Table 1). **Conclusion:** Very few patients had a change in risk that affected FP options. Demographics and diagnosis were not homogenous but male sex patients and those with lymphoma were affected most

Temporal Transcriptomic Profiling of Pediatric Septic Shock Patients Based Upon PERSEVERE-II Risk Strata Identifies a Conserved Network of Cell Cycle Genes in High-Risk Patients

Leland Dunwoodie, MD; Mihir Atreya, MD, MPH; Andrew Lautz, MD

****

Background: Sepsis is a leading cause of death in children worldwide. Yet, personalized therapies beyond antimicrobials and intensive organ support remain elusive in large part due to the heterogeneity amongst children with sepsis. To help unravel this heterogeneity, the Pediatric Sepsis Biomarker Risk Model (PERSEVERE)-II was developed and prospectively-validated to identify children with sepsis at high (16-57%) and low (< 2%) risk for 28-day mortality based upon protein biomarker expression and platelet count at PICU admission. However, it is not known why high-risk children have poorer outcomes over time compared to low-risk children. Given the complexity of the host immune response, these poorer outcomes are likely driven by intricate gene networks. **Objective**: To identify genes co-expressed in high-risk patients on day 1 and day 3 of PICU admission to reveal conserved gene networks associated with the high-risk stratum, thereby suggesting genetic drivers of mortality in high-risk patients. **Methods**: The whole blood mRNA of children with septic shock on day 1 (81 patients; 58 low-risk and 23 high-risk) and day 3 (71 patients; 53 low-risk and 18 high-risk) of PICU admission was obtained. Raw mRNA counts were normalized with TMM normalization and genes with low counts were removed. A gene co-expression network was created using WGCNA for both day 1 and day 3 expression data. DAVID was used for functional annotation analysis. **Results**: Four gene co-expression modules were identified in both the day 1 and day 3 gene co-expression networks that were significantly associated with either the high- or low-risk stratum ($p < 0.05$). A 198-gene day 1 module and a 260-gene day 2 module shared 190 genes; both of these modules were over-expressed in and associated with the high-risk stratum. Both of these modules are cell cycle-related modules, with "Cell Cycle" being their most enriched functional annotation and > 150 genes being in the "Cell Cycle" Reactome pathway. **Conclusions**: 190 genes, many of which function in cell proliferation, were co-expressed and over-expressed on both day 1 and day 3 of PICU admission for septic shock in high-risk patients. These genes warrant further investigation as potential drivers of the high-risk phenotype.

Temporal Changes in Osmolality of Fortified Human Milk with Contemporary Human Milk Fortifiers

Abigail Gardiner, MD; Irmalis Flores-Gonzalez, MS, RD; Carrie Smith, MS, RD; Jacqueline Wessel, MEd, RD; Jae H. Kim, MD, PhD; Ting Ting Fu, MD

****

Background: Fortified human milk can be prepared up to 24 hours prior to feeding. This practice is not standardized across all institutions, with some preparing milk only up to 12 hours in advance. While existing literature suggests that osmolality of fortified human milk increases over time, the currently commercially available products have not been tested to examine if osmolality changes temporally. Osmolality >450 mOsm/kg may cause concern due to a theoretical increased risk for necrotizing enterocolitis. **Objective:** To evaluate the percentage change in osmolality over a 24-hour period of human milk prepared with commercially available fortifiers for both standard and higher calorie recipes. **Methods:** Three recipe bases were tested: fresh human milk, previously frozen human milk, and pasteurized donor breast milk. The human milk fortifiers used were Similac (SHMF), Enfamil (EHMF), and Prolacta (PHMF). EHMF and PHMF were prepared at caloric densities of 22, 24, 26, 28, and 30 kcal/oz following manufacturer's recipes. SHMF was prepared at 22, 24, and 26 kcal/oz. Osmolality of fortified and unfortified milk was tested in triplicate at 0, 12, and 24 hours after preparation. Milk samples were refrigerated and stored at 4 degrees Celsius between time points. One-sided paired t-tests were used to compare whether percentage change in osmolality by 24 hours was greater than change at 12 hours. Mixed-effects linear models were used to study the effect of time, fortifier, and caloric density, with Tukey-Kramer adjustment for post hoc multiple comparisons. **Results:** There was a greater percent change in osmolality at 24 hours compared to 12 hours when considering all samples ($p=0.02$). In the final mixed effects model adjusting for fortifier and milk base and including the interaction between time and fortifier, time was not significantly related to change in osmolality ($p=0.20$). Despite a statistically significant interaction, after post hoc Tukey-Kramer adjustments, no pairwise comparisons remained significant. Initial osmolality was highest with SHMF at all caloric densities tested. **Conclusion:** Commercially available HMFs increase the osmolality of human milk to various degrees and have varying temporal effects. This is likely secondary to differing ingredient and nutrient composition of the products.

Community Respiratory Viruses Are Well-Tolerated in Hematopoietic Stem Cell Transplant Recipients: A Brief report from the TRANSPIRE Study

Meghan Haney, MD, PhD; Arfa Ashraf, MBBS; Kelly Lake, BS; Lauren Strecker; Kasiani Myers, MD; Christopher Towe, MD; Laura Walkup, PhD; Jason Woods, PhD; Stephanie Edwards, RN; Richard Cooper, BS; Leslie Lehmann, MD; Gabriel Salinas Cisneros, MD; Jason Freedman, MD, MSCE; K. Scott Baker, MD, MS; Erin Doherty, MD; Samuel Goldfarb, MD; Stella Davies, MBBS, PhD; Jane Koo, MD;

****

Background: Few studies detail pulmonary complications after hematopoietic stem cell transplant (HSCT) in pediatric recipients. Community acquired respiratory infections in the peri-transplant period are common, and the introduction of rapid respiratory viral panel testing via polymerase chain reaction (PCR) has led to a significant rise in the identification of these viral pathogens. The morbidity and mortality associated with these community acquired viral infections in HSCT are not well understood. Furthermore, identification of these viruses and whether it should redirect clinical management is less understood. **Objectives:** This study aims to characterize the pulmonary infections observed in pediatric HSCT patients and report the morbidity and mortality associated with these infections. **Methods:** The TRANSPIRE study is a multi-institutional prospective cohort study of pediatric and young adult HSCT recipients. Data for this study was taken from patients seen at Cincinnati Children's Hospital Medical Center that were enrolled in the TRANSPIRE study. The study included146 HSCT patients, of which 78 had some type of infectious event during the 4-year study period. **Results:** Rhinovirus was the most common infection, accounting for 38.5% (n=50) of viral infections. Adenovirus (n=16, 12.3%) and SARS-CoV-2 (n=15, 11.5%) were also frequently identified. Interestingly, only 7 (43.8%) of patients with positive respiratory viral swabs for adenovirus had concurrent viremia. There was a wide range of other common respiratory viruses that each made up less than 10% of viral infections: non-CoV-2 coronavirus (n=11, 8.5%), RSV (n=10, 7.7%), parainfluenza (n=8, 6.2%), metapneumovirus (n=5, 3.8%), and influenza (n=3, 2.3%). The majority of viral infections occurred prior to day 100 post-HSCT. Ventilatory support was required by only 4.1% (n=6) of patients and not required by any patients with common respiratory viruses without viremia. Furthermore, there were no deaths associated with respiratory-only viral infections. **Conclusion:** Infections from community acquired viruses are frequent but are not significant causes of morbidity after HSCT. Serious morbidity and mortality are largely limited to CMV and adenovirus. This data should be taken into consideration when weighing the cost-benefit analysis of ordering expensive PCR-based respiratory viral panel testing.

Navigating School with Cystic Fibrosis: Barriers and Support Strategies

Katelyn Heimbruch, MD, PhD; Sarah Strong, MEd; Matt Wackler, MHSA; Marissa Taylor, MPH; Qing Duan, PhD; Stephanie Filigno, PhD; Michelle Hjelm, MD, MMM

****

Background: Cystic Fibrosis (CF) is a chronic, genetic disorder caused by mutations in the CFTR gene, leading to thick and sticky mucus that affects the respiratory and digestive systems. Despite treatment advancements, managing CF often requires balancing medical treatments with daily responsibilities, including education and mental health. **Objective**: This study explores the intersection of CF management and educational attainment for people with CF (PwCF), focusing on: (1) Perspectives of patients and caregivers on the CF care team's role in educational success. (2) Barriers to education due to CF complications. **Methods**: A cross-sectional, survey-based study was conducted in August 2024. The electronic survey was distributed via the Cystic Fibrosis Foundation's Community Voice platform and care teams. PwCF over 18 and caregivers of children with CF participated. The survey included 24-25 questions in multiple formats and was designed to be completed in 15 minutes. Responses were deidentified and analyzed, excluding incomplete data and surveys from care teams. **Results**: Survey respondents included 10 PwCF (ages 18-20) and 136 caregivers and/or caregiver PwCF pairs (ages 12-17). The findings revealed that PwCF and their caregivers value the support provided by the CF care team in navigating educational challenges. Common barriers to education included frequent absences due to medical appointments, difficulty in obtaining necessary school accommodations, and the impact of CF-related health issues on academic performance. Additionally, the survey identified specific concerns such as truancy, infection control, and the need for accommodations such as access to medications and bathroom passes. **Conclusion**: This study identifies common school-related issues faced by PwCF and caregivers, including balancing school performance with healthcare, navigating Individualized Education Plans, and illness in school. Providing specific resources and information can improve the quality of life for PwCF by reducing the burden of school-related issues. Caregivers and PwCF feel comfortable addressing school-related issues with CF care teams but suggest these topics should be initiated by the care teams. The study emphasizes the need for a centralized resource hub for CF-related school needs and better support for obtaining and implementing academic accommodations.

Vitamin D Deficiency is Prevalent and Resistant to Correction in Patients with Hemophagocytic Lymphohistiocytosis (HLH)

Jennifer Jess, MD; Bethany Verkamp, MD; Allison Bartlett, MD; Michael Jordan, MD

****

Background: Vitamin D plays a key role in immunoregulatory functions, and many patients are deficient prior to hematopoietic cell transplant (HCT), which is associated with poor outcome. Worsening nutrient deficiencies can occur during HCT secondary to increased nutritional requirements, inflammation, and mucosal barrier breakdown affecting absorption, potentially leading to endothelial injury and post-HCT complications. Standard repletion often does not sufficiently replete Vitamin D levels in patients undergoing HCT which has led to the implementation of high-dose replacement regimens, such as Stoss dosing (one-time dose of ~7000 U/kg). **Objective:** We sought to characterize the incidence and impact of Vitamin D insufficiency in patients with HLH undergoing HCT. Additionally, we investigated the use of standard repletion versus Stoss therapy on the ability to achieve sufficient levels pre-HCT. **Methods**: A retrospective chart review was performed on 135 patients with a diagnosis of HLH undergoing their first HCT at Cincinnati Children's Hospital Medical Center from 2010 to 2023. Demographic data, vitamin D levels at pre-determined time points, vitamin D supplementation received (Stoss and/or standard therapy), length of supplementation, and post-transplant outcomes were recorded. **Results**: Eighty-four patients had assessable vitamin D levels prior to their first HSCT. Of these, 76 (90%) were identified as vitamin D deficient (<30 ng/mL). At the time of transplant, 30 patients (39%) were corrected to sufficient levels (>30 ng/mL; 22 with standard therapy, 7 with Stoss therapy, 1 with both). One patient who failed to correct with standard supplementation subsequently corrected with Stoss, and 1 patient corrected after receiving both supplementations. The other 46 patients (61%) remained vitamin D deficient at HCT (23 with no supplementation, 21 who received standard therapy, and 2 patients who received both standard and Stoss therapy). **Conclusions**: We show that there is a high incidence of vitamin D deficiency in HLH patients, which may worsen outcomes. Many patients do not correct with standard therapy and often require aggressive repletion to achieve sufficient levels. Future analyses will include examining the impact of steroid exposure on vitamin D levels, describing optimal timing and degree of Vitamin D supplementation needed to achieve and maintain sufficiency, and correlation with outcomes post-HCT.

Elevated Alpha-Fetoprotein Levels in Children with Metabolic Dysfunction Associated Liver Disease

Jamie Klein, MD; Ana Catalina Arce-Clachar, MD; Kristin Bramlage, MD; Stavra Xanthakos, MD, MS; Rachel Sheridan, MD; Marialena Mouzaki, MD, MSc

****

Background: Metabolic dysfunction-associated steatotic liver disease (MASLD) can progress to end stage liver disease and hepatocellular carcinoma (HCC), albeit infrequently in childhood. Characteristics of patients developing such advanced liver disease remain to be determined, but recent data shows an increased incidence of HCC in patients with MASLD and advanced fibrosis/cirrhosis compared to those with MASLD without advanced fibrosis/cirrhosis. Alpha-fetoprotein (AFP) is a commonly used biomarker to screen for HCC in adults, however, there is no clear guidance with regards to if, when, and how often children with risk factors should be screened. **Objectives:** Our objectives were to: 1. Investigate the prevalence of elevated alpha fetoprotein (AFP) in children with advanced, MASLD-related, fibrosis (bridging fibrosis or cirrhosis), and 2. Ascertain whether pediatric MASLD is associated with AFP elevations regardless of fibrosis severity. **Methods:** Retrospective cohort study of patients aged 6-18 years seen at a single center between 2000 and 2024. Demographics, anthropometrics, bloodwork, histological data, and relevant imaging studies were collected. Descriptive statistics were used. **Results:** Out of a cohort of 483 pediatric patients followed for MASLD with available AFP data, 161 had undergone liver biopsy, and of those, 22 had advanced fibrosis. Children with advanced fibrosis were predominantly male (82%), non-Hispanic (55%), with a median age of 11 years (IQR= 10-18), and severe obesity (median [IQR] BMI z-score 2.56 [2.33-2.75]). No patients with advanced fibrosis had elevated AFP levels. Of the entire MASLD cohort, however, n=9 had elevated AFP levels. None were diagnosed with HCC or other tumors. **Conclusion:** In a pediatric cohort with MASLD, severe fibrosis was not associated with elevated AFP levels. AFP elevations were seen however in some patients with MASLD but were not associated with malignancies.

Food Insecurity in Pediatric Celiac Disease

Andrew Krueger, MD; Lin Fei, PhD, MS; Adrienne Henize, JD; Andrew Beck, MD, MPH; Melissa Klein, MD, MEd; Daniel Mallon, MD, MSHPEd

****

Background: Celiac disease (CeD) is an autoimmune condition that requires adherence to a gluten-free diet. Gluten-free foods are more expensive and generally less accessible than wheat-based counterparts, however, there is a paucity of studies investigating food and nutritional insecurity in children with CeD in the United States. **Objective:** To describe the prevalence of food insecurity (FI) in pediatric CeD patients, assess concordance between gluten-free FI and general FI, evaluate demographic, social, and clinical factors associated with gluten-free FI, and analyze whether gluten-free FI is associated with poorer adherence to a gluten-free diet. **Methods:** This was a cross-sectional survey-based study with a retrospective chart review. Pediatric CeD patients seen by a gastroenterologist at Cincinnati Children's Hospital Medical Center in the six-year period from 2018-2024 were eligible for inclusion. The electronic survey was a compilation of validated measures to assess gluten-free and general FI, barriers to gluten-free adherence, and demographic characteristics. Surveys were distributed via email and text message four times on different days and at different times. Electronic health records were reviewed for diagnostic data, serologic monitoring, gastroenterology follow-up, and dietician and resource utilization. **Results:** 1039 patients met inclusion criteria and were invited to complete the survey via 8129 communication outreach attempts. Survey responses were submitted by caregivers for 346 patients, constituting a 33.3% response rate. Patients with survey responses were primarily female (n=221, 64%) with a median age of 12 years. Gluten-free FI was identified in 26% (n=90) of participants, which was higher than the rates of overall (i.e., not just gluten-free) food insecurity (n=68, 19.6%). The most common reasons for gluten consumption in the twelve months prior to survey completion included accidental exposure (189/332, 57%), personal choice/preference (56/332, 17%), and lack of accessible gluten-free food in locations close to the individual's home (42/332, 13%). **Conclusions:** This survey-based study found that 1 in 4 pediatric CeD patients are gluten-free FI. It is essential that clinicians screen CeD patients for gluten-free FI given that adherence to a gluten-free diet is the only available management for this lifelong condition.

2`-Fucosyllactose Directly Modulates Macrophages in An IPSC Model of Crohn's Disease

Tal Marshanski, MD; Ingrid Jurickova, MD; Elizabeth Angerman; Erin Bonkowski; Saidah Gaiter; Katelin Chappell; Benjamin Dreskin; Yael Haberman, MD; Lee Denson, MD

****

Background: Crohn's disease (CD) patients present with inflammatory behavior, many develop stricturing complications. Rare loss-of-function mutations of the dual oxidase 2 (DUOX2) gene have been identified as risk factors for CD and linked to maintenance of mucosal homeostasis. The intestinal macrophage has been described as a key mediator in the inflamed ileum. The human milk oligosaccharide 2`-Fucosyllactose (2`-FL) was found to be a direct modulator of immune cells. An ongoing clinical trial in CD patients hopes to enlist 2`-FL as an adjunct to anti-TNF treatment. **Objective**: To study macrophage and fibrosis mechanisms *in-vitro* by creating induced pluripotent stem cells (iPSC) from pediatric CD patients and differentiating them into an organoid system. **Methods**: iPSCs were derived from peripheral blood mononuclear cells of a CD patient (reference). A loss-of-function mutation was introduced to the DUOX2 gene using CRISPER/Cas9 (variant). Hematopoietic progenitor cells were first differentiated, and then they were terminally differentiated into macrophages. Macrophages were exposed to lipopolysaccharide (LPS) as an activator and characterized by flow cytometry. Macrophages were also pre-treated with 2`-FL and analyzed for cytokine release using Luminex assay. Gene expression was analyzed using real-time PCR for cocultures of HIOs with 2`-FL, as well as cocultures of HIO with LPS activated macrophages either with or without 2`-FL. Collagen content of the tissue cultures was measured using Sirius Red staining with polarized light microscopy. **Results**: iPSC-derived macrophages had morphology and cell surface markers similar to primary macrophages. Both $DUOX2^{ref}$ and $DUOX2^{var}$ lines showed an increase in inflammatory cytokines after LPS stimulation, with significant elevations of TNF-α, OSM, IL-10, and CXCL5. Macrophages that were pre-treated with 2`-FL and then LPS, showed a significant attenuation of OSM, IL-10, and CCXL5. The mesenchymal activators PDGF-AA and ECM1 were not elevated by LPS, but pre-treatment with 2`-FL resulted in their decrease. Gene expression analysis from cocultures of activated macrophages with isogenic HIO showed a higher basal DUOX2 and MMP1 expression levels in the $DUOX2^{ref}$ line. Basal levels of MMP9 did not vary, but LPS activation resulted in a significantly larger increase in the $DUOX2^{ref}$ line. Type I and III collagen increased in the $DUOX2^{ref}$ co-culture in response to LPS independently of 2`-FL. In the $DUOX2^{var}$ HIOs, type I increased only with the addition of 2`-F, while type III increased in both 2`-FL alone and LPS activated coculture. **Conclusions**: We were able to model both inflammation and fibrosis, and to quantify factors that are key to the pathogenesis of fibrosis. We showed direct effects of a prebiotic molecule on macrophages, with trends towards downstream effects on fibrosis. Our HIO:MAC coculture resulted in formation of tissue architecture alongside immune mediators. By introducing a risk variant mutation to our system, we demonstrated differential effects of inflammatory stimuli.

Lung Mesenchymal Cells Undergo Transcriptional Reprogramming After Dysbiosis and *Streptococcus Pneumoniae* Infection

Odemaris Narváez del Pilar, MD, PhD; Jerilyn Gray, MS; Hitesh Deshmukh, MD, PhD

****

Background: Lung resistance and resilience pathways are remodeled by commensal microbiota during the critical neonatal period, contributing to chronic respiratory disease beyond infancy. Nevertheless, a unifying framework explaining how early-life dysbiosis remodels the developmental program in lung mesenchymal cells and rewires the mesenchymal cell-immune cell communication remains unresolved. Here, we approach studying the mouse lung mesenchyme using a recently established framework of three proximal-distal axes based on the endothelium, epithelium and interstitium. From proximal to distal: the vascular axis includes vascular smooth muscle cells and pericytes; the epithelial axis includes airway smooth muscle cells and two populations of myofibroblasts – ductal myofibroblasts, surrounding alveolar ducts, and alveolar myofibroblasts, surrounding alveoli; the interstitial axis residing between the epithelial and vascular trees includes fibroblasts in the bronchovascular bundle and the alveolar region. **Objective:** To unveil transcriptional programs among lung mesenchymal cell constituents after dysbiosis exposure and infection challenge with *Streptococcus pneumoniae,* a common respiratory pathogen in infants. **Methods:** C57/BL6 WT pregnant dams were exposed at E15 to antibiotics vancomycin, gentamycin, and ampicillin. Litter mice were infected at P7 with bacteria *Streptococcus pneumoniae* and harvested at P14. Four experimental conditions were analyzed: (1) uninfected and unexposed, (2) uninfected and exposed, (3) infected and unexposed, and (4) infected and exposed. Whole lungs were digested and sorted for single-cell RNA sequencing (scRNA-seq). Using scRNA-seq output data, we used the forementioned three-axis classification framework and subset mesenchymal cells based on axis-specific markers for downstream differential gene expression and trajectory analysis. **Results:** Using scRNA-seq, we identified that distal interstitial cells (DIC) of infected and antibiotic-exposed mice had downregulated innate immune response genes (*C2, C4b, C1ra, C3*) and upregulated smooth muscle cell genes (*Acta2, Myh11, Myh10*), commonly seen in myofibroblasts, in comparison to infected and unexposed mice. This preliminary finding suggests that dysbiotic and infected DICs exhibit a dampened immunological response and a profibrotic state. **Conclusions:** These findings suggest that dysbiotic lung mesenchyme exposed to *Streptococcus pneumoniae* infection undergo transcript reprogramming due to disrupted mesenchymal cell mediated inflammatory response and promotion of myofibroblast formation.

Human Milk Macronutrient Loss Differs Between Enteral Tube Feeding Systems

Anna Paschall, MD, MHSc; Ting Ting Fu, MD

****

Background: Due to immature feeding reflexes, many premature infants in the NICU require prolonged periods of enteral tube feeding. Prior research has demonstrated significant macronutrient losses from breastmilk with enteral feeding systems, especially fat. Fat intake is critical to rapid brain and lung growth during NICU hospitalization, with growth linked to neurodevelopmental outcomes. As breastmilk reduces overall morbidity and mortality, optimizing nutrient delivery is crucial. Enteral tube feeds are typically delivered via syringe pump or feeding bag systems; however, it is unknown whether nutrient loss differs between these systems. **Objective:** To compare breastmilk macronutrient losses after delivery through syringe and feeding bag enteral feeding systems. **Methods:** Frozen de-identified human milk was combined into 10 pools. Moog feeding bags and NeoMed 35 ml syringes were connected to extension tubing and a 6.5 French feeding tube for simulations. For each simulation, 20 ml of milk was delivered over 30, 60, 90, or 180 minutes (continuous feeds). This was repeated for each pool of milk. Baseline and post-delivery macronutrient composition was analyzed using a mid-infrared milk analyzer. Statistical analyses were performed using repeated measures ANOVA or Mann-Whitney tests. **Results:** A significant reduction in fat content with prolonged of feeding time ($p<0.0001$) and use of a feeding bag was observed ($p=0.0013$). With direct comparison of syringe pump to feeding bag, a significant difference in fat loss was demonstrated at 180 minutes ($p=0.003$). Syringe pumps demonstrated an average fat loss of 9% at 30 minutes, 15% at 60 minutes, 17% at 90 minutes, and 22% at 180 minutes. With feeding bags, average fat loss was 16% at 30 minutes, 22% at 60 minutes, 30% at 90 minutes, and 43% at 180 min (Figure 1). Syringe pumps demonstrated a 9% loss and feeding bag systems demonstrated an average of 20% loss in energy content (kcal) at 180 minutes ($p-=0.003$). **Conclusions:** Prolongation of enteral feeding times results in significant losses in fat and energy content of breast milk. Losses are greater with feeding bag systems than syringe pump systems. Further investigation is needed to quantify the impact of pasteurization and to identify methods to optimize nutrient delivery.

Association Between Language, Medical Complexity, and PICU Admission in Acute Respiratory Illness

Zachary Pitkowsky MD, MPH; Amanda Warmiment MD, MSc; Andrew Beck MD, MPH; Carlie Myers MD, MS

****

Introduction/Hypothesis: Children with medical complexity (CMC) are at greater risk for hospitalization and PICU admission compared to the general pediatric population. Children of families speaking languages other than English (LOE) have worse outcomes during hospitalization, including higher odds of PICU transfer. We hypothesized that CMC of LOE speaking families would be at increased risk of PICU admission during hospitalization for acute respiratory illness compared to CMC of English-speaking families. **Methods**: This was a retrospective cohort analysis of CMC <18 years old admitted to an urban quaternary pediatric hospital with acute respiratory illness from June 2015 to May 2022. CMC were defined using the Complex Chronic Conditions list (CCC) with conditions in at least 2 body systems or technology dependence. Patient sociodemographic (language, race, insurance status) and clinical data were extracted from the medical record. Associations were tested in R with binomial mixed effect regression. The primary outcome was PICU admission and primary exposure was language. **Results**: We identified 939 encounters; 326 unique CMC patients were included in the analysis. Mean age was 4.46 years(SD: 4.95); 20.5% identified as Black or African American, 70.9% White, 3.1% Asian and 7.1% Hispanic. In the cohort, 7.1% of patients' primary language was not English, with 3.7% Spanish and 3.4% language other than English or Spanish (LOES). Technology dependence was present in 74.5% of patients. During the study period, 38% of patients had a PICU admission. In the basic model with binary outcome, PICU admission, the coefficient for LOE was 1.36(OR, 3.89; 95% CI, 0.95-15.9). In models adjusted for race, age, and public insurance, the coefficient for LOE was 1.73(OR, 5.63; 95% CI, 1.1-28.3). In adjusted model with Spanish and LOES, Spanish was not significant and LOES coefficient was 2.49(OR, 12.1; 95% CI, 1.1-140). **Conclusions**: We found a strong association between LOE and PICU admissions among the CMC population with acute respiratory illness. This association was driven by the LOES subgroup. These results may guide healthcare delivery strategies for LOES families, including barrier evaluation and enhancement of language resources. These interventions have the potential to mitigate disparities for all pediatric patients.

The Impact of Social Determinants of Health on Preventable and Urgent Readmissions in Pediatric Acute Care Cardiology

Katherine Price, MD; T. Miller Sisson, MD; Sarah de Loizaga, MD; Samuel Hanke, MD, MS, MBA; Elisa Marcuccio, MD

****

Background: Hospital readmissions are costly, often preventable, and associated with both medical and socioeconomic factors. **Objective:** The purpose of this study was to evaluate the relationship between social determinants of health (SDOH) and readmission to a pediatric acute care cardiology unit, as well as determine the incidence of preventable or urgent readmissions and modifiable contributing factors. **Methods:** This single-center, retrospective analysis reviewed patients readmitted to an acute care cardiology unit within 7 days of discharge from 2019-2022. A preventability score and urgency metrics were assigned to each readmission, and multivariable logistic regression was used to obtain odds ratios and 95% confidence intervals for readmission status according to individual and community-level measures of SDOH. **Results:** Out of 265 readmission encounters, 27 (10%) were preventable and 74 (28%) were urgent. Readmission length of stay was significantly longer for preventable or urgent readmissions. Birth weight, gestational age, English-speaking status, race/ethnicity, sex, insurance category, deprivation index, and single ventricle status were not significantly associated with preventable or urgent readmissions. The most common reason identified for preventable readmission was insufficient discharge education, and the most common reason identified for urgent readmission was advancement of chronic disease. **Conclusion:** SDOH and clinical demographics were not associated with preventable or urgent readmission, which may be partially due to our institution's multidisciplinary approach to address SDOH. Although this data is encouraging, more work is needed to delineate what strategies are most effective for mitigating adverse SDOH, including more robust discharge education.

The Relationship of Handgrip to Body Composition, Cardiopulmonary Fitness, and Functional Status in Children and Adults with Congenital Heart Disease

Carter Richardson, MD; David Leone, MD; Alexander Opotowsky, MD, MMSc; Clifford Chin, MD; Wayne Mays, MS, RCPT; Sandra Knecht, MS; Adam Powell, MD, MS

****

Background: Functional exercise capacity and physical reserves are often reduced and place children and adults with congenital heart disease (CHD) at risk for hospitalization or death. Handgrip strength (HGS) is becoming more commonly used to measure muscular strength in patients with CHD. Unlike the non-CHD population, normal values for HGS by CHD lesion do not exist. Furthermore, HGS has been incompletely compared to body composition, functional status, and cardiopulmonary fitness in patients with CHD. **Objective:** The aims of our study are: i) to describe HGS values by lesion in a cohort of youth and adults with known CHD; ii) to assess the relationship of HGS with markers of fitness assessed by cardiopulmonary exercise testing (CPET), body composition assessed by bioelectrical impedance analysis (BIA), and NYHA functional status in youth and adults with CHD. **Methods:** A single center retrospective review total of 2871 participants referred to our center's exercise laboratory for clinical CPET between January 2020 and June 2023 were reviewed. Each participant underwent HGS testing, bioelectrical impedance body composition analysis (BIA), and CPET. Handgrip for each participant was compared to age and sex matched normative values. Comparisons by lesion and complexity were analyzed with linear regression, Pearson's Chi Squared, Kruskal-Wallis rank sum, Fisher Exact and Wilcoxon rank sum test. **Results:** Following application of our inclusion/exclusion criteria there were 918 participants (average age 24.5 yrs; 34% <18 years, 56% male) included in the analysis. Greater CHD complexity was associated with a decreased HGS Z Score (simple: n = 7, HGS Z Score =0.49; moderate: n = 540, HGS Z Score = 0.03; great: n=371, HGS Z Score = -0.42). Compared to those with great CHD complexity, participants with moderate complexity CHD had higher peak dominant HGS, HGS Z Score, skeletal muscle mass, peak VO2 (oxygen consumption), peak predicted VO2, and peak VO2/kg, ($p<0.001$). Overall, higher HG tertile was associated with higher Peak VO2. **Conclusions:** This study provides normal values for HGS by lesion for youth and adults with CHD. Participants with CHD have lower HGS than their age and sex matched non-CHD peers. Predictably, participants with greater complexity CHD have lower muscular strength, muscular mass, and exercise capacity compared to those with moderate complexity CHD.

Systems Analysis of Influenza Vaccine Response in Chronic Dialysis Patients Reveals Altered Immunometabolism

Carol Rowley, MD, PhD; Ana Oliveira, PhD; Amnah Siddiqa, PhD; William Otto, MD; Lara Danziger-Isakov, MD, MPH; Thomas Hagan, PhD

****

Background: Chronic kidney disease is a life-threatening condition that can lead to dependence on chronic dialysis (CD) therapy. Though CD patients have immune impairments, influenza vaccine responses in the pediatric CD population are unknown. **Objective:** We hypothesized that CD patients exhibit impaired innate and adaptive immune responses to influenza vaccination compared to healthy children (HC). **Methods:** To test this hypothesis, we vaccinated 14 HC and 7 CD patients with the influenza vaccine and collected blood samples pre- and post-vaccination. We performed RNA sequencing and hemagglutination inhibition assays to evaluate the transcriptional and antibody responses, respectively. **Results:** Post-vaccination, both HC and CD patients exhibited an increase in innate immune signatures at day 3 post-vaccination, including in TLR signaling and interferon response pathways. At day 7, HC and CD both showed increases in adaptive immune signatures, particularly in B and plasma cell modules. However, CD patients exhibited perturbation in certain metabolic pathways, including electron transport and inositol phosphate, throughout the time course. Despite these distinct transcriptional signatures, there was no difference in antibody responses to vaccination between HC and CD patients, although high pre-vaccination titers may have limited the analysis. **Conclusions:** Together, this study highlights differences in vaccine responses in CD patients compared to HC that may affect protection against influenza.

The Implementation of Reach Out and Read in a NICU Follow-Up Clinic: Increasing Word Exposure for High-Risk Children

Madilyn Sass, MD; Chunyan Liu, MS; Shelley Ehrlich, MD, ScD, MPH; Jennifer Brady MD, MEd; Morgan Hill, MD

****

Background: Increased word exposure during infancy and early childhood is correlated with improved neurodevelopment. Participation in Reach Out and Read (ROR) is associated with significant increases in expressive and receptive language in early childhood. Most published ROR studies focus on the general pediatric population, but early word exposure also benefits high-risk populations, such as former preterm infants. Therefore, we established a ROR program at the Good Samaritan Hospital NICU Follow-up clinic, which serves high-risk infants and toddlers, including former preterm infants born at <33 weeks gestation and opioid exposed infants. **Objective:** Increase the percentage of families who read to their children through the implementation of a ROR program. **Methods:** Our reading program includes provision of a developmentally appropriate book at every clinic visit and an educational bookmark. Reading practices were assessed via cross-sectional parental survey at two time points, before and one year after program implementation. Completion of the anonymous survey was voluntary. Our survey utilized a subset of the STIMQ2-Infant: the Bookreading Quantity Subdimension Score (BQSS; score 0-9) was calculated for each survey result. Descriptive statistics were used to summarize survey results. Chi-square, Wilcoxon rank tests and multiple regression analysis were used for group differences. **Results:** One hundred and sixty-three surveys were completed; 122 pre-implementation and 41 post-implementation. There was no significant difference in the percentage of families who read to their children pre- and post-implementation (94% vs. 100%). There were no overall differences in reading practices among families of former preterm infants vs. opioid exposed infants. In the former preterm infant cohort, the number of books in the home and the BQSS were significantly higher post-implementation. Families with less books and lower BQSS were more likely to report that book donation would change their reading habits. **Conclusion:** Implementation of our NICU Follow-up Clinic ROR reading program led to more books in the home and a higher BQSS score for families of former preterm infants. Even before our program was implemented, the percentage of our families who read was higher and the frequency of reading greater as compared to rates previously reported in the general population.

Etiology Derives Outcomes During and After the First Episode of Acute Pancreatitis: An Observational Cohort Study

Samuel Schriever, MD; Lindsey Hornung, PhD; Sherif Ibrahim, MD; Peter Farrell, MD; David Vitale, MD; Maisam Abu-El-Haija, MD

****

Background: Most studies on outcomes in pediatric acute pancreatitis (AP) are based on retrospectively collected datasets. Few prospective studies have looked at symptom persistence beyond hospitalization following first time episode of AP. The goal of our study was to use a prospectively enrolled cohort dataset along with yearly follow up questionnaires to investigate gastrointestinal symptom persistence and acute recurrent pancreatitis (ARP) incidence following first attack AP. **Objective:** Determine if in hospital course and post hospitalization symptom persistence following first-attack AP varies by identified etiology of pancreatitis. **Methods:** Patients who presented with first time AP in the inpatient or outpatient setting were enrolled in a prospective cohort trial using Research Electronic Data Capture (REDCAP) from March 2013 to May 2023 (n=322). Outcomes of interest included ICU admission, severity of AP episode (mild vs moderate and severe (SAP)), need for pancreatic surgical intervention, recurrence rate of pancreatitis, and persistence of symptoms in the first year after AP: vomiting, diarrhea, abdominal pain, and weight loss. **Results:** The etiology of pancreatitis was grouped into the following categories: toxic/metabolic/autoimmune (23%, 75/322), gallstone (16%, 52/322), trauma/post ERCP (7%, 23/322), non-gallstone obstructive (7%, 22/322), known genetic (12%, 39/322) and idiopathic (34%, 111/322). Toxic/metabolic/autoimmune and trauma/post ERCP pancreatitis had significantly higher rates of SAP when compared to gallstone, non-gallstone obstructive, and idiopathic (36% and 32% vs. 15%, 18%, and 16%, respectively, P=0.008). Abdominal pain in the first-year post AP, significantly differed by etiology group with trauma/post ERCP (58%) and idiopathic (55%) having the highest prevalence, followed by non-gallstone obstructive (33%), toxic/metabolic/autoimmune (32%) and gallstone (19%) (P=0.02). Vomiting (49%), diarrhea (42%), and weight loss (29%) in the first-year post AP did not significantly differ by etiology but affected close to half of all AP patients. **Conclusion:** Our results showed that clinical course varied by etiology both during initial attack of AP, and at one year follow up. Notably trauma/post ERCP pancreatitis had both a high rate of morbidity during Initial attack of AP as well as a significantly higher occurrence of abdominal pain in the one year follow up period suggesting a more persistent pain phenotype following the initial episode. Overall symptom burden in the year following first attack AP was relatively high with a sizeable portion of subjects reporting some gastrointestinal symptoms though the only difference between etiologies was the occurrence of pain.

Long-Read Sequencing and Optical Genome Mapping Identify Causative Gene Disruptions in Noncoding Sequence in Two Patients with Neurologic Disease and Known Chromosome Abnormalities

Ethan Sperry, MD, PhD; Kristen Sund, PhD; Jie Liu, PhD; Joyce Lee, PhD; John Garbe, PhD; Zakia Abdelhamed, MBChB, PhD; Chelsey Maag; Barbara Hallinan, MD, PhD; Steven Wu, MD; Archana Deshpande, MS; Rolf Stottmann, PhD; Teresa Smolarek, PhD; Lisa Dyer, PhD; Matthew Hestand, PhD

****

Background: Despite advances in next generation sequencing (NGS), genetic diagnoses remain elusive for many patients with neurologic syndromes. Long-read sequencing (LRS) and optical genome mapping (OGM) technologies improve upon existing capabilities in the detection and interpretation of structural variation in repetitive DNA, on a single haplotype, while also providing enhanced breakpoint resolution. **Objective:** To demonstrate utility of LRS and OGM for identification of clinically-actionable genetic diagnoses for patients in whom other genetic testing strategies (chromosome microarray, whole exome and genome sequencing) have been non-diagnostic. **Methods:** We performed LRS and OGM on two patients with known chromosomal rearrangements and inconclusive Sanger or NGS. **Results:** The first patient, who had epilepsy and developmental delay, had a complex translocation between two chromosomes that included insertion and inversion events. The second patient, who had a movement disorder, had an inversion on a single chromosome disrupted by multiple smaller inversions and insertions. Sequence level resolution of the rearrangements identified pathogenic breaks in noncoding sequence in or near known disease-causing genes with relevant neurologic phenotypes (MBD5, NKX2-1). These specific variants have not been reported previously, but expected molecular consequences are consistent with previously reported cases. **Conclusions:** As the use of LRS and OGM technologies for clinical testing increases and data analyses become more standardized, these methods along with multiomic data to validate noncoding variation effects will improve diagnostic yield and increase the proportion of probands with detectable pathogenic variants for known genes implicated in neurogenetic disease.

Impact of Routine Pulmonary Medications on Rescued CFTR in Cystic Fibrosis Cells

Matthew Wleklinski, MD, PhD; Jessica Meeker, BS, MS; Hunter Morgan, BS; Alicia Ostmann, BS; John Brewington, MD

****

Background: Cystic fibrosis (CF) is a complex genetic disorder requiring management of multiple organ systems. As a result, individuals with CF often adhere to complex medication regimens, encompassing a variety of therapies targeting pulmonary function, infection control, and nutritional support. While each of these medications plays a vital role in managing the manifestations of CF, the cornerstone of therapy lies in rescuing the function of the defective cystic fibrosis transmembrane conductance regulator (CFTR) protein. CFTR modulators has revolutionized CF care by addressing the protein defect, but the potential for interactions between these modulators and other prescribed CF medications remains a critical area of investigation. It is essential to understand if routinely used medications influence the function of rescued CFTR. Such interactions could significantly impact treatment efficacy and inform clinicians in optimizing medication regimens for individuals with CF. **Objective:** This project tested if common pulmonary medications affect modulator-rescued CFTR function in CF airway epithelia. **Methods:** CFBE cells (an immortalized bronchial epithelial cell line) expressing the ΔF508 CFTR mutation were cultured on permeable inserts to establish an air-liquid interface. Cells were treated with elexacaftor/tezacaftor or vehicle for 48 hours. Azithromycin, tobramycin, pulmozyme, and hypertonic saline were added to the treatment, either alone or in combination. CFTR function was measured using the Ussing chamber, a device that can measure trans-epithelial chloride ion secretion, which is directly dependent on CFTR activity. **Results:** ΔF508 CFBEs treated with CFTR modulators showed significantly increased CFTR function compared to vehicle-treated cells ([1.16 μA ± 0.73] vs. [3.80 μA ± 1.56] $p < 0.05$. Co-treatment with azithromycin, tobramycin, pulmozyme, or hypertonic saline did not significantly alter modulator-rescued CFTR function. Combination therapy with azithromycin and tobramycin also had no significant effect. **Conclusions:** Common pulmonary medications did not significantly alter rescued CFTR function *in vitro*. These findings suggest that these medications are unlikely to interfere with CFTR modulator therapy. However, further studies utilizing clinical trial data and/or primary patient cell models would be useful to confirm these observations. Ultimately, continuation of this work would help providers decide on continuing vs reducing co-treatments in patients taking CFTR modulators.

Additional Submitted Abstracts

IN ALPHABETICAL ORDER BY RESIDENT AUTHOR(S)

Association Between HLA Typing and Celiac Disease in Turner Syndrome
Rosario Alarcon, MD — Categorical Pediatrics, PGY-3

Capacity in the Transitional Age Youth
Hannah Bachmann, DO — Pediatrics/Triple Board, PGY-2

Contemporary Practices of Dry Weight Estimation and Ultrafiltration on Blood Pressure Control in Pediatric Hemodialysis Patients
Devin Barnaby, MD — Categorical Pediatrics, PGY-3

Role of Surveillance Kidney Biopsy in Lupus Nephritis
Mikayla Burrell, MD — Categorical Pediatrics, PGY-3

Optimizing Fortification Strategies for Donor Breast Milk
Patricia Calma, DO — Categorical Pediatrics, PGY-3

Assessment of Rehabilitation Needs and Utilization Following Pediatric Cardiac Arrest
Paige Haenni, MD — Pediatrics/PM&R, PGY-4

Novel Bone Disease Biomarkers in Pediatric Hematopoietic Stem Cell Transplant Recipients
Meghan Haney, MD, PhD — Categorical Pediatrics, PGY-3

The Prevalence and Predictive Factors of Overlapping Disorders of Gut-Brain Interaction and Celiac Disease in Children
Andrew Krueger, MD — Categorical Pediatrics, PGY-2

Implementing and Evaluating an Intervention to Improve Child Life Utilization to Mitigate Medical Trauma During Venipuncture for Patients with Sickle Cell: Building a Trauma- Informed Curriculum
Tracy Li, MD, MPH, MA — Categorical Pediatrics, PGY-2

Latino Family Voices: Facilitators and Barriers to Caring for Latino Youth with Chronic Illnesses in Cincinnati
Francesca Siegel, MD, MS — Medicine/Pediatrics, PGY-3

Association Between HLA Typing and Celiac Disease in Turner Syndrome

Rosario Alarcon, MD; Daniel Mallon, MD; Iris Gutmark-Little, MD

****

Background: Patients with Turner Syndrome (TS) are 2-5 times higher risk of developing Celiac Disease (CD) compared to the general population. However, there is limited evidence regarding CD onset and risk factors in patients with TS. HLA typing has been previously utilized as an accurate first-line screen for CD in high-risk groups, but the association and predictive value of HLA typing and CD in pediatric patients with TS is not well-established. **Objective:** To investigate the association between HLA typing and risk of CD in patients with TS. **Methods:** Prospective cohort study with recruitment of TS patients with and without CD. HLA typing obtained, and administered a study questionnaire which assessed CD symptoms, history of other autoimmune diseases, and family history. Also, existing HLA typing data from the TS database collected. EMR review included: karyotype, TTG IgA levels, prior HLA typing, endoscopy results, and clinical gastroenterology and endocrinology documentation. Diagnosis of CD was defined as an ICD-10 code for CD with most being diagnosed by a gastroenterologist with or without biopsy. Data analysis included comparing categorical variables such as HLA types by using a Chi-Square test and continuous variables by using a t-test. **Results (preliminary results):** The TS database included 9 patients with prior HLA testing available from EMR review. Recruited 11 new participants, with and without CD, and obtained HLA typing. Analyzed a total of 20 patients with HLA typing, 11 with CD and 9 without CD. HLA typing in the 11 patients with CD showed that two are DQ2 homozygous, one is DQ2/DQ8 heterozygous, one is DQ8 homozygous, three are DQ2 heterozygous, three are DQ8 heterozygous, and one is DQ2/DQ8 negative. HLA typing in the 9 patients without CD consisted of seven who are DQ2/DQ8 negative, one is DQ8 heterozygous, and one is DQ2 heterozygous. Statistical analysis ongoing. **Conclusions:** Statistical analysis is still ongoing to determine the significance of findings.

Capacity in the Transitional Age Youth

Hannah Bachmann, DO; Lucia Wang, MD; Kathryn Soe, MD; Blair Simpson, MD

****

Background: Determination of capacity, specifically in transitional age youth, is a ubiquitous ethical dilemma throughout healthcare. Numerous cases at CCHMC have recently highlighted the importance of thorough and equitable assessment of capacity, specifically in transitional aged youth. Many of these cases emphasize the importance of standardized guidelines and training for clinicians of all specialties to assess capacity for transitional aged youth. It is not uncommon for patients to turn 18 years old while hospitalized, or have recently turned 18, but not have legal guardianship. However, no literature that we know of reviews capacity/decision making ability of young adults or transitional age youth in the pediatric setting. **Objective:** Literature review of current guidelines and research in capacity, specific to transitional aged youth (adolescence through young adult). **Methods:** Standardized literature review by resident and fellow research team. Full searches included Pubmed: "pediatric* transitional age adult capacity" and Pubmed :pediatric adult capacity decision. We will then synthesize information from this literature review into a general guideline to assess capacity in transitional aged youth using various case reports as examples. **Results:** Numerous articles discussing capacity in relations to specific conditions exist. The following are consensus guidelines for capacity across all populations: Capacity is a moving target, changes day to day, topic to topic. Assessment of capacity requires four components in relation to the specific topic/dilemma in questions: understanding, appreciation, evaluation, and expressing a choice. Some examples of individuals not having capacity include delirium, suicidal ideations, changing one's mind, choice but no reason. To further complicate capacity assessment, there are varying levels of significance of capacity (i.e. deciding on a toenail removal vs blood transfusion). Despite the above agreements about capacity across multiple populations and conditions, no articles or studies were found that produced specific generalized capacity guidelines for transitional aged youth (adolescent through young adult). **Conclusions:** Based on review of literature, we will develop a recommended checklist of capacity to spur further discussion and research in this area. Specific checklists and considerations for the following sub-populations will be created: health emergencies, neurodevelopmental, associated psychiatric conditions, malnourishment and capacity.

Contemporary Practices of Dry Weight Estimation and Ultrafiltration on Blood Pressure Control in Pediatric Hemodialysis Patients

Devin Barnaby, MD; Donna Claes, MD; Kelli Krallman, RN; Elizabeth Siry; Mackenzie Lac

****

Background: Dry weight assessment and fluid volume management are key aspects in the management of adult and pediatric hemodialysis patients. Chronic fluid overload is a common etiology of hypertension in hemodialysis patients; therefore, these factors significantly impact morbidity and mortality in the hemodialysis patient population. Though there are many studies in adult literature that establish correlation with these practices with reduced morbidity and mortality, the data in the pediatric dialysis community is lacking. **Objective**: Retrospective cross-sectional review evaluating fluid management practices and associated blood pressure control in patients 1 to < 21 years old on hemodialysis to answer some of the questions that can inform management of hypertension/fluid overload during hemodialysis. **Methods:** Observational cross sectional, chart review of hemodialysis patients for patients between the ages of 1 to < 21 years of age who have received ultrafiltration (as based upon a prescribed estimated or post-dialysis target dry weight) as part of hemodialysis care. Demographic data as well as specific hemodialysis treatment-related data for a defined study month for each patient will be collected. This is a retrospective chart review. **Results:** At this time project does not have reportable data, work in progress.

Role of Surveillance Kidney Biopsy in Lupus Nephritis

Mikayla Burrell, MD; Katherine VandenHeuvel, MD; Francisco Flores, MD; Elif Erkan, MD, MS

****

Background: Lupus nephritis (LN) is one of the most serious complications of systemic lupus erythematous. The benefit of early surveillance biopsies to prevent future flares and to monitor treatment response is not established. In our institution, we implemented surveillance biopsies 6 months after induction therapy. **Objective**: To assess the value of surveillance biopsies in concordance with the clinical findings in medical management. **Methods**: Patients diagnosed with Class III or IV LN on initial kidney biopsy and who had a surveillance biopsy were included in this retrospective chart review. Patients received monthly cyclophosphamide infusions based on NIH protocol or mycophenolate mofetil (MMF) as induction therapy. The clinical history, treatment course, pathology results, and biochemical results were assessed. Proteinuria was determined by urine protein/creatinine mg:mg (UPC) ratio. Estimated glomerular filtration rate (eGFR) was assessed by the CKiD U25 calculation. LN classification and activity index (AI) was determined by pathology on biopsies. **Results**: Nineteen patients fulfilled inclusion criteria. Seven and 12 patients were initially diagnosed with Class III and Class IV respectively. AI was 8.4±5.6, UPC was 2.57±2.1, and eGFR was 79.09±35 at presentation. LN classification improved in 15 (79%) patients on surveillance biopsy. 16 (84%) patients changed from cyclophosphamide to MMF after the surveillance biopsy, and the other 3 received additional treatment. Six patients experienced a flare.
The AI improved in 14 (74%) patients, and mean AI on surveillance biopsy was 1.56. The mean AI on surveillance biopsy was 4.8 and 0.43 between patients who flared and those who did not respectively ($p<0.05$). Patients who flared had a higher LN class on surveillance biopsy in comparison to those without a flare ($p<0.05$). UPC and eGFR at the time of surveillance biopsy did not predict patient flare. **Conclusions**: The results of surveillance biopsies often guided treatment for patients with LN. The AI and degree of improvement in classification of LN on the surveillance biopsy may be a useful tool in predicting likelihood of LN flare. We propose that surveillance biopsies should be considered as part of standard care in management of patients with LN.

Optimizing Fortification Strategies for Donor Breast Milk

Patricia Calma, DO; Ting Ting Fu, MD; Heather Kaplan, MD; Trayce Fields, MD; Alonzo Folger, MD; Katelyn Gordon, MD; Brenda Poindexter, MD

****

Background: Preterm infants have distinct nutritional needs to support their rapid growth and development. Breast milk produced by preterm mothers is naturally enriched with higher levels of protein, especially crucial proteins such as immunoglobulins, lactoferrin, and growth factors, which are essential for the development of the preterm infant's immune system and tissue growth. In contrast, most donor breast milk derives from mothers of term infants, whose milk has lower protein content and lacks the enhanced levels of fat, minerals, and bioactive compounds found in preterm milk. The composition gap means that donor milk often does not meet the specific nutritional needs of preterm infants. **Objective:** To optimize protein fortification of donor breast milk to better mimic the composition of preterm maternal breast milk and determine whether enhanced protein fortification has harmful renal effects. **Methods:** This study was conducted as a prospective cohort study of preterm infants in the Good Samaritan NICU who received protein-fortified donor breast milk. Biomarkers, including serum creatinine and blood urea nitrogen (BUN) levels, were measured and renal outcomes were assessed using acute kidney injury (AKI) staging criteria. **Results:** The study is currently in progress and specific results are not yet available. We plan to investigate whether optimizing protein fortification in donor breast milk is correlated with increased risk of renal injury. **Conclusions:** While the study is ongoing, the results are expected to provide valuable insights into the effects of protein-fortified donor breast milk on the growth of preterm infants. By optimizing the nutritional composition of donor milk, this research can improve outcomes for preterm infants, ensuring they receive the necessary protein for proper growth and development. The study will assess whether the increased protein fortification leads to any adverse renal effects, which is critical for ensuring the safety of this intervention. The findings from this study could inform clinical practice and guide future recommendations on the use of donor breast milk for preterm infants, contributing to improved neonatal care and long-term health outcomes.

Assessment of Rehabilitation Needs and Utilization Following Pediatric Cardiac Arrest

Paige Haenni, MD; Caitlin Chicoine, MD; Nathan Evanson, MD, PhD; Joseph Quinlan, DO; Matthew Zackoff, MD, MEd; Daniel Loeb, MD, MEd; Maya Dewan, MD, MPH; Danielle Maue, MD

****

Background: Thousands of pediatric patients suffer cardiac arrest (CA) annually, with variable survival rates between 6-54% between out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA). More recent studies have started to better characterize functional deficits and neurocognitive challenges after CA at initial discharge and long-term follow up. Unfortunately, there are no best practices guidelines for early identification and monitoring of functional, cognitive, and neurobehavioral differences following pediatric CA. In our institution, pediatric rehabilitation medicine (PRM) is often appropriately consulted to assist in the management of post-arrest patients that suffer severe neurologic injury, but there is no structured inclusion for patients with more subtle residual deficits, and little is known about how the rehabilitation of children with CA should be done. **Objectives:** The primary aim of this study is to determine whether pediatric patients who have experienced CA receive rehabilitation services during or after their initial hospitalization. The secondary aims are to identify specific patient- or arrest-related factors that increase the need for rehabilitation services and to predict which post-arrest patients might benefit from PRM consultation or appointment. **Methods:** This study represents a retrospective cohort study, leveraging data from the Post-Cardiac Arrest Care (PCAC) database to identify patients ranging from 0-years-old to 21-years-old who suffered IHCA or OHCA and were admitted to pediatric intensive care unit for further management. We will evaluate patient-specific factors such as age, race, sex, and pre-existing comorbidities, injury-related factors such as time to ROSC, CA location, and need for ECMO, and post-arrest factors such as imaging findings, neurologic diagnoses, and length of hospital course. Outcome measures include placement of PRM consult, admission to inpatient rehabilitation, placement of PT, OT, or SLP consults and their discharge recommendations, new equipment needs, and presence of neuropsychological testing. We will then assess associations between rehabilitation outcomes and the predictor variables. **Results/Conclusion:** Pending at time of submission.

Novel Bone Disease Biomarkers in Pediatric Hematopoietic Stem Cell Transplant Recipients

Meghan Haney, MD, PhD; Lucy Langenberg, BS; Nathan Luebbering, MS; Sheyar Abdullah, BS; Jonathan Howell, MD, PhD; Natalie Segev, MD, MS; Kasiani Myers, MD; Stella Davies, MBBS, PhD; Anthony Sabulski, MD

****

Background: Standardized bone health screening is needed in pediatric hematopoietic stem cell transplant (HSCT) to avoid fragility fractures and long-term comorbidities associated with abnormal bone mineral density (BMD). Bone health complications are significantly more common in patients with graft versus host disease (GvHD) and those who receive >3 months of steroids. **Objectives:** We aimed to longitudinally study CTX, IL6 and MIP1a in a cohort of pediatric HSCT recipients prospectively screened with dual-energy X-ray absorptiometry (DXA) scans and spine X-rays. **Methods:** Plasma CTX, IL6 and MIP1a ELISAs were performed on 155 HSCT recipients at baseline (prior to transplant), day 30, 60,100 and 1 year after HSCT. **Results:** Plasma CTX ($p<0.0001$), MIP1a ($p<0.0001$) and IL6 ($p=0.04$) showed significant changes across timepoints. Peak CTX levels occurred at day 60 (median, 0.44pg/mL; IQR, 0.19-0.71 pg/mL) and day 100 (median, 0.37pg/mL; IQR, 0.16-0.67 pg/mL). Baseline CTX levels had a median value of 0.156 pg/mL (the lower limit of detection for the assay) with an IQR of 0.156-0.246pg/mL, which implies a minimal bone turnover state prior to HSCT. Day 60 CTX levels correlated with pre-transplant spine DXA BMD ($p=0.04$), supporting a relationship between this bone turnover marker and BMD. Eighteen percent ($n=28$) of patients developed grade 2-4 GvHD by day 100. Patients with grade 2-4 GvHD had significantly higher IL6 at day 100 ($p=0.017$, median 141.6 vs 51.8) compared to patients without GvHD. CTX was also elevated in GvHD patients at day 100 ($p=0.06$, median 0.49 vs 0.34 pg/mL) and day 180 ($p=0.028$, median, 0.18 vs 0.156 pg/mL). Ongoing analyses include integration of all pre- and post-transplant DXA data and predictive modeling of these biomarkers for the early identification of bone disease after HSCT. **Conclusion:** We show that peak bone turnover occurs 2-3 months after HSCT which suggests this may be an optimal time for bone health screening with plasma CTX levels and imaging. Additionally, inflammatory cytokines associated with bone disease are modulated by GvHD and steroid exposure. Further analysis of this dataset will inform mechanisms of HSCT-related bone disease and screening recommendations for bone disease in pediatric HSCT recipients.

The Prevalence and Predictive Factors of Overlapping Disorders of Gut-Brain Interaction and Celiac Disease in Children

Andrew Krueger, MD; Umangi Patel, BDS, MPH; Jennifer Hardy; Temara Hajjat, MD; Daniel Mallon, MD, MSHPEd; Neha Santucci, MD, MBBS

****

Background: Our understanding of disorders of gut-brain interaction (DGBI) and their overlap with pediatric celiac disease (CD) is limited. **Objective:** Establish the prevalence and predictive factors of DGBI in children with CD. **Methods:** Single-center retrospective study of children 4-21 years old with biopsy-proven CD diagnosis who were adherent to a gluten-free diet (GFD) and had at least one follow-up visit 9–24 months after initial visit. Electronic health records were reviewed for symptoms (at presentation and at all follow-up visits), comorbid conditions, serologic monitoring, family history, and medication and treatment utilization. Expected serologic decline was defined as 50% decline by six months, 75% decline by twelve months, or normalization of tissue transglutaminase immunoglobulin A (TTG IgA). DGBI (new or persistent symptoms after meeting expected serologic decline) and no-DGBI groups were compared. **Results:** 83/191 (43%) CD subjects met Rome IV DGBI criteria. Most subjects were female (65%) and white (95%) with a median diagnosis age of 11 years (IQR 6.09 years). There was no significant difference in diagnosis age or baseline TTG IgA between DGBI and no-DGBI groups. The median time from biopsy (proxy for GFD start) to meeting expected serologic decline was 6 months (range = 0.5 – 51 months). The most common DGBI subtypes were functional constipation (33%) and functional abdominal pain (29%). Only two (5.2%) asymptomatic subjects at presentation developed DGBI. Abdominal pain (OR 3.09, 95%CI [1.57,6.31]), constipation (OR 2.19, 95%CI [1.15,4.20]), vomiting (OR 2.36, 95% CI [1.01,5.74]), and nighttime pain awakening (OR 9.76, 95%CI [1.21, 447.23]) at presentation had a significantly increased risk of DGBI, as did complete villous blunting on biopsy (OR 2.28, 95%CI [1.22,4.29]). Comorbid joint hypermobility syndrome (OR 5.23, 95%CI [1.56,22.74]), headaches (OR 3.47, 95%CI [1.40,9.23]), musculoskeletal pain (OR 3.20, 95%CI [1.22,9.08]), and psychiatric diagnoses (OR 2.08, 95%CI [1.09,4.01]) were associated with increased risk of DGBI whereas type 1 diabetes was associated with decreased risk (OR 0.27, 95%CI [0.087,0.74]). **Conclusion:** We found a significant overlap in pediatric CD and DGBI. Clinicians should consider DGBI diagnoses and targeted treatment when there are new or persistent gastrointestinal symptoms despite CD serologic improvement to facilitate optimal care.

Implementing and Evaluating an Intervention to Improve Child Life Utilization to Mitigate Medical Trauma During Venipuncture for Patients with Sickle Cell: Building a Trauma- Informed Curriculum

Tracy Li, MD, MPH, MA; Cheryl Dahling, BS; Rebekah Doshi, BS; Katie Dorn, BS; Jenn Rollins, BSN; Chandra Manuel, MS; Penelope Grubbs, MS, Ed.S; Paige Chaplin, MS; Alexandra Power-Hays MD

****

Background: Sickle Cell Disease (SCD) affects over 100,000 Americans, with increased incidence among Black race and minority ethnicities. Fear of pain from SCD and medical procedures, exacerbated by distrust or mistreatment in the medical system, may lead to medical trauma and poor healthcare engagement. Children identify venipuncture as one of the most feared healthcare experiences. Early development of coping strategies for pain through anticipatory guidance about venipuncture from child life specialists (CLS) may reduce trauma and increase trust in the medical system. **Objective:** To introduce CLS venipuncture anticipatory guidance to families of infants with SCD, as phase one of a trauma-informed, antiracism curriculum. **Methods:** This study's aim is that 80% of newly diagnosed infants with SCD at Cincinnati Children's between January 2024 and March 2025 will receive venipuncture anticipatory guidance at their second clinic visit, prior to their first in-clinic lab draw. Zero new SCD patients in the last 2 years met with CLS prior to their first in-clinic lab draw; rather, CLS is often requested in the midst of an attempt. A team of CLS, care managers, and providers was formed. A care manager identifies newly diagnosed infants with SCD and relays the appointment time to CLS. CLS assesses parent attitudes, teaches coping skills, and empowers CLS utilization for future support. A run chart will be created to track CLS visit completion, and periodic meetings will guide PDSA cycles. The intervention's impact will be evaluated through surveys distributed to families who have and have not received the intervention from February 2025 to March 2025 with three Likert scale and one qualitative question. These questions include: "how likely are you to ask for support for your child during procedures," "how stressful is venipuncture for your child," "do you trust that your SCD team has your best interests in mind," and "describe a negative and positive experience around lab draws?" **Results:** Between January 2024 and February 2025, we have provided 80% of newly diagnosed infants with SCD with venipuncture anticipatory guidance and are awaiting patient survey results. **Conclusions:** This QI Study aims to reduce venipuncture anxiety and introduce pain coping strategies through expanded CLS use.

Latino Family Voices: Facilitators and Barriers to Caring for Latino Youth with Chronic Illnesses in Cincinnati

Francesca Siegel, MD, MS; Skyler Petty, BA; Jonelle Prideaux, MA; Lara Stone, MS; Andrew Beck, MD, MPH; Ndidi Unaka, MD, MEd; Carlos Casillas, MD

****

Background: Latino/a/x youth (LY) are at significant risk of poor health outcomes. Such outcomes are driven by factors including language barriers, insurance barriers, and immigration concerns. As a result, LY experience health outcomes below national benchmarks, particularly for chronic diseases like type 1 diabetes (T1D), asthma, and mental health disorders (MHD). Inequities are further exacerbated in nontraditional destination areas where smaller immigrant communities may lack supportive infrastructure. **Objective**: Qualitatively explore experiences of Latino families with children with chronic diseases and understand barriers and facilitators to care for LY with T1D, asthma, or MHD. **Methods**: We will conduct 30 1-hour semi-structured interviews with caregivers of LY. Interviews will be conducted in either English or Spanish based on participants' preferred language by a bilingual team member. We will identify eligible participants retrospectively based on hospitalizations and/or ambulatory visits from 1/1/2022-12/31/2023. We will also prospectively identify eligible participants based on hospitalizations and/or ambulatory clinic visits as they occur. We will recruit caregivers of children who: 1) are 0-18 years of age and are identified as Hispanic in the electronic health record, 2) have been hospitalized at Cincinnati Children's and/or receive care at one or more affiliated ambulatory clinics (primary care and/or subspecialty), and 3) have one of the following diagnoses – T1D, asthma, or MHD. An interview guide was informed by the Barriers to Care and the Access Barriers Questionnaires and reviewed with a family partner. The study is IRB-approved. Transcripts will be coded in both English and Spanish. Thematic analysis will be performed to identify patterns in LY caregiver experiences. We will conduct the analysis as we interview and will recruit participants until saturation is met, meaning the point at which no new substantive information is gained from 3 consecutive interviews. We anticipate completing participant interviews, coding, and content analysis by April 2025.

Cincinnati Children's®
changing the outcome together

BRV1505507