Pediatric Research Day

September 20, 2023

7:45 a.m. – 4:15 p.m.

Children's Foundation Research Center • Memphis, TN

Research and Diversity:

Superpowers When Linked

Le Bonheur Children's Hospital
Methodist Healthcare Family

Children's Foundation Research Institute

The University of Tennessee Health Science Center

Table of Contents

Welcome

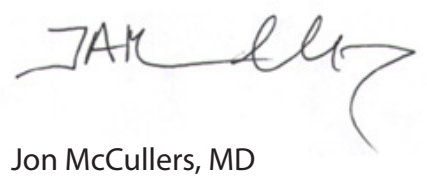
Welcome to the 12th Annual Pediatric Research Day, hosted by the Department of Pediatrics at the University of Tennessee Health Science Center and the Children's Foundation Research Institute within Le Bonheur Children's Hospital.

Our research portfolio has continued to strengthen year over year. We are excited about the work presented at Pediatric Research Day, as it highlights the diversity and depth of basic and clinical research being performed at Le Bonheur Children's Hospital, UTHSC and our academic and clinical partner institutions, including St. Jude Children's Research Hospital and the University of Memphis. It also demonstrates the exciting progress and significant advances that our researchers are making towards uncovering molecular mechanisms underlying pediatric diseases, preventing childhood illness and improving the quality of pediatric health care.

The theme for this year is "Research Diversity: Superpowers When Linked." This forum is intended to both showcase the work of our researchers and trainees, and allow us to learn from our distinguished guests, all of whom are leaders in their field. Russell Ledet, MD, PhD, MBA, the Pediatric Research Day keynote speaker and recipient of the James Hunt Distinguished Visiting Professorship, will talk about the importance of diversity in all forms of the research enterprise. Sandra Arnold, MD, Jason Yaun, MD, Tanjala Gipson, MD, and Amali Samarasinghe, PhD, are all members of our department and will update the audience on the latest discoveries in their respective research areas. Short talks and poster presentations from our faculty and trainees are expected to be engaging and a sure highlight of this year's event.

This year too, we have a record number of Pediatric Research Day participants, reflecting a strong and enthusiastic commitment to research, collaboration and innovation. I hope that you will enjoy this opportunity to interact and discuss your work with fellow researchers.

Enjoy the day!



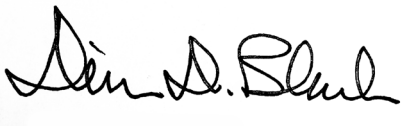
Jon McCullers, MD
Chair, Department of Pediatrics, UTHSC
Senior Executive Associate Dean of Clinical Affairs

Welcome

Welcome to the 12th Annual Pediatric Research Day! Le Bonheur Children's Hospital, along with its major partners, the University of Tennessee Health Science Center, the Children's Foundation Research Institute and St. Jude Children's Research Hospital, have supported cutting edge basic, clinical and translational research for many years, leading to several major breakthroughs impacting the health and well-being of children. Activities surrounding Pediatric Research Day are designed to showcase our pediatric researchers and their work. We are extremely proud of the high-quality, state-of-the-art research produced by these talented individuals.

This year, Pediatric Research Day spotlights accomplishments in the area of Research Diversity. The keynote speaker, Russell Ledet, MD, PhD, MBA, who is a highly accomplished resident at Indiana University and recipient of the UTHSC James Hunt Distinguished Visiting Professorship Award, will take us on his intriguing journey into his budding career in medicine. The other invited speakers and short talk presentations, as well as the poster presentations, will highlight the breadth and depth of the ongoing research activities here at Le Bonheur, St. Jude and the University of Tennessee Health Science Center.

We are excited by the advances in pediatric research at Le Bonheur Children's Hospital and think you will be, too. Again, welcome and enjoy!



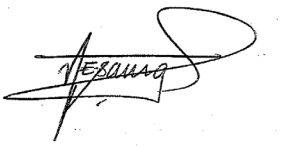
Dennis D. Black, MD
J. D. Buckman Professor of Pediatrics
Professor of Physiology, UTHSC
Vice Chair for Research, Department of Pediatrics
Director, Children's Foundation Research Institute of Memphis
Vice President for Research, Le Bonheur Children's Hospital

Welcome

Welcome to the 12th Annual Research Day co-sponsored by the Department of Pediatrics at UTHSC, Le Bonheur Children's Hospital and the Children's Foundation Research Institute. This year's theme is Research Diversity, chosen to highlight our expertise and commitment to diversity in all forms of research and work practices.

I would like to thank the faculty for volunteering to judge abstracts and posters, administrative staff at UTHSC and Le Bonheur marketing and members from my laboratory for helping to organize this event; this day would not be possible without your help. Thank you to all our invited speakers, poster presenters and guests for participating in today's event by sharing your discoveries and knowledge. A special thank you to Jon McCullers, MD, (Department of Pediatrics), the Children's Foundation, and Le Bonheur Communication and Marketing Department for financial sponsorship that enabled us to host this event and give awards of excellence. The medical student awards were provided as a generous donation by BioLegend®, thank you John Rutigliano, PhD. I also would like to thank Ajay Talati, MD, for chairing the poster judges panel. Please refer to the back of the book for acknowledgements.

This is our first conference after the COVID lockdowns and while many of our programs were impacted, we are fortunate to have active participation from our trainees. In an attempt to keep the conference small in light of the minor surge of infections, we chose not to have a faculty category for poster presentations. Although smaller compared to past years, I hope you enjoy the late-breaking science that your colleagues are engaged in and find new opportunities to form collaborations. Please don't hesitate to ask if you should have any questions. I hope you enjoy the day as much as I enjoyed planning it!



Amali E. Samarasinghe, PhD
Associate Professor, Department of Pediatrics
The Heart Institute
Pulmonology, Allergy-Immunology and Sleep
Director, Pediatric Asthma Research Program
University of Tennessee Health Science Center

12th Annual Pediatric Research Day

Wednesday, Sept. 20 | 7:45 a.m. to 4:15 p.m.

Chesney Auditorium, Children's Foundation Research Institute

Theme - Research and Diversity: Superpowers When Linked

7:45 - 8:00 am	Breakfast
8:00 - 8:10 am	Opening Remarks • Jonathan McCullers, MD Dunavant Professor and Chair, Department of Pediatrics, UTHSC; Senior Executive Associate Dean of Clinical Affairs • Trey Eubanks, MD Interim President and CEO, Le Bonheur Children's Hospital • Haley Overcast Marketing and Communications Manager, Le Bonheur Children's Hospital • Amali Samarasinghe, PhD Associate Professor, The Heart Institute Research Day Director
8:10 – 9:10 am	Keynote Address: James C. Hunt Visiting Distinguished Professorship ***From Security Guard to Physician Scientist: My Journey in Medicine*** Russell Ledet, MD, PhD, MBA Resident, University of Indiana School of Medicine
9:10 – 9:30 am	Coffee served in the atrium of the Faculty Office Building

Auditorium, Faculty Office Building

Session One:

Session Chairs:	Cynthia Cross, MD | Medical Chief, Community Health and Regional Services Shalini Narayana, PhD | Director, Transcranial Magnetic Stimulation Laboratory
9:30 – 9:40 am	Introduction by Session Chairs
9:40 – 10:10 am	***The Family Resilience Initiative: From the Bedside to Research and Back*** Sandra Arnold, MD | Division Chief, Infectious Diseases Jason Yaun, MD | Division Chief, Outpatient General Pediatrics
10:10 – 10:25 am	***Food Allergy and Health Disparities*** Heema Shah, MD Outstanding Abstract Award: Clinical Fellow

Scientific Program

10:25 – 10:55 am — ***My Research Journey in Sickle Cell Disease***
Kenneth Ataga, MD | Director, UTHSC Center for Sickle Cell Disease

10:55– 11:10 am — ***Swinging by the ED: A 10-year Analysis on Playground Injuries of the Head and Neck***
Andrew Franklin
BioLegend Abstract Award: Medical Student

11:10 – 11:15 am — ***The BIG Initiative at Le Bonheur***
Robert Davis, MD | Professor, Pediatrics, CMBI

11:30 – 1:30 pm — **POSTER SESSION** and Lunch
CFRI Ground and Lobby Levels
Presenters must be available at posters from 12:00 - 1:00 pm

Session Two:

Session Chairs: Elisha McCoy, MD | Division Chief, Pediatric Hospital Medicine
Negar Noorizadeh, MD | Instructor, Pediatric Neurology

1:30 – 1:40 pm — Introduction by Session Chairs

1:40 – 2:10 pm — ***Early Language in TSC***
Tanjala Gipson, MD
Associate Professor; Division of Child Development

2:10 – 2:25 pm — ***The Role of Tracheal Aspirate in Antibiotic Usage in a Level IV NICU***
Reid Petersen
BioLegend Abstract Award: Medical Student

2:25 – 2:40 pm — ***Transcranial Magnetic Stimulation and Magnetoencephalography Can Be Sufficient Indicators for RNS Placement***
Austin Varner, MS
Outstanding Abstract Award: Research Staff

2:40 – 2:50 pm — ***Resources at the CFRI***
Dennis Black, MD
Scientific Director, Children's Foundation Research Institute

2:50 – 3:00 pm — Coffee Break

Scientific Program

3:00 – 3:30 pm ***Eosinophils: Focus on a Cell that Bridges Many***
Amali Samarasinghe, PhD
Associate Professor; Pediatric Heart Institute

3:30 – 3:45 pm ***Association between Maternal Iron Deficiency Anemia and Cord Blood Lead Levels in Infants***
Shannon Isennock, MD
Outstanding Abstract Award: Clinical Resident

Session Three:

3:45 – 4:15 pm **Award Ceremony and Closing Remarks**
Dennis Black, MD | Scientific Director, CFRI
Ajay Talati, MD | Division Chief, Neonatology

- Outstanding Abstract Awards from the Department of Pediatrics:
    - o Clinical Fellow: Heema Shah, MD
    - o Clinical Resident: Shannon Isennock, MD
    - o Research Staff: Austin Varner, MS

- BioLegend Medical Student Research Awards: Andrew Franklin
  Reid Petersen

- Outstanding Poster Awards from the Department of Pediatrics:
    - o Fellows and Residents
    - o Research Staff
    - o Medical Students

SAVE THE DATE

13th Pediatric Research Day: Sept. 18, 2024

Le Bonheur Children's Hospital

Le Bonheur Children's Hospital is recognized a top children's hospital by *U.S. News & World Report*. The hospital is Magnet certified and has the only ACS Level 1 Pediatric Trauma Program in the region.

Le Bonheur is a comprehensive, not-for-profit hospital that serves more than 450,000 children in the hospital, clinics and through outreach programs each year. While primarily serving the Mid-South, children come from all 50 states for treatment at Le Bonheur. Families that travel long-distances for care can stay free of charge at FedExFamilyHouse. Le Bonheur serves as the primary pediatric teaching hospital for the University of Tennessee Health Science Center.

The Children's Foundation Research Institute at Le Bonheur Children's Hospital

Founded in 1995, the Children's Foundation Research Institute (CFRI) represents the culmination of a unique partnership between the Children's Foundation of Memphis, the University of Tennessee Health Science Center (UTHSC) and Le Bonheur Children's Hospital to support the expansion of pediatric research. The CFRI provides comprehensive basic and clinical research infrastructure to support all research activities at Le Bonheur, including clinical trial support, provision of lab space, safety assistance, grant submission, budgeting services, scientific editing and statistical assistance. This centralized and coordinated support accelerates discovery and innovation and forges collaboration, allowing our physicians and scientists to concentrate on what they do best: cutting-edge research aimed to improve the health of children.

The Children's Foundation of Memphis

The Children's Foundation of Memphis is a private foundation established in 1982 with the sale of The Crippled Children's Hospital. The organization's mission is to serve the health and well-being of children in the Memphis area. The Foundation has given more than $17 million to support pediatric medical research at the Children's Foundation Research Institute (CFRI). This sustained and significant support makes the CFRI's groundbreaking research possible and is vital to improving the health of children in Memphis.

Department of Pediatrics at the University of Tennessee Health Science Center

The goals of the Department have been to establish a strong partnership with Le Bonheur Children's Hospital, to recruit outstanding faculty and house-staff and to promote excellence in pediatric clinical care, research, education and service to our community. Resources have been acquired from a number of sites, including Le Bonheur, St. Jude Children's Research Hospital, the Regional Medical Center, the Boling Center, the Children's Foundation of Memphis and national funding agencies to fulfill these goals. We are particularly proud of our outstanding pediatric and medicine-pediatric residency training programs. Jon McCullers, MD, is chair of the department.

The department has strong clinical and research programs in Allergy-Immunology & Pulmonology, Cardiology, Critical Care, Developmental Pediatrics, Endocrinology, Gastroenterology, General Pediatrics, Genetics, Infectious Diseases, Neonatology, Nephrology, Neurology and Rheumatology. Two outstanding integrated clinical and translational programs are housed in the Heart Institute and the Neuroscience Institute. The department also has strong ties in both clinical and research areas to the Department of Surgery and Maternal Fetal Medicine in OB-GYN.

The departmental philosophy is to develop new models of care for the most pressing problems in our community including broad, cross-disciplinary challenges such as pediatric obesity, asthma and developmental disabilities. We strive to meet changing environments head-on; our facilities, leaders, and faculty focus on innovative methods in patient care and target research to meet new demands.
The UTHSC Department of Pediatrics continues to play a very important role at Le Bonheur Children's Hospital, and its goal remains to fulfill its education, research, patient care and advocacy missions.

Invited Speakers

Russell Ledet, MD, PhD, MBA

Russell J. Ledet, MD, PhD, MBA is a native of Lake Charles, La., and a US Navy Veteran. Dr. Ledet co-founded The 15 White Coats, an organization committed to increasing diversity in medicine. Dr. Ledet has been featured on CNN, *People* Magazine, NPR, and the *Washington Post*. Following his Triple Board Residency program at Indiana University, he plans to focus on mental health accessibility for marginalized communities. He is a husband of 14 years to Mallory Alise, and the father of two little girls, Maleah Ann and Mahlina Abri.

From Security Guard to Physician Scientist: My Journey in Medicine

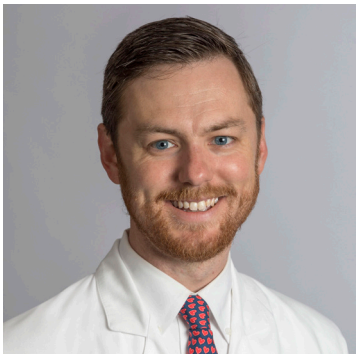
I am Dr. Russell Ledet, and my path to becoming a physician scientist was paved with challenges and moments of self-discovery. Born in Lake Charles, La., I began my professional journey as a security guard at Baton Rouge General Medical Center. During those nights, the dream of becoming a physician took root. Pursuing my passion for science, I earned a doctorate in Molecular Oncology and Tumor Immunology from New York University, further cementing my dedication to medicine. Throughout my journey, I encountered systemic barriers and socio-economic challenges. I am now the very first African-American male to do a Triple Board Residency (pediatrics, adult psychiatry and child and adolescent psychiatry) at Indiana University in Indianapolis, Ind. However, these obstacles only strengthened my resolve. My experiences inspired me to establish "The 15 White Coats," aiming to address disparities in health care and champion the next generation of Minority physicians. Join me as I share the highs and lows of my journey and the lessons it taught me about perseverance, passion and purpose.

Invited Speakers

Sandra Arnold, MD, MSc, FPIDS

Sandra Arnold MD, MSc, FPIDS is a professor of Pediatrics at the University of Tennessee Health Science Center. She is the division chief of Infectious Diseases at Le Bonheur Children's Hospital and medical director of the Le Bonheur Antimicrobial Stewardship program. She is a graduate of the University of Toronto Faculty of Medicine and did her residency and fellowship at the Hospital for Sick Children in Toronto. She is involved in clinical trials of vaccines, antibiotics and antivirals. Her research interests are varied and include bone and joint infections, pneumonia, histoplasmosis and social determinants of health.

Jason Yaun, MD



Jason Yaun, MD, is an associate professor of Pediatrics at the University of Tennessee Health Science Center. He is the Outpatient General Pediatrics division chief and the medical director of the UT Le Bonheur Pediatric Specialists General Pediatrics Clinic at Le Bonheur Children's Hospital, which serves as the academic teaching practice for UTHSC. Dr. Yaun was born and raised in Memphis, completing medical school and residency training at the University of Tennessee before joining the faculty there. He is currently the president of the Tennessee Chapter of the American Academy of Pediatrics. In addition to his clinical duties, Dr. Yaun is involved with education, clinical research and advocacy. He has authored papers on improving vaccination rates, early literacy promotion in primary care, and currently has grant funding for ongoing work to research adverse childhood experiences. He is the medical director of the Family Resilience Initiative, a clinical and research program that aims to address ACEs in the primary care setting. In the community he serves on the board of Books from Birth Shelby County and is passionate about early literacy promotion.

The Family Resilience Initiative: From the Bedside to Research and Back

The Family Resilience Initiative (FRI) is a multi-disciplinary collaboration in the ULPS General Pediatrics Clinic designed to screen children aged 9 months to 5 years for adverse childhood experiences (ACEs) and social determinants of health (SDH). Outreach coordinators then use a wraparound approach to build resiliency and prevent ACEs within a trauma-informed setting through connections with community partner resources to address identified needs. The FRI research program was initiated soon after launch of the clinical program to assess the efficacy of FRI in prevention of adverse outcomes in children associated with ACEs and SDOH. Outcomes we are assessing include developmental disorders and school achievement, as well as clinical entities including obesity, asthma and hypertension. In addition, we are examining the biological impacts of ACEs/SDH through the establishment of a transgeneration biorepository to examine genomic and methylation changes with ACE and SDH exposure that may mediate adverse outcomes.

Invited Speakers

Kenneth Ataga, MD

Kenneth Ataga, MD, received his medical degree from the School of Medicine at the University of Benin, Benin City, Nigeria in 1990. After completing a rotating internship at the University of Benin Teaching Hospital, he relocated to the United States when he underwent residency training in internal medicine at the State University of New York Health Science Center (currently Upstate Medical University) in Syracuse, NY. This was followed by a clinical and research fellowship in Hematology and Oncology at the University of North Carolina (UNC) at Chapel Hill under the mentorship of Eugene Orringer, MD, He joined the faculty at UNC, Chapel Hill and rose to become professor of Medicine and director of the UNC Comprehensive Sickle Cell Program.

In July 2018, Dr. Ataga became the Plough Foundation Endowed Chair in Sickle Cell Disease and the director of the Center for Sickle Cell Disease at the University of Tennessee Health Science Center (UTHSC) at Memphis. Dr. Ataga's clinical interest and expertise focuses on sickle cell disease and related hemoglobinopathies, thalassemia and other red blood cell disorders. Dr. Ataga's primary research interest is in the development of drug therapies for sickle cell disease leading or collaborating in studies of novel drug therapies in sickle cell disease. He was the lead investigator in the clinical studies of senicapoc, a Gardos channel blocker, in patients with sickle cell disease. Dr. Ataga was also the lead investigator in the multicenter study of crizanlizumab, a humanized anti-P-selectin antibody, in sickle cell disease (Ataga KI et al, *NEJM*, 2017). Dr. Ataga's research is also focused on the glomerulopathy of sickle cell disease. Specifically, he is interested in understanding the pathophysiology of albuminuria, the natural history of sickle cell disease-related glomerulopathy and the development of treatments for sickle cell disease-related kidney disease.

My Research Journey in Sickle Cell Disease

Tanjala Gipson, MD

Tanjala Gipson, MD, is an internationally recognized expert in Tuberous Sclerosis Associated Neurodevelopmental Disorders (TAND). Her training as a pediatrician, child neurologist and neurodevelopmental disabilities specialist lends uncommon expertise to the field and led her to create the first TSC Center of Excellence at Kennedy Krieger Institute. After serving at Kennedy Krieger Institute, she decided to focus on underserved populations of affected individuals in Memphis, Tenn., and the surrounding areas. In her current position, she works collaboratively with Le Bonheur Children's Hospital, the Boling Center for Developmental Disabilities and the University of Tennessee Health Sciences Center to further her clinical and research efforts for this unique population. Her mission is to provide the latest in innovative clinical care for this population, conduct research that will lead to improved treatments and work towards the goal of finding a cure. Although Dr. Gipson is in Memphis, she remains dedicated to the mission of serving families affected by TSC worldwide.

A Time to Talk: Early Language in TSC

Autism in TSC has been reported in up to 50-60% of patients. Language deficits impact as many as 70% of those with TSC. However, much of the research has focused on autism, but very little is known about vocal development in this population. One way to assess early vocal development is through measuring volubility (number of syllables used by an infant per minute), canonical babbling (the number of consonant-vowel combinations, e.g.,'ba') and the canonical babbling ratio (CBR, i.e., canonical syllables/total syllables) within the first year. The threshold for entry into the canonical stage has been reported to be greater than or equal to 0.15. Speech and language delays have been reported in children with a CBR lower than this and those who were delayed in achieving this milestone. The purpose of our research is to compare early vocal development in infants with TSC and determine the developmental significance.

Invited Speakers

Amali Samarasinghe, PhD

Amali Samarasinghe, PhD, is a native of Colombo, Sri Lanka. She earned her associate's in Biology from Los Angeles Pierce College, bachelor's in Biotechnology and master's in Neuroimmunology from California State University in Northridge, and a doctorate in Molecular Pathogenesis from North Dakota State University in Fargo all as an international student. Following postdoctoral training in Infectious Diseases focused on viral bacterial synergy under the mentorship of Jonathan McCullers, MD, at St. Jude Children's Research Hospital, she moved to UTHSC as an Instructor in 2012. Her research laboratory is dedicated to understanding immune responses to respiratory infections in complex hosts such as those with underlying chronic asthma and sickle cell disease.

Eosinophils: Focus on a Cell that Bridges Many

Eosinophils were misclassified as host pathogenic, primarily owing to their mass recruitment in allergic diseases like asthma. Over the past several years, a gradual but sure change in reputation has occurred in eosinophils, where they are now accepted as players in the host defense armamentarium against respiratory infectious agents. Our own contribution to this paradigm shift stems from work revolving around a complex model of fungal asthma and influenza wherein we have identified that eosinophils play both direct and indirect antiviral functions during influenza. Direct functions such as virus neutralization are largely mediated through granule proteins. Indirect functions are possible as eosinophils are susceptible to influenza virus infection, which is abortive but license eosinophils to function as antigen presenting cells during influenza in allergic hosts. Eosinophils that are infected with influenza virus migrate to the draining lymphoid organs and home to T cell zones. Eosinophils form immune synapses and engage in crosstalk with CD8+ T cells after virus exposure and are capable of priming naïve CD8+ T cells as well. At the mucosa, eosinophils protect infected epithelial cells from virus-induced cytopathology. Investigating more detailed stepwise mechanisms to these functions in order to identify pathways that may hold therapeutic potential is the primary focus of our laboratory.

Oral Presentations

Food Allergy and Health Disparities: How Socioeconomic Differences Correlate with Delayed Introduction of Food Allergens

Heema Shah, DO, David Yanishevski, MD, Samantha Ouyang, MD, Jay Lieberman, MD
Email address: hshah8@uthsc.edu

Rationale: Current guidelines recommend introduction of certain foods between 4-6 months of age. We hypothesized that counseling and rates of early introduction vary by socioeconomic status (SES). Methods: Caregivers of children 1-5 years of age were recruited from our institution to complete an anonymous online survey. Caregivers answered 28 questions about their child's age, race, type of insurance, if they were educated on the introduction of common food allergens, and when they introduced those food allergens.
Results: A total of 260 caregivers responded. Average age of the child was 1.2 years, 50.4% were female, and 53.1% African American (AA). In univariate analysis, AA respondents were less likely to report receiving education on early introduction OR = 0.56 (95%CI 0.33 to 0.95), less likely to introduce peanut by 1 year of age OR = 0.35 (95%CI 0.19 to 0.63), and less likely to introduce egg by 1 year of age OR = 0.40 (95%CI 0.24 to 0.70) as compared to White respondents. Respondents on Medicaid were less likely to introduce peanut by 1 year of age OR = 0.38 (95%CI 0.21 to 0.69) and less likely to introduce egg by 1 year of age OR = 0.49 (95%CI 0.26 to 0.89) as compared to respondents with commercial insurance. In multivariate analysis, insurance type remained statistically significant as an impact on introduction of peanut at before 1 year of age; OR = 0.47 (95% CI 0.24 to 0.91).
Conclusion: SES plays a role in the information parents receive and when they introduce foods into children's diets.

Swinging by the ED: A 10-Year Analysis on Playground Injuries of the Head and Neck

Franklin, A., Chanamolu, M., Nieri, C., Sheyn, A.
Email address: afrank32@uthsc.edu

Background: Playground injuries, specifically head and neck, are common among children. This study assesses the current trends in pediatric head and neck playground equipment injuries by estimating the nationwide occurrence of ED visits over the last 10 years.
Methods: The National Electronic Injury Surveillance System was queried regarding ED visits of pediatric head and neck injuries involving playground equipment from 2013-2022. Data utilized includes patient demographics, year of injury, age at injury, type of injury, location of injury on the body, patient outcome, and a 1-2 sentence event description.
Results: 25,307 injuries were recorded, yielding an estimated 702,674 injuries occurring in the ten-year period. The mean age was 5.79 years, and 59.3% of patients were males. Common injuries were lacerations (35.4%), internal injury (30.9%), contusions (10.7%), and concussions (8.7%). 96.4% of patients were treated/examined and released, 1.9% were transferred, admitted, or hospitalized, 1.4% left without being seen, and 0.3% were held for observation. Common injuries included swings (23.7%), monkey bars/playground climbing apparatus (20.7%), and slides (19.5%).
Conclusion: Playgrounds contributes to pediatric head and neck injuries in American EDs, with approximately 70,000 injuries per year. Swings, slides, and monkey bars cause most injuries. Males were more likely to be injured. It is imperative that safety is prioritized while maintaining exciting play for youth.

The Role of the Tracheal Aspirate in Antibiotic Usage in a Level IV NICU

Petersen, R., Russell, A., Shapiro, K., Arnold, S., Talati, A.
Email address: rpeter37@uthsc.edu

Purpose of study: Tracheal aspirate cultures (TAcx) are commonly ordered in the NICU in the context of respiratory deterioration to identify lower respiratory tract infection (LRTI). However, these cx have been shown to exhibit low sensitivity and specificity for LRTI and relying on them may lead to overinterpretation of results and unnecessary antibiotic (abx) exposure. Our goal was to identify the utilization of TAcx in diagnosis of LRTI and identify opportunities for diagnostic stewardship.
Methods used: Data was obtained through retrospective chart review of 39 patients with artificial airway in the NICU at LBCH between Jan 2019 - Apr 2023, who in total had 100 TAcx ordered. Data regarding demographics, indications, cx results, treatment and outcomes were all recorded.
Summary of results: 89% of the TAcx were positive and patients received abx 95% of the time a TAcx was ordered. 82% of them were diagnosed with underlying chronic lung disease of prematurity. Abx therapy was continued beyond 72h 88% of the time. Clinical improvement varied, with gas exchange improving only 61.2% of the time within 48h of starting abx.
Conclusions: A high percentage of TAcx were positive, making it difficult to distinguish between colonization and infection. Many of the babies had underlying conditions that can lead to mild inflammatory states and respiratory decompensation, mimicking LRTI. This led to high abx exposure for these patients without significant clinical improvement.
Funding: Medical Student Research Fellowship Program

Transcranial Magnetic Stimulation and Magnetoencephalography Can Be Sufficient Indicators for RNS Placement

Varner, J.A., Rezaie, R., Noorizadeh, N., Boop, F.A., Fulton, S.P., Klimo, P., Wheless, J.W., Narayana, S.
Email address: jackie.varner@lebonheur.org

Responsive neurostimulation (RNS) is a treatment option for patients with refractory epilepsy who may not be candidates for surgical resection due to overlap of the ictal onset zone and eloquent cortex. Presurgical evaluations for RNS placement are typically achieved by invasive methods, however we investigated whether non-invasive methods such as transcranial magnetic stimulation (TMS) and magnetoencephalography (MEG) may also achieve this goal sufficiently. We hypothesized that non-invasive methods would be successful and sufficient indicators for patients who underwent RNS placement. Following a retrospective chart review, eight patients who underwent RNS placement were identified. The sample had a mean age of 21.8 (SD = 4.2) and 62.5% were female. For 7 of 8 patients, characterization of the irritative zone using MEG was successful. Seven patients underwent relevant eloquent cortex mapping by TMS (successful in 7 of 8 patients), and 5 of 8 patients underwent relevant eloquent cortex mapping by MEG (successful in 2 of 5 patients). These data demonstrated that TMS and MEG may be feasible alternatives to invasive methods for identifying candidates for RNS placement. Non-invasive methods for determining RNS candidacy have a high rate of success when data from multiple non-invasive modalities converge and may inform more accurate placement of intracranial electrodes prior to RNS placement or eliminate their need.

Association between Maternal Iron Deficiency Anemia and Cord Blood Lead Levels in Infants

Shannon Isennock, MD[1], Mohamad Elabiad, MD[1]
[1]Unviersity of Tennessee Health Science Center
Email address: melabiad@uthsc.edu

Background: Iron deficiency anemia (IDA) has been associated with increased blood lead (BPb) uptake. Hypothesis: IDA in pregnancy results in increased maternal BPb levels reflected as significantly higher cord BPb levels when compared with pregnancies without IDA. Our objective was to compare cord blood levels of Pb, Mercury, and Selenium between pregnancies with anemia and without anemia.
Methods: Leftover term infant cord blood from the blood bank was used. Inclusion criteria for suspect IDA were mothers with Hb <9 g/dL, 70 fl< MCV 75%, MCHC <32 g/dl. For controls, Hb> 12 g/dL, 80 fl<MCV<90 fl and MCHC >34 g/dl.
Results: 55 infants were included with 27 in maternal anemia group and 28 in control group. There were no significant differences between groups in age, pregnancy histories, vitamin and iron intakes, BMI, calcium levels, or residence in high Pb area. There were no differences between groups in sex of infant or anthropometric measures. Pregnancies with anemia had significantly lower Pb and Hg levels and a significantly higher Se levels when compared to non-anemic pregnancies.
Conclusion: Pregnancies with anemia were associated with significantly higher cord blood Selenium levels and lower lead and mercury levels than pregnancies without anemia. It has previously been shown that selenium toxicity is associated with anemia. This may explain our findings. Future studies should explore reasons for elevated Selenium levels in these pregnancies.

1

A 63-year-Old Male with D-Transposition of the Great Arteries Who Underwent an Early Form of the Arterial Switch Operation

Rebolledo, MA[1], Yao, JS[2], Johnson, JN[1], Boston, US[3], Waller III, BR[1]

[1]Division of Pediatric Cardiology, Department of Pediatrics, The University of Tennessee Health Science Center College of Medicine, Memphis, TN, [2]The University of Tennessee Health Science Center College of Medicine, Memphis, TN, [3]Division of Pediatric Cardiothoracic Surgery, Department of Surgery, The University of Tennessee Health Science Center College of Medicine, Memphis, TN

Background: We present a 63-year-old male with Dextro-transposition of the great arteries repaired at 4 years of age.

Case Description: He complained of shortness of breath while walking up a flight of stairs. He had no chest pain but described occasional fluttering in his chest. He had a pulse of 68, respiratory rate 18, BP 147/80 mmHG, SpO2: 96%. He was well appearing in no distress. There was a sternotomy and left thoracotomy scar. There was a regular rate and rhythm with a normal S1 and S2. There was no murmur or gallop. There was no clubbing. EKG demonstrated sinus rhythm and right bundle branch block. Echocardiogram demonstrated a prior arterial switch operation (ASO). There was normal left ventricular size and low normal systolic function. There was a bicuspid aortic valve which was calcified. There was a prominent aortic root. There was mild aortic regurgitation. There was mild right ventricular hypertension. Cardiac MRI and a chest CT angiogram were performed. (Figure) Cardiac catheterization demonstrated severe pulmonary hypertension with a pulmonary vascular resistance 20.2 Wood Units×m2 responsive to epoprostenol and oxygen.

Conclusion: Based on the clinical and imaging data, he appears to have had an early form of an ASO performed in the mid 1960s. Although we could not obtain any documentation, our case may represent one example of the experimental surgical work prior to Dr. Adib Jatene's report describing the first successful anatomical ASO done in 1975.

2

Impact of Boot Camp on Pediatric Cardiology Fellowship Training

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Background: Pediatric Cardiology Fellowship training has a steep learning curve which requires understanding of concepts and learning procedures that are novel to the pediatric resident. The Pediatric Cardiology Fellowship Boot Camp (PCFB) at Le Bonheur Children's Hospital was developed to facilitate a smooth transition to fellowship by providing a series of lectures and hands-on procedural and case-based simulation sessions. The primary aim of this study was to evaluate whether the boot camp improved incoming fellows' knowledge base and procedural skills. The secondary aim assessed trainee perception of the impact of various facets of PCFB.
Methods: The improvement in knowledge-base was assessed using the Kruskal-Wallis test by comparing results of twenty pre and post-training questions. To measure improvement in procedural skills, a mid-term survey was used to compare the time-frame when the fellows felt comfortable performing a full study pediatric echocardiogram. The Kruskal-Wallis test was used to compare the survey responses between PCFB participants (nine incoming fellows during 2019-2021) and non-participants (ten fellows that included six graduated fellows and four senior fellows, who did not attend the boot camp and served as the control group). The impact of other facets of the PCFB based on the trainee's perception were recorded in a survey with a total of five responses ranging from "strongly agree" to "strongly disagree."

Results: The median score on the post-test was 75% compared to 50% on the pre-test ($P < 0.001$) (Figure 1a). Survey data indicated that the median time when the fellows who participated in PCFB felt comfortable performing a complete pediatric echocardiogram was 6 months (IQR 4-6 months) compared to 8 months (IQR 6-10 months) for fellows who did not participate in PCFB ($P = 0.002$) (Figure 1b).

All nine participants strongly agreed that PCFB helped increase their immediate fund of knowledge and that the simulations were effective. PCFB also helped decrease their anxiety, improved their transition from residency to fellowship and provided an opportunity to meet and interact with a significant number of faculty and their co-fellows (Figure 2). 78% (7/9) of the participants felt that the hands-on echocardiogram simulation sessions were helpful. 88% (8/9) felt the mock codes helped them with their code management skills. Boot camp did not help the fellows identify their scholarly oversight committee members or fellowship faculty mentor.
Conclusion: PCFB provides a strong foundation and serves as an important educational tool for pediatric cardiology fellows to accelerate improvements in their knowledge base, echocardiography and code management skills. It can reduce trainee anxiety and help to smooth the transition from pediatric residency to fellowship. PCFB should include hands-on interactive training in addition to didactic lectures.

3

Impaired Contraction and High Susceptibility to Arrhythmias in a Mouse Model of Desmoplakin-Mediated Arrhythmogenic Cardiomyopathy

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Introduction: Desmoplakin (DP) is a key cardiac protein that connects the desmosome to the cytoplasmic network of desmin intermediate filaments. Truncation variants of the human DSP gene lead to left ventricular (LV)-dominant and biventricular forms of arrhythmogenic cardiomyopathy characterized by a dilated LV, arrhythmias, and an elevated risk of sudden cardiac death. Yet, the pathophysiological pathways triggered by these variants is unknown.

Hypothesis: We hypothesized that DSP truncation variants modify cardiomyocyte excitation-contraction coupling leading to life-threatening ventricular arrhythmias.

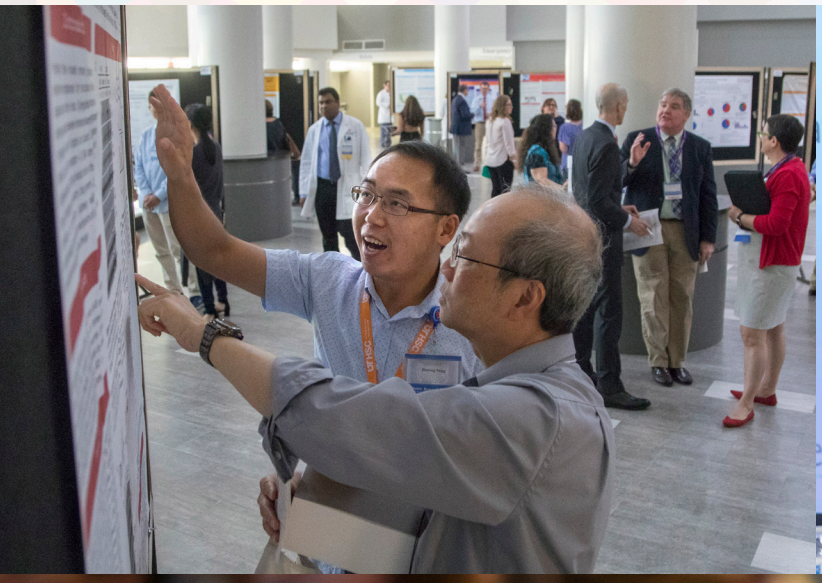
Methods: We created a novel knock-in mouse model based on the human DSP p.S2859LfsX5 variant. We did histologic, cellular, and molecular assessments of 1-year-old sedentary heterozygous ($DP^{+/-}$) and WT mice.

Results: Western blotting showed 50% DP reduction ($P< 0.05$) in mutant right ventricle (RV) indicating mutant protein instability. Histologic assessments of $DP^{+/-}$ hearts revealed LV chamber enlargement and RV wall thinning in the absence of fibrosis and lipid infiltration. DP+/- LV and RV isolated myocytes field stimulated at 3 Hz exhibited 30% reduction in sarcomere shortening ($P< 0.05$), while their Ca^{2+} handling remained normal. Pacing $DP^{+/-}$ isolated myocytes in (100 nmol/L) isoproterenol provoked a 20% increase in Ca^{2+} release due to sarcoplasmic reticulum Ca^{2+} overload ($P< 0.05$). Surface ECGs showed increased susceptibility to ventricular arrhythmias of $DP^{+/-}$ hearts stimulated by isoproterenol.

Conclusions: This pathogenic variant promotes biventricular dysfunction due to the loss in myocyte contraction capacity and catecholaminergic-mediated ventricular arrhythmias from myocyte Ca^{2+} overload.

Poster Presentations:

Fellows and Residents



4 COVID-19 And Out Of Hospital Cardiac Arrest in The Pediatric Population

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Out-of-hospital cardiac arrests (OHCA) increased in the adult population during the COVID-19 pandemic, and we assessed if OHCAs increased in the pediatric population during the COVID-19 pandemic and if the pandemic exacerbated pre-existing racial and socio-economic disparities. Utilizing data from 2015-2020 from the Cardiac Arrest Registry to Enhance Survival (CARES) database, 13,513 pediatric OHCAs were analyzed.
In the adolescent population (>= 13 years) there was an increase in OHCA incidence from 0.29 to 0.40 arrests per 1 million residents ($p<0.0001$), and a decrease in the infant population (<1 year) from 0.861 to 0.803 events per 1 million residents ($p=0.02$). The pandemic worsened the burden of OHCAs in communities with lower socioeconomic status and where COVID was more prevalent. Disparities of CPR or AED use and survival outcomes were seen based on race, sex, and socioeconomic factors, but none of these were further augmented by the pandemic.
As pediatric OHCAs are distinct from adult OHCAs (as are those between adolescents and infants), these populations showed different changes in terms of incidence of OHCAs as a result of the COVID-19 pandemic. Adolescent data was similar to adults, in that the rates of OHCA increased, especially in areas with higher COVID incidence, but in infants there was a decrease in OHCAs, suggesting differing attitudes to how parents responded to the pandemic. This study also underscores disparities that need to be addressed.

5 Thyroid Disease Prevalence after Transcatheter Patent Ductus Arteriosus Closure in Extreme Low Birth Weight Neonates

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Background: The U.S. Food and Drug Administration recommends thyroid monitoring in neonates who receive iodine-containing contrast (ICC). This study hypothesized thyroid abnormalities are rare in ELBW neonates s/p transcatheter PDA closure (TCPC.)
Methods: Retrospective case-control study of ELBW neonates who underwent TCPC with post-procedural thyroid studies: thyroid stimulating hormone (TSH) and free T4 or newborn screen (NBS). Normal TSH range is 0.5-9.1 mcIU/mL.
Results: 136 TCPC patients (99 with ICC and 37 non-ICC) met inclusion criteria. Five (5%) patients with prior hypothyroidism diagnosis were excluded. The non-ICC group had more females and Piccolo device utilization. There were similar TSH and free T4 levels before and after TCPC in the ICC and non-ICC groups. TSH levels >9.1 after TCPC were not statistically different between ICC and non-ICC groups, p 0.31). There was no correlation with the post-ICC TSH value and ICC volume ($R2 <0.001$). Persistent thyroid abnormalities between the two groups were rare with no difference in patients requiring levothyroxine at the end of the study (ICC group 2 (2%) vs non-ICC group 1 (3%), p 0.81).
Conclusion: This is the largest study evaluating thyroid function after TCPC in ELBW neonates which showed persistent thyroid abnormalities were rare. There was no difference between ICC and non-ICC groups. Thyroid evaluation after ICC should be restricted to high-risk patients.

6 Complement Profiles in Critically Ill Children with Sepsis-Associated MODS

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Sepsis, defined as a dysregulation of the immune system that impairs one or more organ systems, results in frequent admission to the pediatric intensive care unit. The disorder and its sequalae, multiple organ dysfunction syndrome (MODS), have a significant rate of mortality in pediatric patients. Despite advancements in sepsis management, outcomes for sepsis-associated MODS remain poor with few therapies consistently demonstrating efficacy.

The complement system, a well-preserved immunologic protein cascade, has been well established in the pathogenesis of sepsis and coagulopathies. Overactivation of the complement cascade, measured by the final protein C5b-9, has recently been associated with the development of MODS in patients with transplant-associated thrombotic microangiopathy (TA-TMA) and with COVID-19. Notably, a monoclonal antibody drug targeting the precursor to C5b-9 resulted in significantly improved survival rates for patients diagnosed with TA-TMA.

No studies have directly examined the relationship between C5b-9 and sepsis-associated MODS in a general pediatric critical care population. In this study, we hypothesize that an overactivated complement system will be significantly associated with the development of MODS. Ultimately, we aim to deepen the understanding of MODS and influence the selection of targeted therapeutics. We are currently in the enrollment phase of the study.

Funding: UTHSC Department of Pediatrics Research Grants Program for Clinical Fellows

7 Pandemic Implications: Secondary Impact on the Diagnosis of Congenital Heart Disease

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Background: Prenatal diagnosis of congenital heart disease (CHD) allows for antenatal care coordination. We hypothesize the COVID-19 pandemic impacted prenatal CHD detection due to compromised access to medical care. Methods: Study included 523 infants with CHD who underwent cardiac surgery at Le Bonheur Children's Hospital pre-COVID (May 2017- July 2023) and COVID era (July 2020-2023). Compared prenatal care (PNC), referral and access to advanced testing (maternal fetal medicine /fetal cardiology), prenatal diagnosis (PND), and postnatal CHD diagnosis.
Results: 27% decrease in infant cardiac surgeries during the COVID-era (pre-COVID: n= 303, COVID era: n=220). There was a not statistically significant decrease in prenatal care and diagnosis in the COVID era (PNC 88% vs 93%, $\chi 2$ 3.17, p 0.07; PND 42% vs 48%, $\chi 2$ 1.8, p 0.17). There was a not statistically significant decrease in PND when further from an advanced testing (55% vs 53%, $\chi 2$ 2, p 0.65), instead, poor rates of referral for advanced testing (45%) regardless of the cohort. If no prenatal diagnosis, there was higher rate of positive CHD screening postnatally in the COVID era (pre-COVID 70%, COVID 79%). **Conclusion:** There was a decrease in PND of CHD during the pandemic and with further distance from advanced testing, but this was not statistically significant. This correlates with unchanged low referral rates to prenatal advanced testing. Targeted education of community centers may improve pre-natal CHD diagnosis.

8 Catastrophic Antiphospholipid Syndrome (CAPS) Manifesting in the GI Tract, Liver and Skin of an 11-Year-Old Boy

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Background: Antiphospholipid syndrome (APS) is classically taught as an obstetric disease that causes spontaneous abortion in women of childbearing age [1]. However, it occurs in all ages and sexes, and can affect any organ system [2]. Catastrophic Antiphospholipid Syndrome (CAPS), is the rarest and most severe form of APS, occurring in less than 1% of patients. It is defined by a rapid succession of thrombotic events affecting >3 organ systems, with histopathological confirmation of small-vessel occlusion, and serologically confirmed presence of antiphospholipid antibodies [3].
Case: We present the case of an 11-year-old boy with a recent history of unprovoked deep vein thrombosis (DVT), who presented with acute-onset abdominal pain. During hospitalization, he exhibited episodic abdominal pain, fever, headache, and an eruption of purpuric lesions across the face and ears. Workup revealed evidence of small vessel thrombosis in the liver, gastric mucosa, and skin. With high clinical suspicion of CAPS, therapy was initiated with steroids, IVIG, and rituximab. Subsequently, an antiphospholipid antibody panel was positive, confirming the diagnosis of CAPS.
Discussion & Conclusions: CAPS can be a devastating manifestation of APS, resulting in death in nearly half of patients despite timely initiation of treatment [3]. This case demonstrates the breadth of CAPS symptomology. It is important to maintain a high clinical suspicion of this life-threatening manifestation of APS.
Funding: UTHSC Department of Pediatrics Research Grants Program for Clinical Fellows

9 Utilization of ICD Codes for Improved Identification of Infants Eligible for Synagis

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Respiratory syncytial virus (RSV) is a common viral infection that can have severe manifestations. Synagis, a humanized monoclonal antibody, is used to prevent serious lower respiratory tract disease caused by RSV. The goal of this project was to increase identification and referral of eligible infants in ULPS General Pediatrics clinic to receive Synagis, with a secondary goal of maximizing the number of doses of Synagis given. A monthly report identified patients who met the following criteria: (1) seen in our pediatrics clinic during RSV season (Oct-April), (2) between the ages of 0-24 months, and (3) diagnosed using >1 ICD-10 code as specified by Synagis prescribing information. The number of patients referred in the 2021-22 RSV season was then compared to the number of patients referred in the prior two seasons. To increase the number of doses each patient received, all Synagis prescriptions were sent to one pharmacy for ease of approval, and guardians were encouraged to sign up for text reminders. Data from the two prior RSV seasons showed an average of 14.5 patients referred for Synagis, with 9.5 patients receiving at least 1 dose. After implementation of these methods in the 2021-22 RSV season, 66 patients were referred to receive Synagis, with 21 patients receiving at least one dose. Our approach to identifying and referring infants eligible for Synagis was shown to drastically increase the number of patients identified and increase the number of doses they received.

10 Neurodevelopment Outcomes Based on Timing of Transcatheter PDA Closure in Extremely Low Birth Weight Infants

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Purpose: Persistence of a large hemodynamically significant PDA in preterm ELBW infants can potentially lead to long-term neurodevelopmental sequelae due to decreased cerebral oxygenation. This study evaluated neurodevelopment outcomes after transcatheter PDA closure (TCPC) and if timing of TCPC impacted risk of abnormal outcomes.

Methods: Retrospective study of ELBW infants that underwent TCPC and had Vineland-3 Neurobehavioral assessment. Based on timing of TCPC, 3 groups were assessed: <30 days (Group-1;n=51), 31-60 days(Group-2;n=38) and >60 days(Group-3;n=13). Adaptive Behavioral Composite (ABC) score and domain scores were analyzed as continuous and categorical variables (score of 70 is < 2SD from normative mean of 100) between groups using ANOVA and Chi-squared testing respectively.

Results: Of the 106 tested, 16 had an ABC score < 70. Group-1(85, IQR 79-98) and Group 2(89, IQR 79-103) had significantly (p 0.005) higher composite scores in comparison to Group-3(78, IQR 55-85). Similar findings were seen within the domains Communication, Daily Living and Socialization. Group-3 was associated with higher incidence (38%) of abnormal neurodevelopment outcome (ABC score < 70) compared to Groups 1 and 2(13% and 7%, $\chi^2 = 7.3$, $p < 0.02$). There was no significant association between the ABC score and gestational age or procedure age.

Conclusion: Early TCPC may be associated with improved neurodevelopmental outcomes in ELBW infants. Serial follow-up assessments are recommended.

11 Diagnostic Utility of Streptococcus Pneumonia Titers in a Single Pediatric, Tertiary Hospital and Clinic System

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Measurement of pneumococcal serotype titers before and after pneumococcal polysaccharide vaccine booster in individuals immunized with the pneumococcal conjugate vaccine (PCV) series is utilized to evaluate humoral immune function. Anecdotally, many patients referred to our clinic have poor response to the primary PCV series, yet do not have a primary immunodeficiency (PID). Here we analyzed characteristics of patients evaluated with pneumococcal antibody titers.

Retrospective chart review was performed at a tertiary care hospital and its clinics. Subjects were included based on age greater than 15 months and titers drawn within five years. Data recorded included pre- and post-booster titer levels, immunization status, diagnosis of any PID, and specialty of the ordering provider.

Analysis of the above using descriptive statistics found 2.3% of testing resulted in diagnosis of a PID. 19% of those initially tested had protective titers based on a cutoff of 1.3mcg/dL in at least 50% and 70% of serotypes for those 1-5 and 6-18 years of age respectively. Of those not protected, 30% received a booster with 76% attaining protective levels, with 11% still not meeting protective threshold leading to diagnosis of a PID, most often CVID.

3.8% of testing by A/I diagnosed a PID while 1.1% of testing by all others diagnosed a PID.

These data suggest testing by A/I specialists is appropriately restricted to those more likely to have a PID, minimizing cost and increasing utility.

12 The Genetic Dissection of RPL3L as a Causal Gene for Neonatal Dilated Cardiomyopathy and Left Ventricular Noncompaction

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Background: Ribosomal protein L3-like (RPL3L) has been associated with neonatal dilated cardiomyopathy (DCM). We studied RPL3L-induced genetic mechanisms involved in DCM.
Methods: Whole exome and RNA sequencing, histology, and immunohistochemistry (IHC) were performed in a human explanted heart. Genetic correlation, functional analysis and expression quantitative trait loci (eQTL) mapping were performed using heart transcriptomes of human and murine genetic reference populations (GRPs).
Results: Infant with DCM and heart failure carrying RPL3L p.A51T and p.V231F variants underwent heart transplantation at the age of 4 months. Morphohistology of the explanted heart displayed apical deep intertrabecular recesses consistent with left ventricular noncompaction (LVNC). IHC revealed disruption of RPL3L, F-actin and dystrophin in cardiomyocytes. In a mouse heart, the Rpl3l level was of 33.45 RPKM, while RPL3L levels was of 32 RPKM. Systems genetics analysis identified high expression values ranged from 11.31 to 12.16 across murine GRPs of BXD mice with the ~1.8-fold difference. Pathways such as ""thermogenesis"", ""diabetic cardiomyopathy"" and ""DCM"" significantly associated with Rpl3l. eQTL mapping suggested Myl4 (Chr 11) and Sdha (Chr 13) as the upstream regulators of Rpl3l.
Conclusions: Compound RPL3L heterozygosity is causal for DCM and LVNC. Myl4 and Sdha, are strong candidates that regulate expression of Rpl3l in heart.
Funding: HL 151438 (JAT, LL, EP)

13 Food Allergy and Health Disparities: How Socioeconomic Differences Correlate with Delayed Introduction of Food Allergens

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Rationale: Current guidelines recommend introduction of certain foods between 4-6 months of age. We hypothesized that counseling and rates of early introduction vary by socioeconomic status (SES).
Methods: Caregivers of children 1-5 years of age were recruited from our institution to complete an anonymous online survey. Caregivers answered 28 questions about their child's age, race, type of insurance, if they were educated on the introduction of common food allergens, and when they introduced those food allergens.
Results: A total of 260 caregivers responded. Average age of the child was 1.2 years, 50.4% were female, and 53.1% African American (AA). In univariate analysis, AA respondents were less likely to report receiving education on early introduction OR = 0.56 (95%CI 0.33 to 0.95), less likely to introduce peanut by 1 year of age OR = 0.35 (95%CI 0.19 to 0.63), and less likely to introduce egg by 1 year of age OR = 0.40 (95%CI 0.24 to 0.70) as compared to White respondents. Respondents on Medicaid were less likely to introduce peanut by 1 year of age OR = 0.38 (95%CI 0.21 to 0.69) and less likely to introduce egg by 1 year of age OR = 0.49 (95%CI 0.26 to 0.89) as compared to respondents with commercial insurance. In multivariate analysis, insurance type remained statistically significant as an impact on introduction of peanut at before 1 year of age; OR = 0.47 (95% CI 0.24 to 0.91).
Conclusion: SES plays a role in the information parents receive and when they introduce foods into children's diets.

14 Association between Maternal Iron Deficiency Anemia and Cord Blood Lead Levels in Infants

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Background: Iron deficiency anemia (IDA) has been associated with increased blood lead (BPb) uptake. Hypothesis: IDA in pregnancy results in increased maternal BPb levels reflected as significantly higher cord BPb levels when compared with pregnancies without IDA. Our objective was to compare cord blood levels of Pb, Mercury, and Selenium between pregnancies with anemia and without anemia.
Methods: Leftover term infant cord blood from the blood bank was used. Inclusion criteria for suspect IDA were mothers with Hb <9 g/dL, 70 fl< MCV 75%, MCHC <32 g/dl. For controls, Hb> 12 g/dL, 80 fl<MCV<90 fl and MCHC >34 g/dl.
Results: 55 infants were included with 27 in maternal anemia group and 28 in control group. There were no significant differences between groups in age, pregnancy histories, vitamin and iron intakes, BMI, calcium levels, or residence in high Pb area. There were no differences between groups in sex of infant or anthropometric measures. Pregnancies with anemia had significantly lower Pb and Hg levels and a significantly higher Se levels when compared to non-anemic pregnancies.
Conclusion: Pregnancies with anemia were associated with significantly higher cord blood Selenium levels and lower lead and mercury levels than pregnancies without anemia. It has previously been shown that selenium toxicity is associated with anemia. This may explain our findings. Future studies should explore reasons for elevated Selenium levels in these pregnancies.

Late Breaking Presentations

44 Evaluating Coronary Fistulas in Children after Cardiac Transplantation

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45

Impact of COVID-19 on the Severity and Length of Stay among Hospitalized Pediatric Patients

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BACKGROUND AND OBJECTIVES: Pediatric hospital admissions and emergency department visits decreased during the COVID-19 pandemic, raising concerns regarding the timeliness of evaluations for children with serious medical conditions. The primary objective was to determine if pediatric patients hospitalized during the pandemic were more severely ill compared to those during pre-pandemic years by measuring the severity of illness, intensive care unit admissions, and length of stay.

METHODS: A cross-sectional study was conducted of patients admitted to Le Bonheur Children's Hospital in Memphis, TN, from 2016 to 2021. Data were collected using the Pediatric Health Information System. All patients 18 years of age and younger admitted through the emergency department for acute illness who met inclusion criteria were included. The prepandemic period was defined as January 1, 2016–February 29, 2020, and the pandemic period as March 1, 2020–December 31, 2021.

RESULTS: A total of 58,369 admissions were included, with 42,877 pre-pandemic and 15,492 pandemic admissions. During the pandemic, admissions of patients with more severe illnesses increased significantly compared to pre-pandemic admissions. Intensive care unit admission rates increased during the pandemic (11%) compared to pre-pandemic levels (9.9%). Length of stay did not differ between the periods.

CONCLUSIONS: The severity of illness for hospitalized pediatric patients significantly increased during the COVID-19 pandemic. This increase could be attributed to unaddressed medical needs or disease-control measures put in place that impacted access to care. Patients should continue to receive routine and acute medical services and chronic disease management even during conditions such as these.

Poster Presentations:

Research Staff

15 Investigating the Immunopathogenesis of Asthma and Sickle Cell Disease Co-morbidity

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Sickle cell disease (SCD) resulting from the inheritance of two copies of the mutant β-hemoglobin gene occurs in 1 in 365 Black Americans. Numerous complications of SCD converge in vaso-occlusive pain crisis and acute chest syndrome. As many as 27% of SCD patients are considered to have asthma although mechanisms promote co-pathogenesis remain unclear. We hypothesized that heightened inflammation and injury in the lungs of SCD hosts promotes a Th2 immune response thereby increasing the likelihood for allergic asthma development. Using humanized mice with SCD subjected to our fungal asthma model, we explored the immunopathogenesis of asthma and SCD co-morbidity. SCD mice had an elevated fungal burden despite having elevated and sustained neutrophilia in the airways. Naïve SCD mice had increased IgE levels indicative of a Th2 immune bias. Additionally, we noted elevated airway wall remodeling and hyperresponsiveness in SCD mice with asthma compared to non-SCD mice suggesting that increased lung injury may result from allergen-induced architectural changes in SCD hosts. In combination with our ongoing studies, we expect our findings will guide new preventative treatment modalities in patients suffering from SCD.
Funding: St. Jude Children's Research Hospital-CIDC, Plough Foundation of Memphis, Le Bonheur Children's Hospital

16 Fungal Antigens as an Adjuvant to Improve Influenza Vaccine Efficacy

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About 29 million people were infected with influenza virus during the 2018-2019 flu season. Despite the importance of mitigating virus spread, the lack of efficacy in the seasonal vaccines and the absence of a universal vaccine, has made this a challenge. Based on our previous work, we hypothesized that Aspergillus fumigatus activates antiviral defenses in airway epithelial cells to help reduce the viral load and improve wound healing. A mouse model was used to test the viral burden and virus-induced morbidity after the administration of a fungal or virus vaccines. In vitro studies with A549 cells with similar treatments were performed in parallel to determine the kinetics of wound healing and epithelial cell responses to pathogens. Cells exposed to A. fumigatus allergen had enhanced wound healing responses in a scratch wound assay although no changes to canonical antiviral genes were noted despite increased fungal growth in virus-infected cells. Mice that received the dual vaccine were more resistant to influenza infection suggesting that synergism between the pathogens may occur. Therefore, a Th2-type antigen delivered in conjunction with the influenza vaccine may perhaps improve barrier defenses to influenza.
Funding: CIDC St. Jude

17 Age at Seizure Onset and Surgical Intervention Together Influence Language Laterality and Plasticity over Time: A TMS Study

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Transcranial magnetic stimulation (TMS) is a non-invasive brain mapping tool used to identify the eloquent cortex for speech and language. The frequency, region, and classification of TMS-induced speech errors are used to calculate language laterality index (LI).
In a retrospective database review, we longitudinally analyzed change in LI to understand the effects that age of seizure onset and surgical intervention have on language plasticity. We identified 18 patients with intractable epilepsy whose LI was measured at two time points. Patients were categorized by age of seizure onset, before and after the age of 10 years, and whether they underwent surgical intervention between assessments.
Analysis of LI by age of seizure onset showed that patients with an onset before 10 years old experienced typical language development in the left hemisphere. Analysis by the factor of intervention showed that patients who received intervention between LI measure became more left hemisphere dominant. When factored together, age of seizure onset and intervention had a significant effect on the sample group. This suggests that early onset and intervention can increase the likelihood of left-sided lateralization; while late onset, no intervention can lead to a decrease in left-sided lateralization and a greater recruitment of right hemisphere language areas. Monitoring LI changes within individuals over time using TMS is a viable approach for creating models of language plasticity.

18 In The Rough: Decade-Long Analysis Examining Golf Injuries of the Head and Neck in Children

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Background: Golf, a popular sport, provides opportunities for confidence building and physical activity. However, golf can present risks for injury. This study aims to investigate the number of emergency department visits due to golf-related head and neck injuries in pediatric patients.
Methods: The National Electronic Injury Surveillance System (NEISS) was queried regarding ED visits of pediatric head and neck injuries involving golf activity, apparel, equipment, or golf carts. Data utilized includes patient demographics, year of injury, age at injury, type of injury, location of injury on the body, patient outcome, and a 1-2 sentence event description.
Results: 2,002 injuries were recorded, yielding an estimated 65,842 injuries occurring in the ten-year period. The mean age was 8.82 years, and 64.9% of patients were males. The most common injuries were lacerations (42.6%) and internal injuries (25.4%). 89.7% of patients were treated/examined and released, 7.1% were treated and admitted, 1.8% were treated and transferred, 0.9% left without being seen, and 0.4% were held for observation. A singular case (1) included a fatality in the ED. The most common body parts that were subject to injury were the head (49.2%) followed by the face (39.3%).
Conclusion: Children should be monitored when playing golf or operating a golf cart, as an estimated 65,842 golf-related injuries resulted in ED visits among pediatric patients over the last ten years.

19 A Decade-Long Analysis Examining Head and Neck Injuries in Children Caused by Volleyball Activities, Apparel and Equipment

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Background: Volleyball is a popular sport among children, but there is a considerable risk of injury associated with volleyball activities, apparel, and equipment. This study aims to assess the frequency of emergency department visits nationwide for head and neck injuries in pediatric patients resulting from volleyball-related incidents.

Methods: The National Electronic Injury Surveillance System (NEISS) was queried regarding ED visits of pediatric head and neck injuries involving volleyball from 2013-2022. Data utilized includes patient demographics, year of injury, age at injury, type of injury, location of injury on the body, patient outcome, and a 1-2 sentence event description.

Results: 2,065 injuries were recorded, yielding an estimated 60,087 injuries occurring in the ten-year period. The mean age was 14.10 years, and 19.6% of patients were males. The most common injuries were concussions (35.6%) and internal injuries (30.8%). 96.9% of patients were treated/examined and released, 1.6% left without being seen, 0.8% were treated and admitted, 0.4% were held for observation, and 0.3% were treated and transferred. The most common body parts that were subject to injury were the head (71.7%) followed by the face (15.0%).

Conclusion: Volleyball related injuries contribute to emergency department visits among pediatric patients. There are an estimated 60,087 volleyball-related injuries of the head and neck in pediatric patients over the last ten years.

20 A 10 Year Analysis on Baseball and Softball injuries of the Head and Neck

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Background: Youth baseball/softball fields are community cornerstones in fostering camaraderie and health. However, participation is not without danger, particularly regarding head and neck injuries. This study aims to estimate the nationwide incidence of ED visits attributed to pediatric head and neck injuries sustained during baseball/softball activities.

Methods: The National Electronic Injury Surveillance System (NEISS) was queried regarding ED visits of pediatric head and neck injuries involving baseball/softball from 2013-2022. Data utilized includes patient demographics, age, year of injury, type and location of injury, patient outcome, and a 1-2 sentence event description.

Results: 15,527 injuries were recorded, yielding an estimated 486,648 injuries from 2013-2022. The mean age was 9.9 years. 68.5% of patients were male. 56.1% of patients were white, 8% were black, and 30.8% had unspecified race. The majority (75.2%) of injuries were baseball-related. Common injuries were internal (22.1%), contusions (19.0%), lacerations (18.0%), fractures (12.7%), and concussions (1.4%). 96% of fractures were of the nasal bones or maxilla, and 4% were skull fractures. 96.1% were treated/examined and released, 1.8% were treated/hospitalized, 1.2% left without evaluation and 0.6% were treated/transferred.

Conclusion: The study highlights pediatric head and neck injuries in baseball/softball, with 486,648 ED cases. Males and whites were mostly affected.

21 Using MEG and TMS for Pre-surgical Planning in Tuberous Sclerosis: A Case Report

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Tuberous sclerosis complex (TSC) is characterized by hamartomatous lesions involving skin, brain, kidneys, eyes and heart. Cortical tubers are the hallmark of the disease and are pathognomonic of cerebral TSC. Non-invasive localization of seizure focus using magnetoencephalography (MEG) and localization of motor cortex using transcranial magnetic stimulation (TMS) have been shown as valuable instruments in the presurgical workup. The patient is a now 6-year-old female who was diagnosed to have TSC type 2 and a contiguous PKD1 gene defect with a past history of symptomatic partial seizures and encephalopathy. She had drug resistant epilepsy and underwent right frontal cortical tuber resection at the age of 1.5 years. Patient continued to have seizures and was evaluated for surgery at the age of 4.5.

She was evaluated with presurgical MEG and TMS. The patient has been seizure free since last surgery. Cortical sources of interictal epileptiform MEG discharges were compared with sEEG results. MEG results were identical with sEEG. TMS was performed for motor mapping. The motor representation for upper extremities in both hemispheres was normally localized to the precentral gyrus. The motor representation for the right lower extremity was also normally localized to the medial frontal cortex. The combination of motor TMS and interictal MEG is a valuable tool for identification of epileptogenic tubers and motor representation in presurgical work-up for patients with TSC.

22 Peripheral Vascular Access as Exclusive Access Mode in Pediatric Intensive Care Unit (PICU)

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INTRODUCTION: The type (central or peripheral) of vascular access in pediatric critical care depends on how long the treatment is needed, the properties of the medication (osmolarity or vesicant), and the need for central pressure monitoring. An increasing number of patients are managed by peripheral intravascular. OBJECTIVES: The goal is to estimate the dwell time of PIVCs, analyze the specific parameters affecting it, and develop recommendations for switching to extended dwell and midline catheter placement when peripheral access is preferred. METHODS: The study enrolled patients aged 0-18 admitted to PICU for over 24 hours and managed with peripheral access only over two years (2019-2021). MEASUREMENTS AND MAIN RESULTS: Four hundred eighty-four patients fulfilled the criteria. The PIVC dwell time was 50.1 (SD: 65.3) hours and required 1.6 insertion attempts. Patients with three or more insertions had an increased odds ratio of 5.2 (95% CI: 3.1-8.5) to receive an extended dwell or midline insertion. Increased dwell time was associated with female gender, 42 hrs (P<.001), first attempt insertion.Increased dwell time was associated with female gender, 42 hrs (P<.001), first attempt insertion, 53.5 hrs (P<.001), use of 24Ga bore, 56.3 hrs (P=.04), left-sided insertions, 54.9 (P=.07).CONCLUSIONS: Extended catheters last longer than PIVCs in PICU patients. Deciding on extended catheter placement requires considering the length of treatment, and in addition, the overall body edema, the level of the patient's restlessness, and the need for vancomycin infusion or blood transfusions since these factors diminish the dwell time of PIVCs and expose the patients to painful insertions. For such cases, an extended dwell catheter might be a better option even for shorter than six days of expected treatment.

23 Transcranial Magnetic Stimulation and Magnetoencephalography Can Be Sufficient Indicators for RNS Placement

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Responsive neurostimulation (RNS) is a treatment option for patients with refractory epilepsy who may not be candidates for surgical resection due to overlap of the ictal onset zone and eloquent cortex. Presurgical evaluations for RNS placement are typically achieved by invasive methods, however we investigated whether non-invasive methods such as transcranial magnetic stimulation (TMS) and magnetoencephalography (MEG) may also achieve this goal sufficiently. We hypothesized that non-invasive methods would be successful and sufficient indicators for patients who underwent RNS placement. Following a retrospective chart review, eight patients who underwent RNS placement were identified. The sample had a mean age of 21.8 (SD = 4.2) and 62.5% were female. For 7 of 8 patients, characterization of the irritative zone using MEG was successful. Seven patients underwent relevant eloquent cortex mapping by TMS (successful in 7 of 8 patients), and 5 of 8 patients underwent relevant eloquent cortex mapping by MEG (successful in 2 of 5 patients). These data demonstrated that TMS and MEG may be feasible alternatives to invasive methods for identifying candidates for RNS placement. Non-invasive methods for determining RNS candidacy have a high rate of success when data from multiple non-invasive modalities converge and may inform more accurate placement of intracranial electrodes prior to RNS placement or eliminate their need.

Poster Presentations:

Health Professional Students

24 Lead Screening in Pediatric Patients at the UT St. Francis Family Medicine Clinic

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Blood lead screening is a well-established preventive element of well-child encounters, but research suggests that clinics often fail to execute screening recommendations. This project assessed the rate of pediatric lead screenings performed at the UT St. Francis Family Medicine Clinic according to Tennessee Department of Health (TN DOH) guidelines. We analyzed data from well-child visits to identify various barriers to screening and propose targeted quality improvement strategies.
We performed a retrospective chart review for 353 randomly-selected UT-St. Francis patients aged 12-72 months. We determined the frequency of 12- and 24-month well-child appointments, TN DOH-recommended lead screenings performed at these visits, associated venous lead levels, and any diagnoses coded for these visits. A survey evaluating awareness of screening recommendations was also administered to the clinic's physicians.
Our results reveal that lead screenings were performed at 47% of 12-month and 26% of 24-month well-child appointments. Physician survey respondents were highly knowledgeable of the TN DOH recommendations, and several systems-based factors were found to account for this discrepancy in completed screenings, which informed our subsequent quality improvement proposals. Our protocol offers replicability for other practices to individualize plans for increasing lead screening rates, and future study should evaluate the longitudinal impacts of these interventions.

Funding: Family Medicine Summer Research Program, 2022

25 The Association between Patent Ductus Arteriosus and Bronchopulmonary Dysplasia

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The patent ductus arteriosus (PDA) has been associated with multiple adverse outcomes in preterm neonates. Treatment is controversial due to a high spontaneous closure rate. Spontaneous closure within the first week varies across institutions and with gestational age, and a prolonged ductal shunt has a negative impact on neonatal outcomes. Early targeted PDA therapy has been shown to improve outcomes compared to either routine therapy or strict conservative management. We sought to test the effects of a hemodynamically significant PDA (hsPDA) in a single level III NICU. We hypothesize that patients with hsPDA are at increased risk for moderate-severe BPD.
59 (50%) patients had an hsPDA with median age to start medical therapy of 8 days (IQR: 5-12). Among survivors, hsPDA was associated with increased risk for moderate-severe BPD (OR 5.9; 95% CI 2.3-15.8). hsPDA treatment was not associated with increased risk for moderate-severe BPD if the PDA was closed with a single course of therapy prior to 10 days of age (OR 2.9; 95% CI 0.73-12.1). The hsPDA group had increased risk of combined death or moderate-severe BPD (OR 4.7; 95% CI 1.9-11.4).
In a single level III NICU, neonates born <28 weeks' gestation who receive targeted therapy for hsPDA have a significantly increased risk for moderate-severe BPD. Medical therapy for PDA is <50% effective at closing the PDA in this population, and successful treatment prior to day 10 does not increase the risk of BPD.

26 [11C]Methionine PET in Diagnosing Pediatric Low-grade Gliomas

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Purpose: Positron emission tomography (PET) imaging of the brain with amino acid tracers, such as [11C] Methionine (MET), is helpful in the evaluation of brain tumors. Although MET-PET has been extensively used in adults and some pediatric brain tumors, data on MET-PET imaging of pediatric low-grade gliomas (pLGG) are scarce. This study aimed to investigate the diagnostic performance of MET-PET in diagnosing pLGGs. **Materials and Methods:** Fifteen patients with newly diagnosed pLGG and twenty-six previously treated pLGG patients were evaluated with MET-PET and magnetic resonance imaging. Biopsy or tumor resection was performed in all patients within 6 months of the MET-PET. Qualitative and semi-quantitative analysis that included tumor to brain uptake ratios (TBR) were performed. TBR was consisted of TBRmax, TBRpeak, and TBRmean analyses. TBR>1 was used to define a positive MET-PET test. **Results:** The sensitivity of MET-PET for diagnosing newly diagnosed pLGG was 87% for TBRmax and TBRpeak, 80% for TBRmean, and 94% for qualitative interpretation. The sensitivity of MET-PET for diagnosing previously treated pLGG was 100% for TBRmax and TBRpeak, 81% for TBRmean, and 96% for qualitative interpretation. The sensitivity for the combined cohort was 95% for both TBRmax and TBRpeak, 80% for TBRmean and 95% for qualitative evaluation. Conclusion: Both quantitative and qualitative MET-PET have high sensitivity in diagnosing pLGG, both newly diagnosed and previously treated.

Funding: Project was completed through Pediatric Oncologic Education program funded by National Institutes of Health. This project was also supported by American Lebanese Syrian Associated Charities (ALSAC).

27 Tackling Underlying Causes of Youth Athlete Collapses through Comprehensive Physical Exams

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Recent collapses of young athletes, e.g., Lebron James Jr. and Caleb White, raise concerns about causative factors. While there are many contributing variables, data suggests that a leading cause of these collapses is Hypertrophic Cardiomyopathy (HCM), a genetic cardiovascular disorder characterized by abnormal thickening of the heart muscle. The diagnosis complexity and underdiagnosis of HCM stem from diverse, nonspecific symptoms.

Underdiagnosis often results from subpar physical exams for high school athletes. Memphis schools lack time, resources, and specialized training with a priority of eligibility over health assessment. This deficiency hampers spotting severe conditions such as HCM.

To address this issue, there is a pressing need to improve the quality of pre-participation physical exams. Incorporating comprehensive assessments such as personal medical history and electrocardiograms (ECGs) could enhance the detection of underlying health issues. By advocating for a more thorough examination process, schools can contribute to the early recognition and prevention of conditions like HCM in young athletes, ensuring their safety while participating in high-intensity sports activities.

Our immediate objectives include persuading Memphis area schools to adopt this recommendation. Concurrently, we plan to gather pre- and post-implementation data on parameters like injuries and collapses, to assess the impact of this recommendation on outcomes for young athletes.

Funding: UTHSC College of Medicine

28 Symptomatic Hypercalcemia in an Infant Secondary to Excessive Consumption of Almond Milk

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This case emphasizes the importance of avoiding plant-based milks as a primary nutrition source in infancy.
A 4-month-old previously healthy female presented with persistent non-bloody, non-bilious emesis, decreased urine output, weight loss, fussiness, and lethargy. Serum levels of calcium were markedly increased at 14.1 mg/dL, serum phosphate decreased at 1.6 mg/dL, and serum parathyroid hormone decreased at <4pg/mL. Abdominal ultrasound was negative for pyloric stenosis. Retroperitoneal ultrasound demonstrated bilateral nephrocalcinosis. After treatment with IV normal saline and phosphorus repletion, the patient's electrolytes normalized and symptoms resolved. The patient had been consuming 8 ounces of unsweetened almond milk every 30-60 minutes due to the inability to find infant formula in the setting of a nationwide shortage.
Although often advertised as healthy, plant-based milk alternatives should not be used as a substitute for breast milk or formula in infants. Milk alternatives including almond milk are calorie-poor, low fat, low protein, and too high in free water content and calcium levels to safely be the primary nutrition source in infants. Clinicians should counsel parents against using these milk alternatives, and patients who have received excessive amounts of plant-based milk should have their electrolytes monitored.

29 Impact of 2022 AAP Hyperbilirubinemia Guidelines on Care Practices and Length of Stay

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Background: In 2022, the American Academy of Pediatrics (AAP) revised guidelines for hyperbilirubinemia screening with the intention of decreasing neonates' exposure to phototherapy while avoiding increased risk of kernicterus. These guidelines raised phototherapy thresholds, specified thresholds for transcutaneous and provided much stricter guidelines for post-discharge follow-up which relies on options to use home phototherapy, otherwise requiring delayed discharge. Here, we compare the utilization of phototherapy, need for collection of total serum bilirubin and length of stay in neonates with application of the AAP 2004 and 2022 hyperbilirubinemia guidelines.
Methods: Data was collected on a retrospective cohort of neonates 35 or more weeks of gestation born at our facility in a 3-month period prior to the adoption of the revised AAP guidelines. Each patient's gestational age (GA), neurotoxicity risk factors, initial transcutaneous bilirubin (TcB) and/or total serum bilirubin (TSB) levels were collected. These values were subjected to both sets of AAP guidelines to assess the need for phototherapy, TSB, and follow-up. For TSB values 0.1-1.9mg/dL below phototherapy threshold, it was assumed that the patient would have delayed discharge as we do not have the ability to provide home phototherapy.
Results: A total of 464 neonates were included with a mean GA of 38.4 weeks (SD 1.38 weeks). Phototherapy was indicated in 3 patients under new guidelines vs 9 under old guide.

30 Establishing Social Determinants of Health Screening to Improve Pediatric Diabetes Patient Outcomes

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Background/Objective: Patients with adverse social determinants of health have been shown to have worse glycemic control. Despite this correlation, our clinic was not previously screening for SDOH in our diabetic patients. To address this disparity, we decided to implement SDOH screening for our type 1 and type 2 diabetes patients based on a set of specific criteria. Our goal was to screen 10% of our type 1 and type 2 diabetes patients and offer resources and referrals to those who screened positive.

Methods: Using the ""Partners in Care"" survey, we screened type 1 and type 2 diabetes patients with a diagnosis of greater than 6 months who had an A1C of 9.5% or greater, had not been seen in the clinic for the past 6 months, or were within a 3-month window of the anniversary of their diagnosis date. Resources and a referral to our clinic's medical social worker were then offered to patients who screened positive.

Results: We increased the screening rate of our pediatric type 1 and 2 diabetes patients from 0% to an estimated 4.3%. Of the patients eligible for screening, 50.8% completed screens, 37.5% of the completed screens were positive, and 87.5% of the patients that screened positive were offered a referral to social work and/or appropriate resources. On average, patients who screened positive for SDOH had an average A1C of 11% with 1.3 ER visits in the last year.

Conclusions: Standardizing our SDOH screening process was helpful in increasing SDOH screening rate.

31 Comparison of Clinical Outcomes in Short vs. Prolonged Antibiotic Treatment in Culture Negative Sepsis in VLBW Neonates

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Background: Neonatal sepsis may be difficult to recognize due to its overlapping clinical presentations with other conditions common in very low birth weight (VLBW) neonates (≤1500 g). Empiric antibiotics (abx) are prescribed for most VLBW babies with consideration of culture negative sepsis. Antibiotic stewardship is essential within the NICU because of abx resistance and consequences on health outcomes in adulthood. We studied outcomes (NEC, ROP, IVH, BPD) and characteristics (CRP, WBC count) in VLBW babies receiving prolonged antibiotics and its impact on neonatal morbidity. **Hypothesis:** We hypothesized that clinical outcomes would be worse in neonates who received abx for at least 72 hours compared to those who received abx for <72 hours. Methods: A retrospective study was conducted and the demographics and outcomes of VLBW neonates who were culture negative and received abx for <72 hours were compared with those who received abx for at least 72 hours. **Results:** Of the 106 VLBW neonates who were culture negative on admission and received empiric abx, 24 (22%) had abx for ≥72 hours; they tended to be smaller in weight, had a higher mean CRP, and had a higher mean WBC count. **Conclusion:** In our cohort, smaller and more critical babies seemed to get longer abx for culture negative early onset sepsis. They also tended to have longer hospital stays and a higher chance of death or BPD prior to discharge. Further data collection is needed to ensure these associations are true. **Funding:** Medical Student Research Fellowship (MSRF), UTHSC College of Medicine

32 Validation of the 2022 Neonatal Research Network BPD Outcome Estimator

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Background: Bronchopulmonary dysplasia (BPD) is a common morbidity that affects 30%-50% of preterm infants. Postnatal steroids have been recognized as an effective treatment for reducing the risk of BPD, however, indiscriminate use may place infants at high risk of neurodevelopmental delays. Therefore, it is important to have a method of selecting high-risk patients. The NICHD had developed an online tool to estimate the outcome of BPD in at-risk infants.

Objective: To assess the external validity of the 2022 NICHD BPD outcome tool, as it may not reliably predict the outcomes of BPD and its grades in a patient population different than the original patient data on which it was developed.

Results: 89 patients included. Rates of antenatal steroids in our population are lower than reference population (84% vs 91%, p=0.04), however, BPD rates in our population are lower as well (43% vs 65%, p<0.01). The tool shows poor and variable specificity and sensitive for predicating individual grades of BPD. However, for the composite outcome of BPD grade 2/3 and Death, it shows specificity ranging from 89.6-95.8% and a PPV range of 74-79.5% on various days of life. The most reliable assessments are days of life 14 and 28.

Conclusion: The 2022 NICHD BPD outcome estimator tool showed poor performance at predicting individual grades of BPD but showed good performance at predicting the composite outcome of BPD grade 2/3 death with few false positives and an acceptable PPV and specificity.

33 Anesthesia-Related Pulmonary Complications: Do Fasting Guidelines Matter in Pediatric Orthopedic Emergencies?

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INTRO: We found no increased risk of post-anesthetic complications in pediatric patients that did not meet ASA fasting guidelines at the time of their procedure for an orthopaedic emergency.

METHODS: 321 pediatric patients who underwent emergency orthopaedic procedures were identified through operative booking records at a high-volume pediatric trauma center from 2010-2020. Patients were divided by: ASA fasting criteria at the time of the procedure, 8 hours fasting from solid food and 2 hours from liquid, and those who did not1. All were then reviewed for potential complications of gastric content aspiration surrounding anesthesia.

RESULTS: Of the 321 patients who met the inclusion criteria, 264 (82%) met fasting guidelines, and 57 (18%) did not. Of the 264 cases meeting preoperative fasting guidelines there was 1 patient with an anesthesia related complication who required prolonged oxygen supplementation post-operatively. Of the 57 patients not meeting fasting guidelines there were no anesthesia or procedural related complications. Utilizing the rate of anesthetic complications found in this study (0.3%) a patient cohort of 2067 patients is needed to achieve adequate power.

CONCLUSION: Our findings support moving forward with anesthesia for pediatric orthopedic emergency procedures regardless of the patient's fasting status. We believe this serves as a valuable starting point for further research into fasting criteria in pediatric trauma patients.

34 Acute Weakness in an Infant

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GBS is an acute inflammatory demyelinating disease affecting children aged 2 and older that presents as ascending weakness. However, presentations of GBS in patients younger than 2 years of age may present significant diagnostic challenges.
A 10-month-old male presents with 10 hours of acute onset drowsiness, right eye fluttering and lateral deviation, and imbalanced movements with recent diagnosis of acute otitis media. Physical exam was notable for continuous eyelid fluttering and sleepiness. Remainder of the neurologic exam was normal. CTH showed AOM and LP and EEG were both negative. Over the following 2 days, he developed stridor, wheezing, bradycardia to the 70s, and hyporeflexia in addition to continued weakness, worsening ptosis, and transient anisocoria and miosis. EMG was not consistent with botulism and MRI showed enhancements of the conus medullaris, cauda equina, and CN3 and CN5. Patient was started on IVIG due to increased suspicions of GBS and showed improvement, no longer desatting or bradycardic. Repeat LP on day 7 showed a protein of 243 confirming our suspicion of GBS. Upon discharge, he was able to roll, lift his head, and had improved truncal control although he will require PT.
This case highlights that treatment for GBS should not be withheld if concern for GBS is high. Diagnostic uncertainly can be mitigated with a second LP and/or MRI but must be weighed with the risks of sedation, especially when there is already cardiopulmonary involvement.

35 Exploring Sickle Cell Disease and Fungal Asthma through a Novel Mouse Model

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Introduction: Sickle cell disease (SCD) results from mutant hemoglobin S (HbS) causing distorted erythrocyte morphology. Asthma is an inflammatory airway disorder that often coexists with SCD and exacerbates the complexity of both conditions. Our understanding of disease co-pathogenesis is hindered by the absence of a suitable mouse model, a gap in technology filled by this study.
Methods: The BERK humanized mouse model grafts HbS-expressing human stem cells into immunodeficient mice, recapitulating key aspects of SCD pathology. To simulate coexisting asthma, BERK mice underwent fungal allergen-induced airway inflammation. RNA extractions, quantitative PCR, and histopathology evaluated the immunologic and structural impacts of fungal exposure on the pulmonary system.
Results: Although fungal clearance was reduced in BERK SCD mice compared to wild-type controls, BERK mice did not develop aspergillosis. The inflammatory profile was skewed toward a neutrophilic profile and Th1-associated genes were upregulated in the BERK model in contrast to the Th2/Th17 profile in the wild-type mice with asthma. BERK SCD mice had elevated airway hyperresponsiveness, epithelial hyperplasia, and collagen deposition but limited goblet cell metaplasia.
Discussion: This novel mouse model elucidates the pathophysiology underlying SCD and asthma. Implications extend beyond basic research, offering opportunities for targeted therapeutic strategies and improved management for affected individuals.
Funding: CIDC St. Jude

36 Improving Adherence to Reach Out and Read Model

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Rationale and Purpose: Language development is crucial to early development. There is evidence that primary care-based interventions have a statistically positive effect on parent-child participation in cognitively stimulating activities. ROR is a pediatric primary care literacy program centered around the model of giving a book and literacy counseling at every well child visit for patients ages 2 weeks to 5 years. The purpose of this study is to assess adherence to the ROR model and improve the percentage of eligible children that receives a book.
Procedures: Baseline data was obtained over 6 months by administering surveys upon checkout to guardians of eligible patients and comparing the number of ROR eligible visits to the reported number of books given away. We have since implemented Plan-Do-Study-Act (PDSA) cycles with the goal of increasing the percentage of eligible children that receive books.
Results and Conclusions: At baseline, 72% of eligible patients received a book from a provider during their visit, and 79% discussed the importance of reading. Following PDSA 1, these percentages increased to 76% and 82%, respectively. Following PDSA 2, 85% of eligible patients received a book, and 89% discussed reading with their provider. The percentage of patients who discussed reading with a provider decreased to 83% following PDSA 3, while 84% received a book. PDSA 4 is ongoing. The PDSA cycle associated with the highest increase in adherence is PDSA 2.

37 Reliability of TMS-Derived Motor Mapping in a Clinical Pediatric Cohort with Refractory Epilepsy or Brain Tumor

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Transcranial Magnetic Stimulation (TMS) motor mapping over short time frames is shown to be reliable in a typically developing population. We investigated at what age the TMS measures would become reliable in a clinical pediatric population. We hypothesized that TMS metrics would be reliable only after the motor development was completed.
A retrospective chart review, approved by the IRB, identified participants with ≥ 2 motor maps and had ≥3 motor-evoked potentials (MEP) of ≥ 50μV of a distal arm muscle (n = 31; mean age 13.1 ± 6.3; 15 male, 17 female; avg. lapse 3.5 years ± 1.9 years). The TMS measures of conduction velocity (CV) and motor threshold as measured by the TMS Electric-field (E-field) were evaluated to index changes in myelination and cortical excitability. Statistical analyses were performed with GraphPad Prism. There was a significant correlation between age and CV and E-field in patients ≤ 15 years old (CV: $r = 0.77$, $p < 0.01$; E-field: $r = -0.60$, $p < 0.01$) that diminished after 15 years of age (CV: $r = 0.42$, $p < 0.01$; E-field: $r = -0.27$, $p=0.05$). The results indicate that myelination and cortical excitability reach a plateau by 15 years of age. The difference in CV and E-field over time was not significantly impacted by surgical intervention, sex, or time lapse between mappings. Overall, TMS motor mapping can index the stage of motor development in pediatric clinical cohort and shows good reliability in older children for whom motor development is complete.
Funding: Partially supported by the Neuroscience Institute of the University of Tennessee Health Science Center

38 The Role of Social Determinants of Health on Participation in Opioid Maintenance Programs in Pregnancy and Neonatal Outcomes

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Background: Rates of opioid use during pregnancy are increasing. Participation in opioid maintenance programs (POMP) in pregnancy improves maternal and neonatal outcomes. The role that social determinants of health (SDoH) play in POMP and neonatal outcomes remains unclear. **Objective:** We investigated whether SDoH correlate with POMP in pregnancy and neonatal outcomes. **Methods:** Data were obtained between Jan. 2018 and Apr. 2021 at Regional One Health from pregnant mothers with reported opioid use during pregnancy. **Results:** A total of 263 mothers and 271 infants were included. Compared to patients with POMP, a larger percentage without POMP did not complete high school (31% vs. 20%, p=0.05). There was no association between age, insurance status, ≥3 prenatal care visits, or employment and POMP. Compared to infants of mothers with POMP, those without POMP were preterm ≤37 weeks (52% vs. 19%, p<0.01) and had lower birth weights (2438 vs 2900 g, p<0.01), discharge weights (2761 vs. 3232 g, p<0.01), and rates of NOWS diagnosis (23% vs. 60%, p<0.01). No association existed between POMP and DCS referrals or discharge to mother. POMP increased screening for Hep C (OR=2.6; CI95: 1.52-5.45) and psychiatric illness (OR=2.1; CI95: 1.18-3.70). **Conclusion:** Low education levels correlate with lack of POMP, which is associated with worse neonatal outcomes. Future research should further explore other SDoH associated with POMP and outcomes as well as interventions to increase POMP.

39 Palliative Care Referral Patterns in Cardiac ICU

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Background: CVICU patients experience morbidity, ongoing hospitalizations, and interventions and benefit from pediatric palliative consultation (PPC), however referral patterns are non-standardized. We sought to review PPC patterns in patients who died and had CVICU stay.
Methods: Retrospective study of pediatric (<21 years) patients experiencing death and CVICU stay to review presence and timing of PPC. PPC presence and timing of initial PPC was analyzed with patient demographics, mode of death, intervention type, therapies utilized, presence of DNR discussion, and clinical characteristics associated with PPC intervention time frames.
Results: 54 CVICU patients with CVICU died during a 5-year period aged 11d – 17y; 54% male and 40 (74%) patients had PPC, while initial PPC occurred on DOD in 10% and in 8% between 1 to 7 days prior to DOD. Of non-PPC patients, 11/13; 85% qualified by CAPC criteria for PPC. Average timing of last PPC to DOD was 1 day. PPC patients were more likely to have had a DNR discussion (24/40;60%) compared with those without PPC (2/14; 14%,both on DOD). Of those with PPC within 7 days of death, CPR was rare on DOD (7/33; 21% vs 5/14; 34% in non-PPC group) and 10 patients (30%) died after LVAD/ECMO withdrawal vs 3/6; 50% in non-PPC group.
Conclusion: A majority of these CVICU patients had PPC, especially within 7 DOD. DNR discussion and planned withdrawal was more likely with PPC. These findings warrant furthering efforts to promote and expand PPC.

40 Eosinophil Exosomes and Their Role in Antiviral immunity against Influenza

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Eosinophils are known for their role in defending against helminth infections and responding to allergic reactions. Previous studies conducted by our lab have demonstrated that eosinophils have direct and indirect effector functions when regulating anti-viral host responses during influenza virus infections. Interestingly, influenza virus-induced cytopathic responses on airway epithelial cells are avoided in the presence of eosinophils. This same level of protection can be mimicked when virus-infected epithelial cells are cultured in the presence of eosinophil-conditioned media, suggesting that secretory products are responsible for epithelial cytoprotection. Preliminary studies conducted in our lab show that exosomes derived from influenza-exposed eosinophils, spanning 60-130 nm in size, induce antiviral host protection in vivo leading to significant reductions in the lung viral load in recipient mice. Building on this foundation, our investigation delves into purifying exosomes from eosinophils that are unstimulated and pre-stimulated by the influenza virus, and characterizing them by morphometric parameters including size, surface antigen expression, proteomics, and lipidomics. The goal is to unveil the key effector molecules housed within eosinophil exosomes that provide protection from the influenza virus. Identifying such factors will not only advance our understanding but also enable future studies aimed at developing a novel antiviral therapeutic for influenza.

41 Spectinomycin Analogs for the Treatment of Mycobacterium Abscessus Infections

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Non-tuberculous mycobacteria (NTM) are emerging pathogens with high intrinsic drug resistance. Among NTM species, Mycobacterium abscessus is among the most pathogenic. Standard-of-care therapy has led to unacceptable outcomes and demonstrates the urgent need to develop effective, broad-spectrum antimycobacterial regimens. Through synthetic modification of spectinomycin (SPC), we have identified a distinct structural subclass of N-ethylene linked aminomethyl SPC (eAmSPC) that are up to 128-fold more potent against M. abscessus when compared to SPC. Lead eAmSPC retain activity against other NTM species and multi-drug resistant M. abscessus clinical isolates. Mechanism of action studies demonstrate the eAmSPCs display an identical mode of ribosomal inhibition as SPC, however, the derivatives are not similarly subject to high-level, TetV-mediated efflux. These leads display favorable pharmacokinetic profiles and robust efficacy in M. abscessus murine infection models. The results suggest that eAmSPCs have the potential to be developed into clinical treatments for M. abscessus and other NTM infections.

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42 Swinging by the ED: A 10-Year Analysis on Playground Injuries of the Head and Neck

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Background: Playground injuries, specifically head and neck, are common among children. This study assesses the current trends in pediatric head and neck playground equipment injuries by estimating the nationwide occurrence of ED visits over the last 10 years.
Methods: The National Electronic Injury Surveillance System was queried regarding ED visits of pediatric head and neck injuries involving playground equipment from 2013-2022. Data utilized includes patient demographics, year of injury, age at injury, type of injury, location of injury on the body, patient outcome, and a 1-2 sentence event description.
Results: 25,307 injuries were recorded, yielding an estimated 702,674 injuries occurring in the ten-year period. The mean age was 5.79 years, and 59.3% of patients were males. Common injuries were lacerations (35.4%), internal injury (30.9%), contusions (10.7%), and concussions (8.7%). 96.4% of patients were treated/examined and released, 1.9% were transferred, admitted, or hospitalized, 1.4% left without being seen, and 0.3% were held for observation. Common injuries included swings (23.7%), monkey bars/playground climbing apparatus (20.7%), and slides (19.5%).
Conclusion: Playgrounds contributes to pediatric head and neck injuries in American EDs, with approximately 70,000 injuries per year. Swings, slides, and monkey bars cause most injuries. Males were more likely to be injured. It is imperative that safety is prioritized while maintaining exciting play for youth.

43 The Role of the Tracheal Aspirate in Antibiotic Usage in a Level IV NICU

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Purpose of study: Tracheal aspirate cultures (TAcx) are commonly ordered in the NICU in the context of respiratory deterioration to identify lower respiratory tract infection (LRTI). However, these cx have been shown to exhibit low sensitivity and specificity for LRTI and relying on them may lead to overinterpretation of results and unnecessary antibiotic (abx) exposure. Our goal was to identify the utilization of TAcx in diagnosis of LRTI and identify opportunities for diagnostic stewardship.
Methods used: Data was obtained through retrospective chart review of 39 patients with artificial airway in the NICU at LBCH between Jan 2019 - Apr 2023, who in total had 100 TAcx ordered. Data regarding demographics, indications, cx results, treatment and outcomes were all recorded.
Summary of results: 89% of the TAcx were positive and patients received abx 95% of the time a TAcx was ordered. 82% of them were diagnosed with underlying chronic lung disease of prematurity. Abx therapy was continued beyond 72h 88% of the time. Clinical improvement varied, with gas exchange improving only 61.2% of the time within 48h of starting abx.
Conclusions: A high percentage of TAcx were positive, making it difficult to distinguish between colonization and infection. Many of the babies had underlying conditions that can lead to mild inflammatory states and respiratory decompensation, mimicking LRTI. This led to high abx exposure for these patients without significant clinical improvement.
Funding: Medical Student Research Fellowship Program

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Abstract Judges

These faculty members were blinded to the authors of assigned abstracts. Abstracts that received the highest mean score were selected for oral presentations.

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Notes