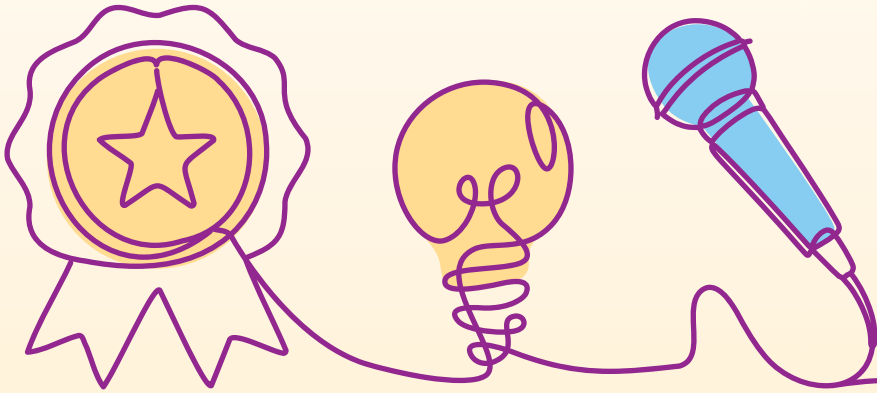
Child Health Research Institute

University of Nebraska Medical Center | Children's NEBRASKA

24th ANNUAL
Pediatric Research Forum
May 7-8, 2026

Children's Nebraska



Welcome!

Ann L Anderson-Berry, MD, PhD, FAAP

Welcome to the 24th annual Child Health Research Institute's (CHRI) Pediatric Research Forum. A highlight of the academic year, the forum allows us to share our work and celebrate the scientific curiosity of CHRI child health investigators and our trainees.

The work our trainees and faculty are doing is cutting edge, making an impact on the health and wellbeing of children everywhere. This is a terrific opportunity to showcase the breadth and depth of CHRI investigators from Children's Nebraska, UNMC, the NU system and Creighton University. Working together in multi-disciplinary teams, we impact child health with our research endeavors.

Despite changes in federal funding and shifts in the processes for grant review and submission, we remain committed to conducting impactful research that holds immense significance for our patients and their families. Science continues to be critically important worldwide and especially to the families we serve here in Nebraska. By the very nature of their work and discoveries, researchers are leaders in our nation. Pediatric academic scientists, like those at CHRI, bear a unique responsibility to ensure that advancements in child health science not only progress but are also accessible and understandable to the communities they are meant to benefit. Today's gathering provides us with an invaluable opportunity to share our work with one another. Equally important, it allows us to advocate for science within our broader community and to highlight the positive impact research has on our society—delivered through the dedication of their friends, neighbors, and family members The scientific process, mentoring, research training and career development are critical to the health and welfare of our children and our communities. This progress will not happen without each person here today. I am grateful for your attendance, interactions with our presenters, and your engagement with this great event.

As you know, great events like this take a lot of expertise and planning, and I would like to recognize the CHRI team for organizing our event again this year and the volunteers for making everything happen today.

Please enjoy yourself today as we celebrate child health research at UNMC and Children's Nebraska, and I encourage you to pause and congratulate the presenters you interact with for completing such impressive work.

Ann L Anderson-Berry, MD, PhD, FAAP
Professor, Pediatrics, Vice-Chair, Research, Department of Pediatrics
Executive Director, Child Health Research Institute
Division Chief, Neonatology, University of Nebraska Medical Center
Dr. John and Patti Sparks Chair of Pediatric Research

Agenda

Thursday, May 7

4:30 P.M. WELCOME (GLOW AUDITORIUM)

Ann L Anderson-Berry, MD, PhD, FAAP
Professor, Pediatrics, Vice-Chair, Research, Department of Pediatrics
Executive Director, Child Health Research Institute
Division Chief, Neonatology, University of Nebraska Medical Center
Dr. John and Patti Sparks Chair of Pediatric Research

KEYNOTE PRESENTATION

"Academic Entrepreneurship: Turn Clinical Problems into Research and Market Opportunities"

Thanh Nguyen, PhD
Assistant Professor, University of Nebraska Medical Center Department of Emergency Medicine

5 P.M. AWARD CEREMONY

5:45-7 P.M. RECEPTION & POSTER SESSION

(CHILDREN'S SOLARIUM)

Friday, May 8

8 A.M. GRAND ROUNDS (GLOW AUDITORIUM)

Elena Roberts, MD
Med-Peds Resident

8:45 A.M. MEDICAL STUDENT AWARD CEREMONY

Speaker Bios

Thanh Nguyen, PhD

THANH NGUYEN, PHD

ASSISTANT PROFESSOR, UNIVERSITY OF NEBRASKA MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

Dr. Nguyen started his career in 2010 as a staff nurse in the emergency department and immediately started developing solutions to everyday clinical problems through innovative thinking. His primary interest lies in finding the nexus between technology and medicine to improve the patients' overall wellness.

In 2020, Dr. Nguyen founded Open-MediciNE, an open-source platform, where health technologies are reversed engineered, made free and DIY-able to be deployed in low-resource regions. One such technology is a 3D printable component that can turn a bicycle pump and empty soda bottle into an asthma nebulizer for patients who lack access to electricity. Dr. Nguyen strongly advocates for the utilization of innovative technologies such as AI, 3D printing and open-source medicine to end global health disparities.

Elena Roberts, MD

ELENA ROBERTS, MD

MED-PEDS RESIDENT PHYSICIAN, UNIVERSITY OF NEBRASKA MEDICAL CENTER

Dr. Roberts was born in Santa Ana, CA and raised in Medford, OR. She obtained her Bachelor of Science in Biology from the University of Portland in 2016 and Master of Biomedical Sciences from Duke University in 2018. Prior to medical school, she worked as a research associate at Duke University's Center for Global Women's Health Technologies, helping to develop cervical cancer screening technologies for resource-limited communities. She obtained her Medical Doctorate from the University of South Carolina School of Medicine in Greenville, SC in 2023. She is currently a third-year Internal Medicine and Pediatrics resident at UNMC and will spend her final year of residency as the Med-Peds co-chief resident, while applying to adult Pulmonary and Critical Care fellowship programs. Her career interests include transitions of pulmonology care from pediatrics to adulthood, optimizing inpatient care for patients requiring frequent ICU admissions and palliative care.

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** - Notates abstracts awarded 1st, 2nd, or 3rd place in their designated category
* - Notates Pediatric Honors Program student

Due to limited space, any references included may have been removed but are available by contacting the investigator


2026
CHRI
PEDIATRIC
CANCER
RESEARCH
EVENTS
AUGUST 18
BRIDGING THE DIVIDE: PEDIATRIC & ADULT BRAIN TUMOR SUMMIT
Truhlsen Event Center, UNMC
AUGUST 19
PEDIATRIC CANCER RESEARCH GROUP SYMPOSIUM
Truhlsen Event Center, UNMC
REGISTER TO ATTEND EITHER EVENT OR BOTH.
Child Health
Research Institute
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2026 CHRI Scientific Conference
November 13, 2026
Scott Conference Center
Child Health
Research Institute
University of Nebraska Medical Center
Children's NEBRASKA

2025-26 Pediatric Honors Program

The Pediatric Honors Program is an application-based program designed to foster the growth and development of UNMC students interested in pediatrics.

A key component of the program involves providing students with exposure to faculty in informal settings who will mentor students and share their own journeys within and outside of pediatric medicine. Many such interactions will come from monthly seminars (fireside chats) hosted by faculty. Fireside chats include faculty from diverse specialties, backgrounds, and experiences.

The program also aims to match faculty mentors with students to work in collaboration on a scholarly project, including research abstracts, manuscripts, case reports, or projects that have the potential to impact clinical care or the educational experience in pediatrics.

The underlying hope is that this program excites, energizes, and prepares them as they move toward their next step of residency and beyond.

We would like to recognize our senior medical students who have successfully participated in this year's Pediatric Honors Program:

Kayley Anderson	Zach Headley	Natalie Sturd
Molly Coffey	Sean MacBride	Nathan Turner
Rachel Cournoyer	Kaitlyn Nein	Allison Zetterman
Joslyn Ford	Noelle Pick	

In addition, please be sure to visit the following student poster during the research forum!

Kayley Anderson

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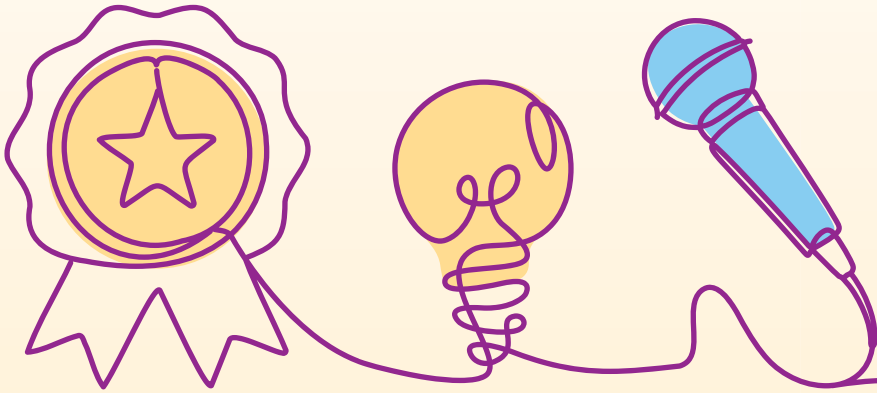
ABSTRACTS



Abstract 1

High Sodium and Low Omega-3 Intake Enhance Prediction of Newborn NICU Admission During Maternal Diabetes

Kayla Adams[1], Colman I. Freel[2,3], Paras Kumar Mishra[3], Corrine K. Hanson[4], Ann L. Anderson-Berry[2]
[1]College of Allied Health Professions, University of Nebraska Medical Center, Kearney, NE 68845
[2]Division of Newborn Medicine, Department of Pediatrics, University of Nebraska Medical Center, Omaha, NE 68198
[3]Department of Cellular and Integrative Physiology, University of Nebraska Medical Center, Omaha, NE, 68198
[4]College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE 68198

Background: Diabetes mellitus (DM) affects over 20% of pregnancies and increases the risk of adverse neonatal outcomes, including neonatal intensive care unit (NICU) admission. Current risk assessment models primarily rely on maternal clinical characteristics but do not incorporate maternal dietary factors, despite evidence that nutrition influences both maternal glycemic control and fetal development.

Significance: High maternal sodium intake and low omega-3 fatty acid intake have been linked to worsened metabolic control and increased pregnancy complications, suggesting potential utility in predicting newborn NICU admission.

Hypothesis: Incorporating maternal sodium and omega-3 intake into risk assessment models will improve prediction of NICU admission among offspring of pregnancies complicated by DM.

Experimental Design: In this IRB-approved study (IRB #112-15-EP), 70 patients with DM delivering at ≥27 weeks gestational age were recruited at Nebraska Medicine (Omaha, NE, USA). Maternal dietary intake was assessed using the Harvard Food Frequency Questionnaire. Thresholds for high sodium (≥3000 mg/day) and low omega-3 intake (≤600 mg/day) were based on established dietary guidelines. Maternal obesity status and newborn sex were obtained from the electronic health record. Logistic regression with robust standard errors assessed predictors of NICU admission. Model discrimination was evaluated with area under the receiver operating characteristic curve (AUC), sensitivity, specificity, and overall classification accuracy.

Results: Of the 70 neonates included, 26 (37%) were admitted to the NICU. High maternal sodium intake (OR 14.2, 95% CI 1.87-108.1, p=0.01) and low omega-3 intake (OR 0.07, 95% CI 0.006-0.72, p=0.03) were independently associated with NICU admission. Maternal obesity (OR 39.6, 95% CI 2.51-625.1, p=0.009) and male sex (OR 14.2, 95% CI 2.14-95.2, p=0.006) were also significant predictors. The full model demonstrated excellent discrimination (AUC 0.89), with sensitivity of 85%, specificity of 89%, and correctly classified 87% of cases, outperforming a baseline model including only maternal obesity status and newborn sex (AUC 0.81).

Conclusion: Maternal dietary factors, specifically high sodium and low omega-3 fatty acid intake, significantly improve prediction of NICU admission in DM-complicated pregnancies. Integrating dietary information into risk models may enhance early identification of neonates at high risk for intensive care, enabling preparation for clinical management and targeted interventions. Future studies in larger, diverse populations are warranted to validate these findings and explore whether modifying maternal diet could reduce neonatal complications.

Abstract 2

Proteomic Signatures in Cerebrospinal Fluid Reveal Biomarkers for Central Nervous System Infections

Kayley Anderson, MPH[1], Christian Clodfelder, DO, MS[1,2], Matt Beaver, BS[1], Gwenn Skar, MD, PHD[1,2]
[1]University of Nebraska Medical Center, Omaha, NE
[2]Children's Nebraska

Background: Central nervous system (CNS) infections are life-threatening conditions that require rapid and accurate diagnosis to guide appropriate therapy. Conventional diagnostic methods, including cerebrospinal fluid (CSF) culture, Gram stain, and PCR, may lack sensitivity, particularly after prior antibiotic exposure or delayed sampling. Emerging next-generation sequencing approaches remain time-intensive and may not provide actionable results in acute settings. Proteomic analysis offers an unbiased, high-throughput method to characterize the CSF protein landscape and capture host immune and inflammatory responses that may persist even after pathogen clearance.

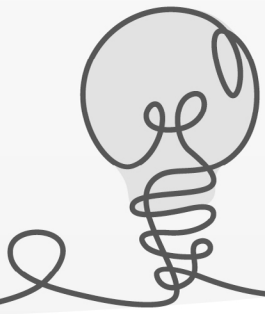
Significance of the Problem: Delayed or inconclusive diagnosis of CNS infections can lead to inappropriate antimicrobial use, prolonged hospitalization, neurologic morbidity, or mortality. A host-response–based diagnostic approach could complement pathogen-specific testing and improve diagnostic precision, particularly when conventional microbiologic studies are negative.

Hypothesis/Question: We hypothesized that CSF proteomic profiling can differentiate bacterial, viral, and autoimmune CNS pathologies from noninfectious controls based on distinct host-response protein signatures.

Experimental Design: This pilot feasibility study included female patients across four groups: confirmed bacterial CNS infection, confirmed viral CNS infection, autoimmune encephalitis, and absence of CNS infection (controls). Restricting to female patients reduced potential sex-related variability in proteomic analysis. Demographic and clinical data were abstracted from medical records. CSF samples were collected within 24 hours of completion of routine diagnostic testing, frozen, and analyzed using mass spectrometry–based proteomics. Differential protein expression was assessed between disease groups and controls, as well as through between-group comparisons.

Results: Bacterial pathogens included Haemophilus influenzae, Streptococcus pneumoniae, Enterococcus faecalis, Streptococcus agalactiae, and Enterobacter cloacae. Viral pathogens included HSV, parechovirus, HHV-6, and influenza. Compared with controls, bacterial CNS infection demonstrated the greatest proteomic changes (214 upregulated, 240 downregulated proteins). Viral CNS infection showed 40 upregulated and 55 downregulated proteins, while autoimmune encephalitis exhibited 15 upregulated and 28 downregulated proteins. Between bacterial and viral infections, 294 proteins were upregulated and 303 downregulated. S100 calcium-binding protein A9 (S100A9) emerged as a potential biomarker distinguishing bacterial CNS infection from viral, autoimmune, and noninfectious conditions.

Conclusions: CSF proteomic profiling is feasible and demonstrates distinct host-response signatures across bacterial, viral, and autoimmune CNS pathologies. These findings support proteomics as a promising adjunct diagnostic approach when conventional testing is inconclusive and highlight candidate biomarkers, including S100A9, for further validation in larger cohorts.



Abstract 3

Investigating the Role of Astrocytes in Deficient Sleep in Fragile X Syndrome Mouse Model

Alexandria Anding[1], Niveditha Sankar[2], Zahra Arbabi[2], Peng Zhong PhD[2], Anna Dunaevsky PhD[2]
[1]Dept. of Genetics, Cell Biology & Anatomy, University of Nebraska Medical Center
[2]Dept. of Neurological Sciences, University of Nebraska Medical Center

Background: Fragile X syndrome (FXS) is the most common form of inherited intellectual disability, and the leading monogenic cause of autism spectrum disorders. Clinical polysomnography studies show that children with FXS frequently experience sleep impairments, including difficulty falling sleep and frequent nighttime awakenings. Similar sleep deficits have been reported in the Fmr1 knockout (KO) mouse model, yet the developmental trajectory of sleep architecture and the mechanisms underlying these impairments remain poorly understood. While neuronal dysfunction has been the primary focus of FXS research, the Fragile X messenger ribonucleoprotein (FMRP) is also expressed in astrocytes, and a growing number of studies implicate a role for astrocytic FMRP in FXS pathogenesis. Additionally, there is cumulative evidence that implicates astrocytic calcium (Ca2+) activity in sleep physiology.

Significance: Identifying astrocyte-specific contributions to sleep regulation may reveal new mechanisms linking glial dysfunction to disrupted neural rhythms and behavioral phenotypes in FXS.

Hypothesis: Our hypothesis is that loss of FMRP from cortical astrocytes contributes to sleep impairments in the Fmr1 KO mouse.

Experimental Design: To test this hypothesis, we performed simultaneous electroencephalography (EEG), electromyography (EMG), and behavioral monitoring in Fmr1 KO mice and astrocyte-specific Fmr1 conditional knockout (cKO) mice using wireless telemetry. Recordings were collected longitudinally (postnatal day 75–150) to examine changes in sleep architecture over time. Mice also underwent a sleep deprivation paradigm to assess sleep homeostasis. In ongoing experiments, in vivo recordings are being conducted to characterize astrocytic Ca²⁺ signaling patterns throughout sleep.

Results: Across 24 hours, both younger and older Fmr1 KO mice exhibit reduced sleep compared to controls, driven by a reduction in non-rapid eye movement (NREM) sleep. Fmr1 KO mice also display increased NREM sleep fragmentation, and higher microarousal density across development. While Fmr1 astrocyte-specific cKO mice do not exhibit an overall sleep reduction, they do display a similar NREM sleep fragmentation phenotype. Sleep deprivation experiments further revealed impaired sleep homeostasis in Fmr1 KO mice. Preliminary in vivo recordings indicate that astrocytic Ca²⁺ signals exhibit distinct patterns throughout sleep and may be altered in FXS.

Conclusion: These findings suggest that astrocyte dysfunction contributes to sleep instability in Fragile X syndrome. Increased NREM fragmentation in both Fmr1 KO and astrocyte-specific cKO mice indicates that loss of astrocytic FMRP is sufficient to destabilize sleep even when total sleep time is preserved. Together, these results support a model in which altered astrocyte signaling interacts with neuronal circuits to disrupt sleep architecture in FXS.

Abstract 4

Dual Diagnosis: De Novo Pathogenic Variants in PTEN and SOS1 in a Female Infant

Connor Aylor, MS[1], Nicole Harter, MD[1,2], Lois J Starr, MD, PhD[1,2]
[1]University of Nebraska Medical Center
[2]Children's Nebraska

We report a 16-month-old female with a dual molecular diagnosis of de novo pathogenic variants in PTEN and SOS1, representing a previously unreported coexistence of PTEN hamartoma tumor syndrome (PHTS) and SOS1-related Noonan syndrome. This case highlights the clinical and biologic interplay between the PI3K–AKT–mTOR and RAS–MAPK signaling pathways, both regulators of cellular growth and proliferation.

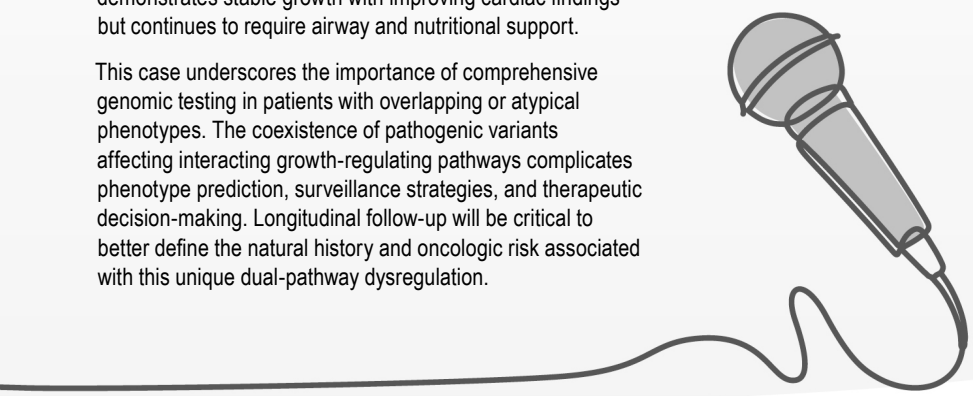
The patient was born at 31+4 weeks gestation following a pregnancy complicated by polyhydramnios and severe preeclampsia. She required neonatal intensive care for prematurity and respiratory distress. Early clinical findings included dysmorphic facial features, multiple cutaneous vascular lesions, diaphragmatic eventration, and respiratory compromise. Genetic evaluation using rapid trio exome sequencing identified two de novo variants: a partial deletion of PTEN consistent with PHTS and a missense variant in SOS1 predicted to be pathogenic based on previously reported substitutions at the same residue.

Phenotypically, the patient demonstrated overlapping features of both syndromes, including macrocephaly, craniofacial dysmorphism, and cardiac defects. Additional findings included airway involvement requiring repeated surgical interventions and propranolol therapy for subglottic hemangioma, as well as feeding intolerance necessitating gastrostomy tube placement. Neuroimaging and EEG were unremarkable, and no hepatic vascular anomalies were identified. Family history was noncontributory, and both variants were absent in the parents.

This dual diagnosis provides insight into the functional convergence of the PI3K–AKT–mTOR and RAS–MAPK pathways. Loss of PTEN activity results in increased AKT signaling, while gain-of-function SOS1 variants enhance RAS-mediated MAPK activation. Crosstalk between these pathways may amplify downstream proliferative signaling, potentially explaining the patient's complex phenotype, which spans features of both syndromes.

Management has required a multidisciplinary approach, including cardiology surveillance, oncology/genetics follow-up for tumor risk, dermatologic monitoring of vascular lesions, and developmental support services. At 16 months, the patient demonstrates stable growth with improving cardiac findings but continues to require airway and nutritional support.

This case underscores the importance of comprehensive genomic testing in patients with overlapping or atypical phenotypes. The coexistence of pathogenic variants affecting interacting growth-regulating pathways complicates phenotype prediction, surveillance strategies, and therapeutic decision-making. Longitudinal follow-up will be critical to better define the natural history and oncologic risk associated with this unique dual-pathway dysregulation.



Abstract 5

Infant Hypothermia and Hypoglycemia at CUMC-Bergan Mercy

Lauren Barbush, MS[1], Terence Zach, MD[1]
[1]Creighton University School of Medicine

Neonatal thermoregulation is vital in the first few days after birth; each 1.0°C below 36.0°C is associated with a 28% increase in mortality1. Temperatures are classified as severe (<35.0°C), moderate (35.0–35.9°C), or mild (36.0–36.4°C) hypothermia, normothermia (36.5–37.4°C), or hyperthermia (≥37.5°C)2. Even mild hypothermia may correlate with hypoglycemia, which can cause seizures and metabolic instability3. Despite the clear guidelines and normothermia targets, newborn hypothermia has a prevalence range of 32% to 85% worldwide4; real-world adherence to guidelines remains inconsistent, particularly in high-volume and low-income centers. To minimize newborn mortality, it is essential for hospitals to track their rates of normothermia upon admission to the nursery and swiftly identify areas of improvement in newborn care delivery. CommonSpirit – a health system with hospitals in Omaha, NE – has a goal that 85% of infants born ≥35wk gestation will be normothermic for 24h post-delivery. We aim to 1) assess whether a local hospital, CUMC-Bergan Mercy, meets CommonSpirit's 85% normothermia target, and 2) identify factors associated with hypothermia and hypoglycemia.

We performed a retrospective chart review with Epic EMR. Inclusion criteria: neonates born ≥35wk gestation at CUMC-Bergan Mercy between 2/1/24-2/29/24 without congenital abnormalities or NICU admissions, and the mothers of those neonates. We identified 249 neonates and collected data on: sex, birthweight percentile, gestational age, 1- and 5-min APGAR scores, and hypoglycemia. If hypothermic: lowest temperature and duration of hypothermia. Maternal data: demographics, grav/para, history of gestational diabetes mellitus (GDM), and type of delivery. Chi-square tests and adjusted odds ratios were used for statistical analysis.

In the first 24h post-delivery, 53.4% of infants were normothermic. Most hypothermic infants had mild hypothermia, and the median duration of hypothermia was 70min. No assessed factors were associated with hypoglycemia. As expected, the adjusted odds of hypothermia were 4.16 times greater among small-for-gestational-age infants (95% CI 1.36-15.6). Unexpectedly, the adjusted odds of hypothermia were 2.85 times greater among infants of GDM mothers (95% CI 1.16-7.43). CUMC-Bergan Mercy did not meet CommonSpirit's 85% normothermia goal. Being small for gestational age and being born to a mother with GDM were significantly associated with hypothermia. Our results are limited by a small sample size, the frequency of temperature charting, and the frequency of blood glucose checks. Future work will be aimed at collecting data across a longer period and at other CommonSpirit hospitals. We must also assess the current hypothermia interventions at CUMC-Bergan Mercy and identify areas of improvement.

Abstract 6

Predictors of success for clean catch urine colletion using the QuickWee method in pre-toilet trained children aged 61 days-24 months

Baxter, Jared[1,2], Sánchez, Sophia[1], Sneller, Hannah[1,2], Adam, Adeeb[1,2], Moro-Sutherland, Donna[1,2]
[1]University of Nebraska Medical Center
[2]Children's Nebraska

Background: Urine collection (UC) in pre-toilet trained children is a common but challenging clinical task. The QuickWee method, a non-invasive technique utilizing suprapubic stimulation, has shown promise in young children. Predictors of this methods success, such as bladder volume/kilogram of bodyweight and association with UTIcalc pre-test probability data have not been studied.

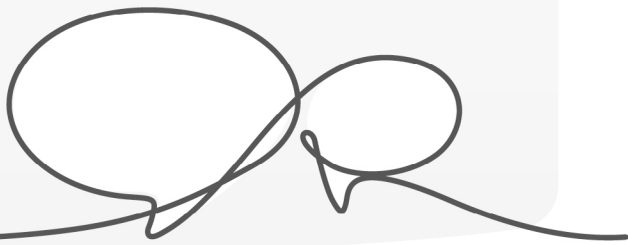
Significance: Urinary tract infections (UTIs) are common in young children. Overall, 3.5% of young, febrile children have a UTI, including 5.7% of those without a source of fever. The diagnosis of a UTI has important implications for follow-up and delayed treatment can result in morbidity. There is no consensus on the default method for UC in young children and, in recent literature, contamination rates of clean catch (CC) UC methods were not shown to be different than catheterization methods. Invasive methods are known to cause pain and distress and require equipment and technical expertise to collect, therefore, non-invasive methods may be favored for screening for UTI.

Hypothesis: We hypothesize that UTIcalc pre-test probability and bladder volume/kilogram of bodyweight will be associated with success of the QuickWee technique.

Experimental Design: This prospective quality improvement study enrolled pre-toilet trained children aged 61 days to 24 months presenting to a tertiary care pediatric emergency department whose provider recommended urine testing. Study personnel are to collect measurements of bladder volume with ultrasound, clean the genitals with room temperature sterile water and then rub the suprapubic area with cold saline. The clinician/RN will attempt to collect a midstream urine sample within 5 minutes of the Quick Wee method. If the QuickWee method was unsuccessful, standard catheterization was performed by RN/Paramedic for UTI evaluation.

Results: 61 total patients enrolled with a median age of 11.1 months. 33 (54%) bladder volumes by POCUS were available for analysis. The median bladder volume/kg was 2.8 mL/kg. The QuickWee technique was successful in 14.8% of encounters. No statistically significant difference was found in bladder volume/kg between successful vs unsuccessful encounters. Also, there was no significant association between UTIcalc pre-test probability and QuickWee success.

Conclusion: Our QuickWee success was lower than previous literature success of ~30% which could be due to the novelty of technique and could plausibly be improved by more bedside/provider experience with technique. Bladder volume was not associated with QuickWee success. Significant ultrasound measurements were lost in a data systems merge. A larger study population with more complete data set would be beneficial to further evaluate potential associations.



Abstract 7

Parent and Healthcare Team Satisfaction With Quick Wee Method in Pre-Toilet Trained Children Aged 61 Days to 24 Months

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Background: Urine sample collection in pre-toilet trained children is a common but challenging clinical task. QuickWee, a non-invasive technique utilizing suprapubic stimulation with cold saline, has shown high clinician (physician and nursing) and parental satisfaction in original research.

Significance: Non-invasive urine collection methods show ongoing promise in urinary tract infection (UTI) evaluation. Correlation between satisfaction ratings and QuickWee success has not been evaluated. Correlation with number of previous QuickWee attempts performed by bedside provider (BP) (RN, Paramedic, EMT) and success have not been evaluated. Medical (MD, DO, APP) and BP satisfaction have not been evaluated individually.

Hypothesis: We hypothesize that we will show continued satisfaction with QuickWee, there will be more satisfaction with successful QuickWee attempts, and number of previous QuickWee attempts performed by BP will be associated with success of the technique.

Experimental Design: This prospective quality improvement study enrolled pre-toilet trained children aged 61 days to 24 months presenting to a tertiary care pediatric emergency department whose provider recommended urine testing. Children underwent QuickWee method involving suprapubic stimulation using cold saline-soaked gauze for up to 5 minutes. If QuickWee was unsuccessful, standard catheterization was performed by bedside provider. Outcomes included 1) medical provider, bedside provider, and parental satisfactions, 2) association between Quickwee success and number of previous QuickWee attempts by BP and 3) association with QuickWee method success and satisfaction scores. Satisfaction scores were evaluated via Likert Scale 1-5.

Results: A total of 61 patients were enrolled. Medical and Parental satisfaction ratings were favorable for all QuickWee attempts at 3.8 and 3.6, respectively. BP satisfaction ratings were neutral at 3.0. Number of previous QuickWee attempts by bedside provider were not associated with QuickWee success. QuickWee success was associated with higher parental and nursing satisfaction.

Conclusion: Quickwee shows promise as a non-invasive alternative method in UTI evaluation in pre-toilet trained children. Healthcare team members and parents are satisfied with QuickWee and nursing and parents are more satisfied when successful. It is plausible that nursing was providers are less satisfied with QuickWee due to time needed for the method and/or due to being a novel technique. If number of bedside providers performing QuickWee had been reduced, we may have seen an association with method success as they would have been more familiar with the technique. Further investigation and expanding the total patient population would be beneficial.

Abstract 8

Comparison of Point of Care and Serum Sodium Values in Extremely Low Birthweight Infants

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Background, Significance and Problem: Extremely low birth weight (ELBW) (<1000 grams) neonates undergo frequent blood draws for monitoring of acid base-status, electrolytes, and red blood cell levels. Sodium monitoring is important, as adequate sodium supports growth and disruptions in sodium homeostasis adversely impacts long-term developmental outcomes. Neonatal intensive care units (NICUs) utilize point-of-care (POC) devices, which provide rapid results from small quantities of blood. The i-STAT 1 (Abbott Diagnostics, Abbott Park, Illinois) with the CG8+ cartridge is currently utilized in the CHI CUMC Bergan NICU, allowing measurements of blood gas, glucose, electrolytes, and hemoglobin/hematocrit from <0.1 mL of blood. Despite frequent use, data on the reliability of sodium measurements from these devices compared to standard laboratory instruments in ELBW infants is limited and conflicting. The reliability of results obtained from this device in ELBW infants is unknown.

Experimental Design: A retrospective chart review was conducted using the electronic medical record to identify paired sodium values. Patients were identified from NICU logbooks at CHI CUMC Bergan Mercy, including maternal-infant dyads from July 2020 to September 2024. The inclusion criteria were infants born <1000 grams and admitted to the NICU. Infants receiving comfort care or who did not survive to NICU admission were excluded. Additional variable collected included: birthweight, birthweight percentile, gestational age at birth, sex, source specimen (arterial, venous, or capillary blood), respiratory support at time of collection, use of ionotropic/vasotropic support, and use of antibiotics at time of collection. Each central laboratory value was matched with a POC value from the same sample.

Results: Analysis was performed using a paired t-test and a p-value of <0.05 for significance. Agreement was assessed by mean difference with 95% limits of agreement. POC sodium values showed a consistent negative bias relative to serum sodium with a mean difference of -1.6 mmol/l (95% CI: -1.3 to -1.9). The negative bias was constant regardless of serum sodium value, birth weight, gestational age, blood source, age at time of collection, antibiotic usage, and weight on day of sample.

Conclusions: Sodium measurements obtained via the i-STAT 1 device consistently underestimate the serum sodium by approximately 1.6 mmol/L. This bias was consistent whether the patient was hyponatremic, eunatremic, or hypernatremic. While bias does exist, the clinical impact of this small bias would be expected to be negligible.

Abstract 9

Targeting the "undruggable" oncogenic transcription factor nuclear factor I/B in pediatric medulloblastomas

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Background: Medulloblastomas (MB) are the most common malignant pediatric brain tumors and divided into four primary subgroups amongst which group 3 tumors (G3MB) exhibit the highest aggressiveness. Nuclear Factor I/B (NFIB), a developmentally active transcription factor enriched in G3MBs, plays a pivotal role in tumorigenesis and metastasis by inducing a change in chromatin structure that enhances accessibility to pro-tumorigenic and pro-metastatic programs.

Significance: Transcription factors like NFIB are considered undruggable due to lack of well-defined binding pockets for inhibitors. A viable alternative is to target downstream signaling pathways activated by NFIB.

Hypothesis: We hypothesized that NFIB facilitates an oncogenic role in group 3 MB by driving chromatin remodeling, resulting in enriched expression of oncogenic targets that maintain and promote tumorigenicity.

Experimental Design: First, we delineated the role of NFIB in facilitating tumorigenicity and cancer stemness via NFIB knocked down (small-interfering RNA and dox-inducible knockdown) in two classical G3MB cell lines (HDMB03 and D458) that exhibit NFIB enrichment. Functional assays comprised of MTT, migration/invasion, and medullosphere/colony formation. Second, using transcriptomic analyses, we isolated top targets activated by NFIB enrichment in cell lines and tumors. This enabled us to isolate the most promising and potentially druggable NFIB binding partners. The top target was further explored via pharmacologic inhibition to determine impact on G3MB cancer cell tumorigenesis.

Results: NFIB silencing reduced cancer cell proliferation, migration and invasion, and induced apoptosis. It also abrogated medullosphere and colony formation, silencing stem cell markers, CD133, Nanog, Oct4, and Sox2. Our transcriptomic analysis identified ATAD2 as a top deregulated target of NFIB in G3MBs. We tested pharmacologic inhibition of ATAD2 using a small-molecule inhibitor BAY850 in two G3MB cell lines, wherein we found significant growth reduction (HDMB03 IC50 ~3.5μM; D458 IC50 ~1.5μM) and abrogation of colony formation. Mechanistically, BAY850 induced high expression of the pro-apoptotic protein, cleaved PARP, and inhibited cyclin B1, a checkpoint protein for entry into G2/M phase of the cell cycle. Additionally, BAY850 also inhibited CENPE, PLK4 and NDC 80 which are crucial for kinetochore formation during cell division. BAY850 also exhibited strong synergy with cisplatin, a standard of care G3MB chemotherapy agent, in reducing tumorigenicity of G3MB cells.

Conclusion: Herein, we have identified a putative pharmacologic inhibitor of ATAD2 that may serve as a practical means to target NFIB's oncogenicity. Its strong synergy with cisplatin may open new avenues for treating G3MBs, thus improving therapeutic option to treat this devastating cancer of childhood.

Abstract 10

High Frequency of Streptococcus Anginosus in Pediatric Appendicitis Patients

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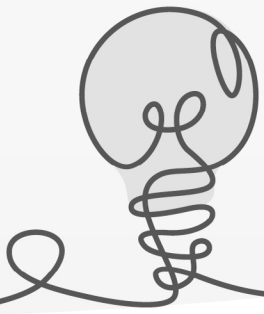
Background: In 2014, a higher-than-expected postoperative infection rate was identified following appendectomy at Children's Nebraska. One hypothesized contributor to this trend was an increased prevalence of Streptococcus anginosus (SA), a pathogen associated with abscess formation in cases of ruptured appendicitis. To explore potential causes of increased postoperative infection rate, a retrospective review of all appendectomy cases performed at Children's Nebraska between 2014 and 2024 was conducted to evaluate the frequency of S. anginosus and identify additional factors contributing to postoperative infections.

Objective: The aim of this study was to determine the frequency of Strep anginosus in ruptured appendicitis and to identify factors contributing to high postoperative abscess rate.

Methods: A ten-year retrospective chart review was performed on patients who underwent appendectomy between January 2014 and December 2024. Data collected included initial length of hospital stay, intraoperative findings, microbiological culture results, readmission rates, and postoperative complications. Fisher's exact test was used to evaluate associations between SA and abscess. Fisher's exact test was used to evaluate associations between SA and abscess.

Results: A total of 3049 appendectomy cases from 2014 to 2024 were reviewed. Of these, 866 (28%) patients had ruptured appendicitis. There was a statistically significant linear trend in ruptured appendectomies over the 10-year period ($p<0.0001$). Intraoperative cultures were obtained in 400 of these cases (46%), with 255 (64%) positive for Strep anginosus. Strep anginosus was the most common isolated organism, followed by mixed anaerobic flora and Escherichia coli. The frequency of Strep anginosus in complicated appendicitis increased from 55 percent in 2014 to 65 percent in 2024 among cultured patients. There was no statistically significant linear trend in SA positive ruptured appendectomies over the 10–year period ($p=0.2639$). There were no statistically significant associations between SA positive cultures at initial surgery or abscess drainage with abscess formation over the 10-year period or within each year.

Conclusions: The proportion of complicated appendicitis among appendectomy cases has increased at Children's Nebraska. There is a high frequency of Strep anginosus among appendectomy cases at Children's Nebraska. Future research on this topic will include investigating the impact of antibiotic regimens and duration on rupture and abscess rate.



Abstract 11

Spleen Tyrosine Kinase as a Therapeutic Target in MYC-Driven Group 3 Medulloblastoma

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Background: Group 3 medulloblastoma (MB) is the most aggressive pediatric brain tumor subtype, defined by MYC amplification, early metastasis, and dismal survival outcomes despite intensive multimodal therapy. The lack of actionable therapeutic targets underscores an urgent need to identify druggable regulators of MYC driven oncogenic signaling.

Significance: While MYC is a central driver of Group 3 MB, it remains largely undruggable. Spleen Tyrosine Kinase (SYK), a non receptor tyrosine kinase with clinically available inhibitors, has emerged as a critical regulator of cancer cell survival and proliferation and has been shown to cooperate with MYC dependent transcriptional programs in other malignancies, especially cancers having hematologic and immunological origin. These features position SYK as an attractive and translationally relevant therapeutic target in MYC driven MB.

Hypothesis: We hypothesize that SYK sustains MYC dependent oncogenic signaling in Group 3 medulloblastoma and that pharmacologic SYK inhibition will suppress tumor growth and enhance chemotherapy responsiveness.

Experimental Design: We evaluated the effects of SYK inhibition using a panel of commercially available SYK inhibitors in MYC low and MYC amplified medulloblastoma cell lines and neurosphere models. Tumor cell viability, cell cycle regulation, apoptosis, and MYC expression were assessed via MTT assays, PI / Annexin V staining, and Western blotting. Combinatorial treatment with cisplatin was examined to assess chemosensitization. Ongoing studies aim to define the molecular and epigenetic mechanisms underlying SYK MYC signaling in vitro and in vivo.

Results: SYK is expressed significantly across medulloblastoma datasets, with elevated expression correlating with poorer survival outcomes. Pharmacologic and transient (using siRNA) SYK inhibition reduced SYK and MYC protein levels, significantly decreased tumor cell viability, and increased apoptosis in MYC amplified in vitro 2D and 3D models. Notably, SYK inhibitors synergized with cisplatin, producing enhanced cytotoxic effects consistent with a chemosensitization mechanism.

Conclusion: Our findings identify SYK as a key regulator of MYC driven oncogenesis in Group 3 medulloblastoma and support therapeutic targeting of the SYK MYC axis. The observed synergy between SYK inhibitors and cisplatin highlights a promising, clinically actionable strategy to overcome therapeutic resistance and improve outcomes for children with high risk, MYC amplified medulloblastoma.

Abstract 12

Does Fetal Exposure to Selective Serotonin Reuptake Inhibitors Increase the Need for Neonatal Resuscitation?

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Background: Fetal selective serotonin reuptake inhibitor (SSRI) exposure has been associated with multiple neonatal complications, including respiratory distress, term postnatal adaptation syndrome (PNAS), and congenital defects (particularly with paroxetine). However, untreated mood disorders in pregnancy are also associated with increased morbidity in the maternal-infant dyad, supporting SSRI use in pregnancy.

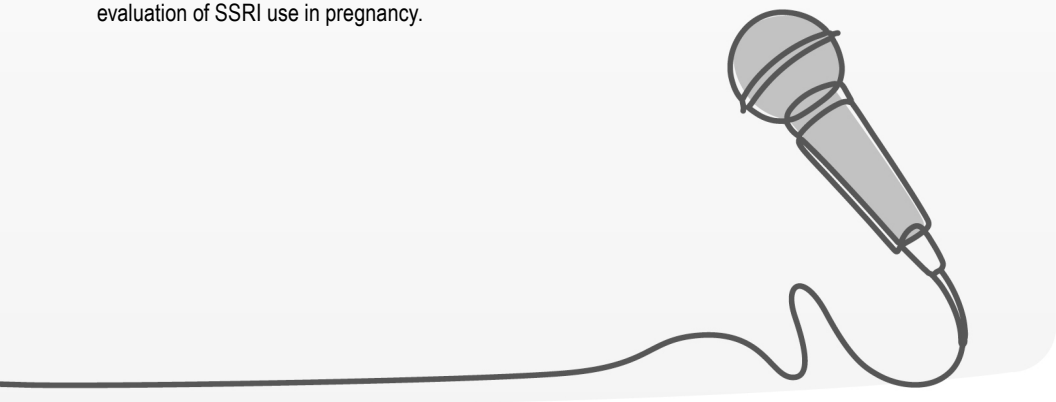
Significance: Despite these findings and the prevalent use of SSRIs in pregnancy, there are currently no consensus guidelines for monitoring for symptoms of PNAS or delivery room management of SSRI-exposed neonates.

Question: Does fetal exposure to SSRIs increase the need for neonatal resuscitation?

Experimental Design: A retrospective chart review of maternal-infant dyads was performed for infants born > 36 weeks gestation at three Omaha, Nebraska hospitals from February - April 2024. Data were extracted to determine in utero SSRI exposure and whether respiratory support – defined as the utilization of positive pressure ventilation (PPV) or continuous positive airway pressure (CPAP) – was initiated in the delivery room. Statistical analysis included chi-square test with appropriate corrections and risk ratio analysis.

Results: Of the 970 neonates, 93 (9.59%) were exposed to SSRI in utero. Overall, neonatal resuscitation occurred significantly more frequently in SSRI-exposed than non-exposed neonates (17.2% vs 6.3%, $p<0.001$). This association was consistent across all three hospitals, with statistically significant findings at each site. Resuscitation was 2.74 times more likely with in utero SSRI exposure (95% CI, 1.64-4.58). No significant difference was found in neonatal need for resuscitation based on specific SSRI exposure ($p=0.7$).

Conclusion: In utero SSRI exposure was associated with significantly greater risk of neonates needing delivery room resuscitation. While this correlation does not imply causation, it supports further investigation. Limitations include unmeasured confounders (e.g. medication exposures, environmental stressors). Despite limitations, the consistent increase in risk across hospitals for exposed neonates prompts consideration of delivery room preparedness for SSRI-exposed neonates and further evaluation of SSRI use in pregnancy.



Abstract 13

Bronchoalveolar Results in Young Children with Chronic Lung Symptoms: Lessons Learned from an Allergy–Pulmonology Project

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Background: Normative BAL cellularity data in children has not been updated in over 25 years. In young children, BAL may be the only objective tool for clinical decision making.

Significance: Eosinophils and neutrophils are essentially absent in normal children, yet their recovery in symptomatic children carries important diagnostic implications for asthma and bronchitis.

Hypothesis: Eosinophils and neutrophils are not expected in normal pediatric BAL, and their presence in symptomatic children should prompt further investigation regardless of pre-BAL diagnosis.

Experimental Design: IRB-approved retrospective review of 317 children ages 0–6 who underwent BAL (2020–2024) at an academic allergy–pulmonology division, stratified by operative day diagnosis. BAL cytology, culture, and LLM Index were analyzed.

Results: Eosinophils ≥1 were recovered in 20–28% of children across all diagnostic groups. Neutrophils >50% were found in ~47–55%. High colony counts co-occurred frequently with neutrophilia. Elevated LLM was more common in non-aspiration groups ($p=0.014$).

Conclusion: Neutrophilia and culture positivity were pervasive, suggesting protracted bacterial bronchitis. Eosinophilia in ~20–28% supports post-BAL asthma evaluation regardless of indication. LLM data did not confirm aspiration. BAL findings meaningfully direct post-procedure care.

Abstract 14

Severe congenital nemaline myopathy in a neonate due to a novel homozygous LMOD3 variant: A case report

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Nemaline myopathy is a heterogenous group of congenital myopathies caused by genetic variants encoding sarcomeric thin filament proteins. It is characterized by skeletal muscle weakness with accumulation of nemaline rods derived from Z-discs. Pathogenic variants in LMOD3, encoding leiomodin-3 at chromosome 3p14.1, disrupt actin filament assembly and are associated with a severe autosomal recessive neonatal phenotype (NEM type 10). Neonates with this phenotype typically present with profound hypotonia and early respiratory failure with high infant mortality.

We report a patient with a novel, bi-parentally inherited homozygous pathogenic frameshift LMOD3 gene sequence variant: c.712C>T (p.Q238*) with profound hypotonia and acute respiratory failure. The proband was a male neonate born at 36 weeks to consanguineous parents (fourth-degree relatives). Pregnancy was complicated by limited fetal movement, polyhydramnios, and prenatal ultrasound concerning for arthrogryposis. At the time of consultation, exam was notable for severe hypotonia, diffuse joint contractures, absent deep tendon, Moro, and grasp reflexes, minimal spontaneous movement, respiratory failure requiring ventilator support, cryptorchidism, and dysmorphic craniofacial features. Cardiac, ophthalmologic, and metabolic evaluations were largely unremarkable. EEG demonstrated diffuse encephalopathy. Brain MRI revealed multiple subacute infarcts and scattered subarachnoid hemorrhage, likely perinatal and atypical for NEM type 10, which typically presents without intracranial abnormalities.

The diagnosis of NEM type 10 accounts for the constellation of findings in the proband, who harbors a homozygous novel truncating pathogenic LMOD3 variant, indicating a loss-of-function mechanism disrupting sarcomere assembly. Unfortunately, the patient's clinical course was complicated by severe infections, including MSSA bacteremia and polymicrobial pneumonia. In light of receiving the diagnosis and multidisciplinary input, care was transitioned to comfort measures. The patient died at one month of age.

This report describes a severe neonatal presentation of a rare LMOD3-related nemaline myopathy due to a novel, previously unreported variant. While primarily a skeletal muscle disorder, additional neurologic and systemic findings may complicate the evaluation. This report expands the clinical and genetic spectrum of LMOD3-related disease and underscores the importance of timely genetic diagnosis for guiding management for critically ill neonates, with the ultimate goal to optimize medical decision making while supporting parental autonomy.

Abstract 15

CCL21 Therapy in Conjunction with Metronomic, Low-Dose Cyclophosphamide Generates Superior Responses Against Neuroblastoma In Vivo

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Background: High-risk neuroblastoma is a pediatric malignancy that employs immune evasion strategies: down regulation of MHC class I molecules on the tumor cells, infiltration of the tumor with regulatory T (Treg) cells, and release of immunosuppressive cytokines that impair dendritic cell (DC) antigen presentation, promote cytotoxic T cell exhaustion, and prevent effective CD4+ TH1 immunity. Successful immunotherapies for high-risk neuroblastoma must reverse this suppressive phenotype. In preclinical models of other cancers, chemokine CCL21 therapy promoted CD8+ and CD4+ T cell infiltration and CD11c+ DC infiltration, limiting tumor growth. Cyclophosphamide (CPX) is a standard chemotherapy for neuroblastoma, and our rationale behind combining CCL21 therapy with CPX is that immunomodulatory effects of CPX (observed in other cancers) include triggering immunogenic cell death, promoting DC antigen presentation, and selectively depleting Tregs.

Significance: High-risk neuroblastoma has a poor prognosis, with the 5-year survival rate for high-risk neuroblastoma at a mere 46%, and so there is a clear and present need to develop superior treatment modalities for it.

Hypothesis: Our central hypothesis is that CCL21 will be an effective therapeutic approach for neuroblastoma in combination with low-dose, metronomic delivery of CPX.

Experimental Design: To test the therapeutic and immunological effects of CCL21 + mCPX treatment, we used a syngeneic A/J mouse model whereby Neuro2a neuroblastoma cells were subcutaneously implanted into the left flank and intratumoral CCL21 and intraperitoneal mCPX were administered upon palpable tumor formation. Tumor volume was measured via caliper measurements until tumors reached 1000 mm3 or until significant signs of morbidity were present. Tumor and spleen were excised for subsequent immunological studies of the tumor microenvironment, cytokine profiling, and co-co-culture studies of splenocytes with Neuro2a cells to assess for evidence of systemic T cell activation post-treatment.

Results: Herein, we show that CCL21 therapy plus metronomic low-dose cyclophosphamide (mCPX) chemotherapy generates superior therapeutic efficacy in a syngeneic, immunocompetent murine model of neuroblastoma relative to CCL21 or mCPX alone. Subsequent immunological studies demonstrate the ability of CCL21 + mCPX or CCL21 alone to restructure the cytokine milieu to reduce the abundance of cytokines implicated in M2-like macrophage and myeloid-derived suppressor cell infiltration such as CXCL1, CCL11, CCL17, TREM-1 and IL-1a. Moreover, both CCL21 + mCPX and CCL21 alone were able to increase anti-tumoral cytokines associated with CD8+ T cell and NK cell infiltration and activity such as CCL4, CXCL13, IL-2, IL-16, and IL-27. Co-culture ELISpot studies indicate that both mCPX alone and CCL21 + mCPX generate systemic T cell responses against Neuro2a neuroblastoma in vivo. Flow cytometric studies of the tumor microenvironment demonstrated that CCL21 alone promoted infiltration of CD4+ and CD8+ T cells, NK and NK T cells, and reduced infiltration of immune suppressive M2-like macrophages relative to mCPX and CCL21 + mCPX, suggesting that the superior therapeutic efficacy of CCL21 + mCPX is both due to tumor cell intrinsic effects and the influx of anti-tumor immune cells.

Conclusion: Our studies suggest that CCL21 + mCPX is a potential therapeutic regimen that could be used to generate superior therapeutic responses with reduced toxicity for neuroblastoma treatment. Moreover, this novel treatment regimen possesses the capability to generate anti-tumor immune responses in a poorly immunogenic tumor type such as neuroblastoma.

Abstract 16

Navigating the Pediatric to Adult Care Transition in Patients with Complex Airways - A Case Report

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Background: Advancements in medicine, technology, and care coordination have increased survival in pediatric patients with complex airways. Consequently, more complex pediatric patients are transitioning into adult care. Children with complex airways often do not experience a successful transition, as their condition exhibits high variability dependent on patient characteristics and past medical and surgical history.

Significance: Failure of care transition and limited understanding of the adult healthcare system leads to traditional healthcare safety nets, such as the emergency department (ED), to become de facto points of care. For complex airway patients, minor issues can rapidly escalate, prompting frequent ED visits.

Hypothesis: Patients with complex airways who transition from pediatric to adult care experience high rates of ED utilization due to gaps in continuity and care coordination.

Experimental Design: We report the case of a 38-year-old female with a complex airway. A retrospective single-institution chart review from November 20, 2023, to November 20, 2025, was conducted to identify ED touchpoints and primary visit diagnoses. Individualized interventions aimed at reducing ED utilization were also documented.

Results: Over the study period, the patient presented to the ED 53 times. The most common primary visit diagnoses were chest pain (n = 12, 22.6%), headache/migraine (n = 12, 22.6%), allergic reaction (n = 9, 17.0%), abdominal pain (n = 8, 15.1%), shortness of breath (n = 6, 11.3%), and anxiety (n = 3, 5.7%). Interventions included targeted referrals, care coordination, and consideration of adult case management.

Conclusion: Transitions from pediatric to adult care for high-risk patient populations are often abrupt and fragmented, lacking the continuity of care and care coordination present in pediatric care. This results in frequent ED utilization. As survival into adult care becomes increasingly prevalent, acknowledgement of gaps in the care continuum is necessary. This case highlights the necessity of targeted interventions, individualized considerations, and a multidisciplinary approach to ensure smooth transition of care and successful navigation of adult healthcare systems.

Abstract 17

Adverse Perinatal Effects of "Borderline" Gestational Diabetes Mellitus

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Background: Current recommended screening for gestational diabetes mellitus (GDM) in the United States is a 50g 1-hour non-fasting glucose test (1-GTT) between 24 and 28 weeks of gestation. If the 1-GTT is abnormal, then a 100g 3-hour fasting glucose test (3-GTT) is used for diagnosis. Under current guidelines, only women with at least two abnormal glucose values on the 3-GTT are diagnosed with GDM. Those with a single abnormal glucose value on the 3-GTT have recently been labeled as having "borderline" GDM.

Significance: GDM can result in significant adverse effects in offspring. Patients with borderline GDM have shown higher rates of adverse pregnancy outcomes such as pre-eclampsia, but little is known about the resulting neonatal outcomes.

Hypothesis: We hypothesized that patients with borderline GDM have higher rates of adverse pregnancy outcomes when compared to healthy controls, similar to those patients with a formal diagnosis of GDM.

Experimental Design: This was a retrospective study of patients who delivered at the University of Nebraska Medical Center (UNMC) between January 2015 and January 2025. For patients with multiple deliveries during the study period, only the first delivery was included. Demographics and outcomes were compared between patients with a single abnormal glucose value during the 3-GTT, patients with 2 or more abnormal glucose values on the 3-GTT (formal diagnosis of GDM), and a normal 1-GTT (healthy controls). Variables with statistical significance ($p<0.05$) in the univariable analysis were entered into a multivariable logistic regression model.

Results: A total of 9,103 patients were included. Maternal age, body mass index (BMI), pre-eclampsia, and cesarean section delivery were significantly higher in the borderline GDM and GDM groups (each $p<0.001$). Neonates born to borderline and GDM mothers had significantly higher rates of positive pressure ventilation both in the delivery room and in the newborn intensive care unit (NICU), need for NICU admission, hypoglycemia (defined as <45 mg/dL in the first 24 hours), large for gestational age (LGA) status, and need for phototherapy when compared with the control group. LGA status remained significantly more common among children of women with borderline GDM when compared to controls after multivariable adjustment (aOR 1.64 95% CI 1.27-2.11).

Conclusion: In unadjusted analyses in our cohort, pregnancies complicated by borderline GDM more closely resembled those with a formal GDM diagnosis than control pregnancies. Additional research should examine whether interventions during pregnancy could improve outcomes in patients with borderline GDM.

Abstract 18

Retrospective Review of Activity and Outcomes of the CUMC Bergan Mercy Perinatal Palliative Care Team

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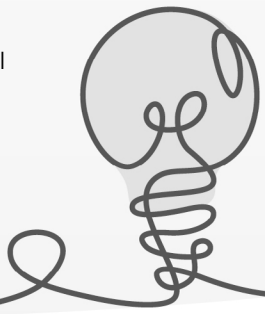
Background and Significance: Advances in prenatal diagnostics have allowed for the identification of life-limiting fetal diagnoses during pregnancy. Following such diagnoses, parents are typically referred to a perinatal palliative care team to maximize quality of life and comfort. However, perinatal palliative care can be inconsistently offered. This study conducted a retrospective chart review to analyze the maternal demographics, fetal diagnoses, and neonatal outcomes of patients referred to the perinatal palliative care team at CUMC Bergan. Analysis of maternal demographics could identify populations at higher risk, while analysis of neonatal outcomes would allow for more accurate prognoses.

Experimental Design: This study was a single-center, retrospective chart review conducted at CUMC Bergan Mercy. Data were collected from patient electronic medical records (EMRs). Inclusion criteria consisted of: (1) mothers of fetuses diagnosed with congenital diagnoses deemed incompatible with life; (2) mothers referred to perinatal palliative care team at CUMC Bergan Mercy between January 1, 2021, and December 31, 2024; and (3) infants born to such mothers.

A standardized data abstraction form was developed in Microsoft Excel to ensure consistent data collection. The following data points were abstracted from the EMRs: maternal age at birth, maternal race/ethnicity, maternal marital status, fetal diagnosis, gestational age at fetal diagnosis, gestational age at first palliative care team consult, total number of palliative team consults, status at delivery (alive or stillborn), NICU admission if delivered alive, and age at death.

Data and Results: Maternal demographics consisted of predominantly white and Hispanic mothers, with an average age at birth of 27 and no statistical significance between marital statuses. Most pregnancies (77%) resulted in a live birth, and most live births (71%) were admitted to the NICU. Of the neonates born alive with known ages of death, the median length of survival was 2 hours with a range of 1 hour to 14 days. On average, the palliative care team was first consulted at 26w2d gestational age, or 6w4d after the average gestational age of fetal diagnosis. Palliative consults for Trisomy 18 occurred earlier, at an average of 221w1d gestation. The team was consulted an average of 2.7 times per pregnancy.

Conclusion: Due to the relatively rare incidence of neonates born with life-limiting congenital anomalies, there were not enough data points to establish statistical significance of neonatal outcomes between diagnostic categories. Furthermore, since the data concerning maternal demographics likely reflect the general obstetrics population at CUMC Bergan Mercy, there was not an increased risk associated with any maternal population.



Abstract 19

Short-term Effects of Transcatheter Ductal Occlusion in Preterm Infants

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Background: Patent ductus arteriosus (PDA) can cause excess pulmonary blood flow and reduced systemic perfusion in preterm infants. Although the value of PDA closure in this population is hotly debated, transcatheter occlusion (device placement via catheterization) has emerged as the preferred method. Procedural safety is established, but data on efficacy and outcomes remain limited, leaving clinicians without clear guidance on which infants are most likely to benefit.

Significance: Preterm infants face high morbidity and mortality. PDA is associated with adverse outcomes. No study to date has evaluated whether transcatheter occlusion reduces these risks. Identifying which infants derive the greatest benefit from transcatheter PDA closure is critical for optimizing intervention timing and guiding individualized neonatal intensive care unit (NICU) management.

Hypothesis: Transcatheter PDA occlusion improves early respiratory outcomes, and pre-procedural clinical and echocardiographic factors predict the likelihood of respiratory improvement.

Experimental Design: Single-center retrospective cohort study of preterm infants (<37 weeks) who underwent transcatheter PDA occlusion at Children's Nebraska from 2015-2025. Infants with unsuccessful device placement or significant structural cardiac abnormalities were excluded. Infants were stratified by respiratory improvement, defined as the ability to wean to a lower level of respiratory support within 28 days post-procedure. Mixed-effects models compared trajectories of post-procedure fraction of inspired oxygen (FiO2) and peak inspiratory pressure (PIP) between groups.

Results: Ninety-three infants met inclusion criteria; 54 (58%) demonstrated respiratory improvement. Baseline demographics were similar between groups. Infants with improvement were more likely to have left atrial enlargement (p=0.0094), higher ductal shunt velocity (2.95±1.22 vs 2.44±0.95 m/s, p=0.042), greater left ventricular end-diastolic dimension z-scores (1.97±1.61 vs 0.75±1.55, p<0.001), and less bidirectional flow (1.9% vs 17.9%, p=0.009) on pre-procedural echocardiography. Pre-procedural respiratory support was lower in the improvement group: mean FiO2 28.0±6.6% vs 41.1±17.0% and mean PIP 22.8±7.0 vs 30.1±7.3 cmH2O. Differences persisted at 1 week (FiO2 32.1±8.6% vs 50.4±19.8%; PIP 22.8±5.8 vs 29.5±7.1 cmH2O) and 4 weeks (FiO2 26.1±5.7% vs 44.3±19.4%; PIP 20.1±7.1 vs 32.3±10.2 cmH2O).

Conclusion: Preterm infants with pre-procedure echocardiographic evidence of volume overload were more likely to experience respiratory improvement following transcatheter PDA occlusion. In contrast, infants with bidirectional shunting or severe baseline markers of lung disease derive less clear short-term benefit. These findings support an individualized, physiology-based approach to PDA closure in the NICU. Future studies should focus on predictive models integrating clinical and echocardiographic variables to guide individualized treatment.

Abstract 20

Real World Evaluation of CFTR Modulators on Long-Term Outcomes in Pediatric Patients with Cystic Fibrosis: A Retrospective Cohort Study

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Background: Cystic fibrosis (CF) is an autosomal recessive disorder caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene, resulting in impaired ion transport and the production of thick, viscous secretions that obstruct organ function. CFTR modulators represent a major therapeutic advancement in the treatment of CF, as they directly target the underlying defect and restore CFTR function across multiple organ systems.

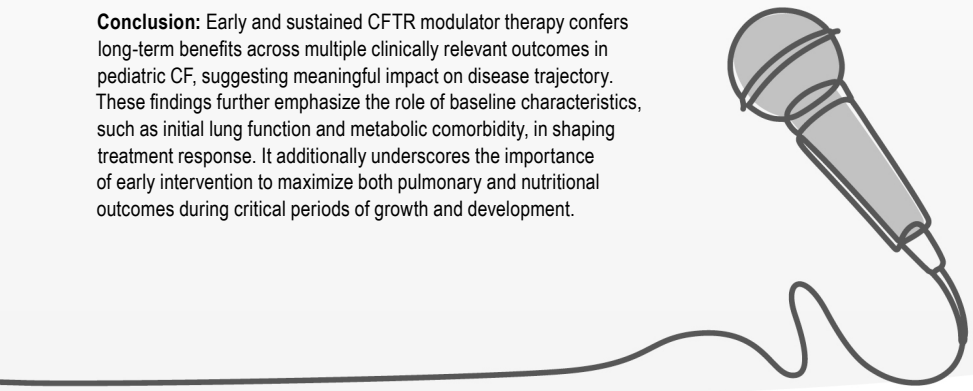
Significance of the Problem: Although clinical trials have consistently demonstrated short-term pulmonary benefits, long-term real-world outcomes following early initiation in children remain limited, particularly regarding sustained pulmonary and systemic effects. Addressing this gap is essential to guide clinical decision-making and optimize timing of intervention during critical developmental periods.

Question: Can early CFTR modulator use modify disease progression and preserve pulmonary and systemic organ function in pediatric patients with CF?

Experimental Design: A retrospective cohort study was conducted at a single tertiary pediatric center that included individuals aged 4-21 years with CF who initiated CFTR modulator therapy between January 2016 and April 2025. Electronic health record data were analyzed from one year prior to CFTR modulator initiation through eight years of follow-up. The primary outcome was mean percent predicted forced expiratory volume in one second (ppFEV1). Additional clinical variables were compared pre- and post-initiation of CFTR modulator therapy to evaluate longitudinal changes and associations with pulmonary function. Linear mixed-effects models were used to evaluate longitudinal changes and identify baseline modifiers of treatment response.

Results: A total of 109 patients (61% male, 57% homozygous F508del) contributed 2,131 FEV1 measurements. Following initiation of CFTR modulators, mean ppFEV1 increased by 1.69% per year (95% CI, 1.21-2.20; $p<0.0001$), corresponding to a cumulative improvement of 13.52% over eight years. Baseline ppFEV1 and CF-related diabetes (CFRD) significantly modified pulmonary trajectories ($p = 0.001$ and $p = 0.041$, respectively), with lower baseline ppFEV1 associated with greater improvement and CFRD associated with persistently lower ppFEV1. Body mass index (BMI) z-scores increased significantly following treatment initiation (0.056/year, $p = 0.002$), demonstrating a nonlinear pattern with early improvement followed by plateau.

Conclusion: Early and sustained CFTR modulator therapy confers long-term benefits across multiple clinically relevant outcomes in pediatric CF, suggesting meaningful impact on disease trajectory. These findings further emphasize the role of baseline characteristics, such as initial lung function and metabolic comorbidity, in shaping treatment response. It additionally underscores the importance of early intervention to maximize both pulmonary and nutritional outcomes during critical periods of growth and development.



Abstract 21

Impact of Directly Measured Oxygen Consumption (VO2) on Surgical Decision Making in Congenital Heart Disease

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Background: Pulmonary vascular resistance (PVR) is the resistance of blood flow through the pulmonary vascular bed and serves as a critical marker for disease progression and clinical management in pediatric patients with several congenital heart lesions. Children with single-ventricle physiology rely on accurate measurement of PVR for risk stratification and to guide surgical decision making in staged palliation. Elevated PVR may preclude surgical candidacy for procedures that are dependent on passive pulmonary blood flow without a subpulmonic ventricle. PVR is calculated using Ohm's law, where pulmonary blood flow (Qp) is derived from oxygen consumption (VO_2). VO_2 can be directly measured or estimated.

Significance: Historically, VO_2 measurement by indirect calorimetry was time-consuming and technically challenging, while predictive VO_2 equations offer convenience but demonstrate poor validity and wide bias in congenital heart disease populations.

Hypothesis: Equations for estimating VO_2 are not reliable when compared to direct VO_2 measurement, potentially leading to clinically meaningful misclassification of surgical risk in patients being evaluated for cavopulmonary anastomosis procedures.

Experimental Design: Children undergoing cardiac catheterization with hemodynamic assessment were prospectively enrolled. The GE CARESCAPE E-sCAiOVX miniature metabolic monitoring platform continuously measured VO_2 via in-line gas sampling. Measurements were taken during steady state (≤ ±5% variability over five minutes), on stable FiO_2, and before the procedure. Predictive VO_2 equations included: Seckeler, Lundell, Wessel, and LaFarge. Systemic (Qs) and pulmonary (Qp) flows were calculated by the Fick equation. PVRi was then derived using Ohm's law.

Results: Between July 30th and December 30th, 2025, 85 patients (40 male, 45 female) were analyzed (mean age 6.3 years, mean weight 24.9 kg, mean BSA 0.83 m²). 16 were critically ill (ICU/CICU status prior to OR). Bland-Altman plots and intraclass correlation coefficients compared measured and predicted VO_2. Mean VO_2 differences were: Seckeler 4.64, Lundell -1.46, Wessel 3.33, LaFarge -17.33. ICCs demonstrated poor reliability: Seckeler 0.42, Lundell 0.08, Wessel 0.16, LaFarge 0.41.

Conclusion: Preliminary data revealed that none of the 4 predictive equations are reliable in terms of VO_2 estimation. The Seckeler and Wessel equations are shown to overestimate VO_2 while the Lundell and LaFarge equation underestimates VO_2. Discrepancies in PVRi values show a misclassification rate of 0.0117 (1/85) but an average difference between measured and estimated PVRi (calculated using the Seckeler equation) of 0.56 in cases with PCRi >3.

Abstract 22

The Ratio of Dietary Sodium-to-Potassium Intake is Associated with Gestational Hypertension

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Background: Sodium (Na) and potassium (K) intake are established contributors to blood pressure (BP) regulation in non-pregnant populations, with excess Na linked to hypertension (HTN) risk. Emerging evidence suggests the dietary Na-to-K (Na/K) ratio may better predict BP than either electrolyte alone. While these relationships are characterized in chronic HTN, their role in hypertensive disorders of pregnancy (HDP) remains unclear.

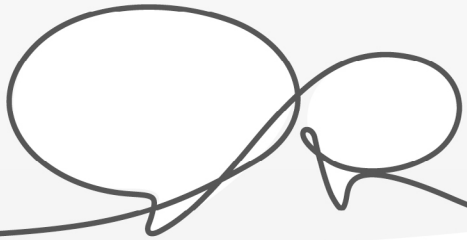
Significance: Evidence on Na, K, and their ratio in HDP is limited, highlighting a critical gap in understanding modifiable dietary risk factors.

Hypothesis: We hypothesized Na/K intake would be associated with new-onset HDP, including gestational hypertension (GH) and preeclampsia (PE), and that models incorporating both Na and K would better predict HDP than single-nutrient models.

Experimental Design: This retrospective cohort study included data previously collected under an IRB approved protocol. Patients ≥19 years old who delivered at least one live infant at Nebraska Medicine were eligible to participate. Dietary intake was assessed with the Harvard Food Frequency Questionnaire (FFQ). Daily intake of Na, K, and Na/K ratio were computed. Linear and multinomial logistic regression models were used to evaluate associations between Na, K, and Na/K intake ratio and HDP, BP, and Na–K interaction dynamics ($p<0.05$ was considered significant).

Results: Among 436 participants, 290 were normotensive (NT), 101 had GH, and 45 had PE. Median Na, K, and the ratio of Na/K intake did not differ between HDP groups, although >40% of participants did not meet intake recommendations. Na and K intake were positively correlated across groups; however, the slope was steeper in NT compared to GH and PE, suggesting altered K-to-Na scaling in HDP. In adjusted multinomial models, higher Na/K ratio was associated with GH (RRR 2.50, $p=0.047$, 95% CI 1.01–6.26) but not PE. No significant associations were observed in single-nutrient models. In multi-nutrient models, higher Na trended toward increased risk, while higher K trended toward decreased risk for both GH and PE. Na and K were positively associated with systolic BP in independent models, but only Na retained a positive trend when modeled jointly.

Conclusions: Higher Na/K ratio was associated with GH but not PE, highlighting the importance of electrolyte balance. These findings support distinct pathophysiologic mechanisms between GH and PE and suggest that dietary Na reduction and K optimization may be a low-risk strategy for GH prevention. Mechanistic studies may elucidate the roles of salt-sensitivity and the renal potassium switch in GH. Validation of findings in larger cohort studies may support clinical recommendations.



Abstract 23

Development and Early Outcomes of The UNMC LEAP for Medical School Program

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[2]Middle Tennessee State University, LEAP Scholar
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Background – The UNMC Long-term Enhanced Advising and Preparation (LEAP) for Medical School program was developed to provide sustained advising and mentorship for students following participation in the UNMC Summer Health Professions Education Program (SHPEP), a six-week academic enrichment program for first- and second-year undergraduate students who are first-generation and/or from underserved communities. While SHPEP provides foundational exposure to health careers, many participants lack the sustained mentorship and guidance needed to navigate the medical school application process after completing the program.

Significance – Limited access to structured, ongoing advising contributes to persistent barriers for students underrepresented in medicine pursuing medical careers. Longitudinal, near-peer advising programs may improve preparedness, confidence, and application success, supporting efforts to strengthen and diversify Nebraska's future physician workforce.

Problem/Question – What are the development, implementation processes, and early outcomes of the UNMC LEAP program, a medical student-led advising initiative designed to support premedical students from underrepresented backgrounds?

Methods – Initiated in 2021, LEAP is led by medical student coordinators with faculty mentorship and undergraduate liaisons from past SHPEP cohorts. Programming evolved from quarterly to monthly virtual sessions covering MCAT preparation, application strategies, professional development, and wellness. Sessions include large-group presentations and a small-group advising portion led by medical students, with expanded interactive workshops for select topics (e.g., interview practice, personal statement development). Program evaluation includes post-session surveys assessing perceived usefulness and engagement, along with review of participation trends and learner feedback. Given the longitudinal nature of the medical school application process and frequent gap years, evaluation has focused on early indicators of engagement rather than matriculation outcomes.

Results – Since its inception, LEAP has expanded in frequency, content, and learner engagement. Survey feedback indicates that participants perceive sessions as helpful and appropriately detailed. Response rates to post-session surveys, however, remain low. Additionally, recurring requests for previously covered topics suggest opportunities to improve content accessibility and retention despite the availability of recorded sessions. Overall, 10 sessions are delivered each school year between July and April. About 20 students consistently register for sessions each month, and all respondents reported sessions as helpful.

Conclusion – The UNMC LEAP program demonstrates the feasibility of a student-led, longitudinal advising model to support premedical students from underrepresented backgrounds. Early findings highlight strengths in program growth and perceived usefulness as well as opportunities to enhance engagement, feedback collection, and access to resources. Ongoing efforts will focus on optimizing program delivery and evaluating longer-term outcomes, including medical school matriculation success.

Abstract 24

Time to Surfactant and Short-Term Outcomes on Oxygen Demands in Infants with Respiratory Distress Syndrome

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[1]Creighton University School of Medicine, Department of Pediatrics

Background: Preterm infants are at high risk for respiratory distress syndrome (RDS) due to surfactant protein deficiency. Exogenous surfactant therapy combined with positive airway pressure (CPAP) or mechanical ventilation remains the standard of care. For infants supported on CPAP, multiple international guidelines for surfactant administration primarily focus on a fraction of inspired oxygen (FiO_2) threshold, rather than age (in hours), for exogenous surfactant administration. While some guidelines suggest surfactant administration within two hours of birth, the effect of time to surfactant administration on short-term outcomes such as duration of respiratory support, need for mechanical ventilation, and length of stay—remain unclear.

Question: To determine the impact of time from birth to surfactant administration in spontaneously breathing infants supported on CPAP on short term respiratory outcomes including duration of CPAP support, time from surfactant administration to 21% FiO2, and subsequent need for intubation within 72 hours of surfactant administration.

Experimental Design: Retrospective chart review of 450 infants born at CHI Health Bergan Mercy from July 2020 – June 2025. Infants were included if they were supported with CPAP or another form of non-invasive positive pressure modality at the time of surfactant administration. Exclusion criteria were infants receiving mechanical ventilation at time of surfactant administration and those with congenital anomalies. Patient demographics and short-term respiratory outcomes were collected, and regression analyses were performed.

Results: Of the 450 infants, eighty-four met inclusion criteria. Neither time to surfactant administration nor FiO2 at time of administration resulted in a significant difference in duration of respiratory support (P=0.38) or subsequent need for mechanical ventilation (P=0.34). However, both longer time to surfactant administration (P<0.001) and higher FiO2 at time of administration (P=0.004) resulted in significantly longer time to reach 21% FiO2. In a sub-group analysis of infants born at 30-31 weeks' gestation, time to surfactant administration and FiO2 at time of administration still did not significantly impact duration of respiratory support (P=0.43, P=0.98) or length of stay (P=0.39, P=0.67).

Conclusion: In infants supported on CPAP with RDS, time to surfactant administration and FiO2 at time of administration did not significantly impact duration of respiratory support or subsequent need for mechanical ventilation but did result in a significantly longer time to wean to 21% FiO2. Results may support more liberal thresholds for surfactant administration.

Abstract 25

Initial NICU Temperatures of Premature Infants Based on Gestational Age and Birth Weight

Kealy Johnson, BS[1], Terence Zach, MD[1]
[1]Creighton University School of Medicine, Department of Pediatrics

Background: Hypothermia in infants, defined by the WHO as less than 36.5°C, is a concern due to its association with short-term and long-term outcomes, most significantly mortality, neurological injury, retinopathy of prematurity, necrotizing enterocolitis, and bronchopulmonary dysplasia. Infants do not have a shivering mechanism and instead break down brown fat to generate local heat. This process has significant oxygen needs and when infants do not have sufficient respiratory efforts, blood supply is directed towards brown fat and diverts away from other essential tissues leading to hypoxia.

Significance: Since preterm and low birth weight infants are especially at risk for hypothermia related negative outcomes, due to their developmental stage, it is important to stabilize their temperature by the time they are admitted to the NICU. Current practices include immediately drying and swaddling infants after birth or placing them in a polyethylene bag to induce humidity within the bag. Identifying the temperature of premature infants upon arrival to the Creighton University Medical Center – Bergan Mercy NICU can aid in evaluating efficacy of warming techniques.

Question: Is there a significant relationship between initial temperature taken in the NICU and gestational age, as well as birth weight?

Experimental Design: Retrospective study including CUMC – Bergan Mercy NICU. Participants included 199 infants born between July 1st, 2023, and February 28th, 2025, at 34 weeks' gestation or less. These infants were identified using EPIC and the NICU logbook. 10 infants met exclusion criteria by either being deceased or having been admitted to other NICUs prior to CUMC – Bergan Mercy. Independent variables are gestational age and birth weight. Dependent variable is initial temperature taken in the NICU. Regression analysis was done to evaluate significance.

Results: Mean temperature was between 36.6°C and 37°C. 24.9% of the 189 infants were initially hypothermic in the NICU, but less than 1% of these infants were moderately hypothermic. Gestational age ($R^2=0.0017$) and birth weight ($R^2=0.0219$) were not significantly associated with the initial NICU temperature.

Conclusion: There were no significant relationships between gestational age or birth weight and initial temperature taken in the NICU. Any infants who were hypothermic upon arrival to the NICU appear to be outliers and do not follow a trend. These findings support that current practices at CUMC – Bergan Mercy are effective in ensuring that premature infant's temperatures are stabilized.

Abstract 26

Initial NICU Temperatures of Premature Infants Based on Method of Delivery and Sex

Kealy Johnson, BS[1], Terence Zach, MD[1]
[1]Creighton University School of Medicine, Department of Pediatrics

Background: Hypothermia in infants is a concern due to its association with short-term and long-term outcomes, such as mortality, neurological injury, retinopathy of prematurity, necrotizing enterocolitis and bronchopulmonary dysplasia. Heat loss after birth can be due to being born in a cool environment or being placed on a cool surface, making cesarean section (C-section) births a risk factor for hypothermia.

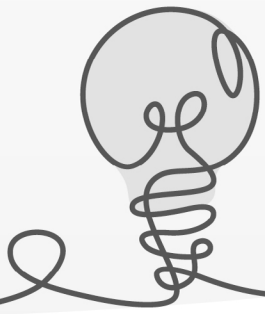
Significance: Since C-sections are a risk factor for hypothermia, it is important for delivery centers to emphasize infant temperature control prior to arrival to the NICU. Current practices include immediately warming infants after birth and keeping C-section rooms warmer. In addition, there is little evidence evaluating the effect of sex on initial temperature. Identifying the temperature of infants upon arrival to the CUMC – Bergan Mercy NICU can aid in evaluating efficacy of warming techniques.

Question: Is there a significant relationship between initial temperature taken in the NICU and method of delivery, as well as sex?

Experimental Design: Retrospective study including CUMC – Bergan Mercy NICU. Participants included 199 infants born between July 1st, 2023, and February 28th, 2025, at 34 weeks' gestation or less. These infants were identified using EPIC and the NICU logbook. 10 infants met exclusion criteria by either being deceased or having been admitted to other NICUs prior to CUMC – Bergan Mercy. Independent variables are method of delivery (vaginal delivery or C-section) and sex (male or female). Dependent variable is initial temperature taken in the NICU. ANOVA was done to compare the means of each group.

Results: 23.4% of infants born by C-section were initially hypothermic, with less than 1% of these infants who were moderately hypothermic. 27.7% of infants born by vaginal delivery were initially hypothermic, and none of these infants were moderately hypothermic. 21.1% of male infants were initially hypothermic, with 1.1% who were moderately hypothermic. 27.7% of female infants were initially hypothermic, and none of these infants were moderately hypothermic. Method of delivery ($p=0.53$) and sex of the infant ($p=0.62$) were not significantly associated with the initial temperature taken in the NICU.

Conclusion: Neither method of delivery nor sex was significantly related to the initial temperature taken in the NICU. These findings suggest that at CUMC - Bergan-Mercy, infants born via C-section are not at higher risk for hypothermia suggesting well controlled operating room temperatures, and sufficient warming methods.



Abstract 27

Flupirtine Derivative AVC-104 Protects Against Apoptosis in a Model of Neonatal Hypoxic-Ischemic Brain Injury

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[2]Child Health Research Institute
[3]Pharmaceutical Sciences, University of Nebraska Medical Center
[4]Children's Nebraska

Background: Neonatal hypoxic-ischemic encephalopathy is the clinical diagnosis of hypoxic-ischemic brain injury (HIBI), a serious neurological injury resulting from insufficient blood flow to the brain around the time of birth. Therapeutic hypothermia is the standard of care for term infants with HIBI in high resource settings and improves both mortality and morbidity. Flupirtine was a promising neuroprotective molecule but produced toxic metabolites in some patients. Our collaborators have worked to synthesize derivative molecules that are incapable of forming the metabolite but maintain their anti-apoptotic properties in models of other neurological pathologies.

Significance: Up to 26/1000 babies suffer globally from neonatal encephalopathy. No pharmaceutical therapy has yet proven neuroprotective for the more than one million infants suffering each year from HIBI. Even with therapeutic hypothermia, nearly half of affected babies die or experience severe disability. Additionally, many infants are not candidates for therapeutic hypothermia as it has not proven to decrease death or disability for infants in low- and middle-income countries. Thus, HIBI therapies that provide neuroprotection independently from hypothermia are also desperately needed.

Hypothesis: The flupirtine derivative AVC-104 protects against apoptosis in Neuro2a cells after oxygen-glucose deprivation (OGD).

Experimental Design: Using a well-validated OGD model of moderate-severe HIBI, Neuro2a cells were placed in a hypoxia chamber that was flushed with nitrogen for 10 minutes and remained in hypoxia and glucose-free media for 3 hours. AVC-104 was administered immediately at the conclusion of OGD at concentrations ranging from 25nM to 3μM and re-administered at 24 hours. Cell viability was measured via alamarBlue at 24 and 48 hours and apoptosis was assessed via Annexin V staining.

Results: At 24 hours after OGD, AVC-104 at 25 nM, 100 nM, 1 μM, and 3 μM improved cell viability by 15-27% ($p<0.05$) compared to vehicle (DMSO)-treated OGD controls. At 48 hours after OGD, AVC-104 treatment resulted in 14-19% improvements in cell viability ($p<0.05$). Reduced apoptosis was demonstrated by lower Annexin V staining positivity and cell morphology more consistent with phenotypic baseline in treated cells compared to vehicle controls.

Conclusion: AVC-104 is a promising potential therapeutic agent for HIBI, resulting in significant improvement in cell viability in an in vitro model. Future studies will focus on elucidating specific mechanisms and establishing the efficacy in multicellular and in vivo models.

Abstract 28

The Impact of Intraoperative Intercostal Liposomal Bupivacaine for Regional Anesthesia during Minimally Invasive Repair of Pectus Excavatum on Postoperative Milligram Morphine Milliequivalents received and Length of Stay

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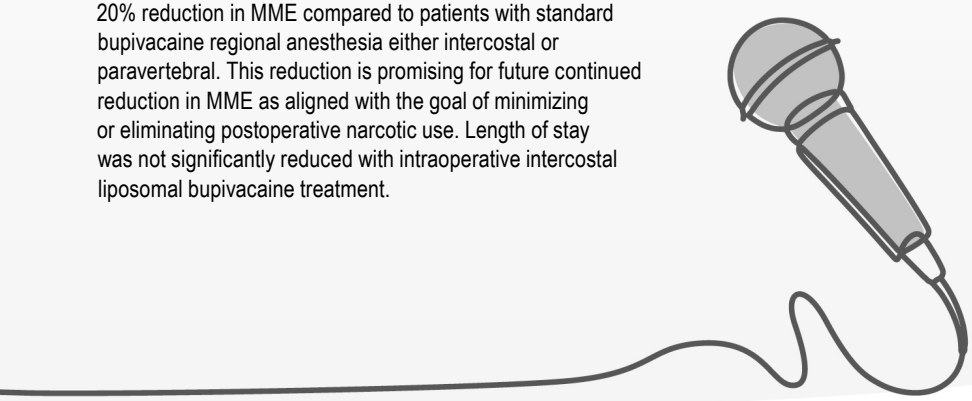
Introduction: Pectus Excavatum (PE) is a chest wall deformity in which the sternum is sunken into the chest cavity and is the most common chest wall deformity in children. Minimally invasive repair of pectus excavatum (MIRPE) is the gold standard for treatment of pectus excavatum. There is a need to optimize postoperative pain management and reduce postoperative length of stay (LOS) with this historically painful procedure. We began to utilize liposomal bupivacaine for intercostal nerve blocks during MIRPE about 1 year ago. The aim of this study is to determine the impact on narcotic use, measured as Milligram Morphine Equivalents (MME) received postoperatively and LOS when utilizing liposomal bupivacaine for intraoperative regional anesthesia. This is part of a larger program to minimize or eventually eliminate narcotic use in MIRPE.

Methods: We reviewed three groups over 4 years: 57 historical controls utilizing intercostal cryoablation and multimodal pain control regimens including paravertebral blocks, Toradol, and gabapentin, 35 patients with intraoperative intercostal bupivacaine blocks, and 10 Patients with intraoperative intercostal liposomal bupivacaine blocks. LOS and MME received postoperatively were compared among groups. Data was stratified for age, sex, Haller index, and number of bars placed operatively to identify potential confounding variables.

Results: Patients who received intraoperative regional anesthesia with liposomal bupivacaine showed a 20.4% reduction in MME compared to patients who did not receive this treatment. Average LOS in this group was reduced by 0.08 days for a 6.25% reduction. Of the patients receiving intraoperative intercostal regional anesthesia, those who received the liposomal bupivacaine instead of standard bupivacaine demonstrated a 21.9% reduction in MME. Average LOS in this group was reduced by 0.08 days or a 6.25% reduction.

Conclusions: Intraoperative intercostal regional anesthesia with liposomal bupivacaine demonstrated a greater than 20% reduction in MME compared to patients with standard bupivacaine regional anesthesia either intercostal or paravertebral. This reduction is promising for future continued reduction in MME as aligned with the goal of minimizing or eliminating postoperative narcotic use. Length of stay was not significantly reduced with intraoperative intercostal liposomal bupivacaine treatment.



Abstract 29

Timing and Follow-Up of Newborn Metabolic Screening in Infants Born via Water Immersion: A Retrospective Chart Review

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Background: Newborn blood-spot screening is a critical early-life test that detects metabolic disorders that may result in intellectual disability, organ damage, or death without early treatment. In Nebraska, newborn screening is required and recommended within 24–48 hours of birth. Samples collected before 24 hours increase the risk of false negative results for conditions such as congenital hypothyroidism and require repeat testing at 48–72 hours of life. The American Academy of Pediatrics emphasizes the importance of timely newborn screening and consistent follow-up regardless of birth setting. Water immersion birth at CHI Immanuel Medical Center Birthing Center (CIMCBC) allows discharge as early as 6-12 hours post-delivery. For these infants, an initial blood-spot sample is collected before discharge and repeat sample must be collected within 24 hours of discharge.

Significance: Early infant discharge may introduce challenges to collection of follow-up testing. While early testing ensures completion of blood-spot collection, it necessitates repeat testing and increases risk of failure to follow-up. Evaluating screening timing and follow-up ensures appropriate completion of newborn metabolic screening.

Question: Do infants born via water immersion receive timely follow-up newborn metabolic screening when first sample collection occurs prior to 24 hours of life?

Experimental Design: We conducted a retrospective chart review of infants born via water immersion at CIMCBC in 2024 (n=49). Data collected includes date and time of delivery, discharge, and collection of first, second, and third newborn screening samples. Length of stay and age at screenings were calculated in hours. Descriptive statistics were used to evaluate timing and follow-up.

Results: The mean age at first screening was 18.9 hours (SD 8.8), with a median of 24.2 hours (range 1.7–32.0 hours). A total of 18 (36.7%) were discharged before 24 hours of life. Among early discharge infants, 100% underwent screening before discharge (mean 7.9 hours; range 1.7–11.1 hours). Mean age of second screen was 29.2 hours (range 9.8–40.0 hours). Average length of stay was 22.5 hours. All infants discharged ≥24 hours (64.5%), required only one sample collection, as initial collection occurred within the recommended 24–48-hour window.

Conclusion: For infants born via water immersion at CIMCBC, initial newborn screening frequently occurs prior to 24 of life to due to discharge practices. However, reliable follow-up ensures timely repeat screening and completion of newborn metabolic screening. These findings demonstrate that early discharge can maintain adherence to Nebraska state recommendations when reliable outpatient follow-up occurs.

Abstract 30

Strengthening Perinatal Mood and Anxiety Disorder Screening in the NICU: A Quality Improvement Initiative

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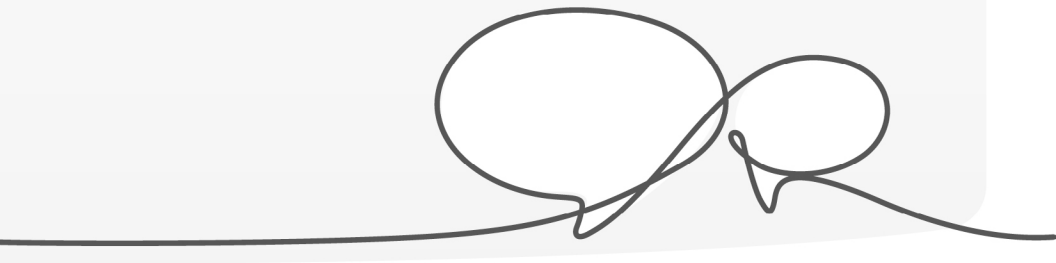
Background and Significance: Perinatal Mood and Anxiety Disorders (PMADs) are the leading cause of maternal death in the perinatal period. For parents with infants in the neonatal intensive care unit (NICU), the risk of developing a PMAD is amplified. Timely recognition of PMADs is imperative to facilitate treatment and mitigate the effects of untreated mental health disorders on infants. Screening for PMADs is the standard of care recommended by the American Academy of Pediatrics. However, little specific guidance exists to optimize screening programs.

Methods: The Nebraska Medicine NICU is a level III, 36 bed unit. We organized a multidisciplinary team including neonatologists, nursing leadership, a social worker, nurse practitioner and psychologist and created a process map and driver diagram. Our aim to was to ensure >80% of registered nurses (RNs) recalled the thresholds for referral to psychology and endorse comfort with administering screens by January 1, 2027. To establish a baseline, we conducted semi-structured interviews with 14 RNs who perform Edinburgh Postnatal Depression Scale (EPDS) screening. Interviews were analyzed thematically.

Results: 14 interviews (9/14 (64%) day shift nurses) provided insight into the strengths of the nurse-led screening program and noted areas for improvement. 100% (14/14) RNs viewed PMAD screening positively and displayed high levels of empathy for parents. The mean RN comfort level with administering screens (scale of 1-10, 10 being the most comfortable) was 8.7. 4/14 (29%) recalled the correct intervals for screening, and 0/14 (0%) reported the threshold value that indicates a positive EPDS screen for depression. 2/14 (14%) RNs recognized that a score > 0 for question 10 assessing for suicidality indicates a positive score. 1/14 (7%) RNs recognized that there is a separate threshold for assessing anxiety.

Conclusion: Interviews with RNs revealed potential areas for improvement that we labeled as our primary drivers within our driver diagram: ambiguity in screening process, inefficiency in screening process, barriers to screen completion, and the impact of mental health-related stigma on screening. Nurses' self-described comfort levels with administering and responding to screens were not reflected by their understanding of screening thresholds and intervals. Unintentional bias and stigma toward mental health concerns suggest a need for PMAD education. Next steps include implementing RN education and assessing impact on RN knowledge of screening algorithms.



Abstract 31

Assessing Parent Perceptions of Perinatal Mood and Anxiety Disorder Screening in the NICU: A Quality Improvement Initiative

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Background: Although Perinatal Mood and Anxiety Disorder (PMAD) screening for parents of infants hospitalized in neonatal intensive care units (NICUs) is recommended by the American Academy of Pediatrics, minimal guidance exists regarding who should perform screening or how often screening should occur. Parent perspectives have not been assessed and are paramount to ensure screening meets their needs.

Methods: A multidisciplinary quality improvement team was organized at the Nebraska Medicine NICU, including neonatologists, nursing leadership, social worker, nurse practitioner, and psychologist. Our aim was to improve parent acceptability of screening in terms of perceived value, frequency, and support received after screening to >80% across demographic groups by January 1, 2027. Optional and anonymous surveys were given to caregivers with length of stay ≥ 7 days near discharge from 10/6/25 to 2/17/26.

Results: 18 parents completed surveys (11/18 (61%) mothers, 7/18 (39%) fathers). 14 (78%) parents identified as white and 4 (22%) identified as a race other than white. Infant length of stay ranged from 1 to 18 weeks (mean 6.8, median 7). All mothers agreed to some extent that screening benefits parent and infant health compared to 5/7 (71%) and 6/7 (86%) of fathers. All parents agreed they received the right amount of support after screening. Parents preferred to be screened by nurses (8/11 (72%) mothers, 4/7 (57%) fathers), nurse practitioners (5/11 (45%) mothers, 2/7 (29%) fathers), behavioral health specialists (3/11 (27%) mothers, 3/7 (43%) fathers), residents/fellows (2/11 (18%) mothers, 3/7 (43%) fathers), electronically (4/11 (36%) mothers, 3/7 (43%) fathers), and neonatologists (3/11 (27%) mothers, 2/7 (29%) fathers). A higher proportion of parents who identified as a race other than white compared to white preferred to be screened by nurses (3/4 (75%), 9/14 (64%)). Parents who identified as a race other than white did not desire screening by behavioral health specialists, nurse practitioners, neonatologists, or electronically. A higher proportion of parents who identified as a race other than white compared to white felt they were screened “too often” (2/4 (50%), 1/14 (7%)). Parents answering “too often” were hospitalized >5 weeks.

Conclusion: Acceptability of screening was high with regard to support received after screening. Differences in perspectives between mothers and fathers regarding benefit of screening and across racial groups regarding screen frequency should be addressed through PDSA cycles to ensure PMAD screening meets the needs of our diverse population.

Abstract 32

Comparing Structured and Natural Naming Experience on Incidental Bidirectional Naming in Children with Autism

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Background: Early language development in typically developing children occurs through incidental learning, where children acquire new words through everyday interactions with caregivers without requiring direct instruction for each word (Hart & Risley, 2008; Gros-Louis et al., 2014; Paavola et al., 2005). This incidental learning process, termed incidental bidirectional naming (inc-BiN), enables children to acquire both receptive and expressive labels from brief caregiver-child interactions called naming experiences, without explicit teaching (Gilic & Greer, 2011; Greer & Longano, 2010; Hawkins et al., 2018). Children who lack this repertoire require intensive direct instruction for every new word, placing substantial burden on families and clinicians.

Significance: Incidental bidirectional naming (inc-BiN) refers to acquiring new names for stimuli without direct teaching through incidental exposure to the object-name relation. Children who demonstrate inc-BiN can subsequently identify untaught names receptively and expressively following incidental exposure to the name through interaction with a caregiver, referred to as a naming experience (Speckman-Collins et al., 2007; Sivaraman & Barnes-Holmes, 2023). Research shows that the establishment of inc-BiN repertoire enhances language development and symbolic verbal behavior (Greer & Keohane, 2005; Horne & Lowe, 1996), as well as stimulus categorization skills (Horne et al., 2004; Miguel & Kobari-Wright, 2013). Children with established inc-BiN repertoires require significantly fewer learning trials to acquire new vocabulary (Abdool-Ghany & Fienup, 2024; Greer et al., 2018). Given its importance, inc-BiN is considered a critical pivotal repertoire for children with autism, who often exhibit significant delays in vocabulary acquisition.

Hypothesis: Our first hypothesis is that the environmental context in which naming experiences occur significantly influences inc-BiN assessment outcomes in children with autism. Specifically, we hypothesize that participants will demonstrate higher levels of inc-BiN when assessed with naming experiences in structured tabletop settings (using picture cards) compared to natural play-based settings (using three-dimensional toys). This would indicate that inc-BiN may be context-dependent rather than a fully generalized repertoire, with critical implications for how clinicians assess this foundational language capability.

Our second hypothesis is that intervention context affects generalization: structured-setting training will improve inc-BiN in structured contexts only, whereas natural-setting training will generalize across both contexts. These hypotheses are grounded in the premise that naturalistic learning contexts more closely approximate conditions under which typical language development occurs (Hart & Risley, 2008; Horne & Lowe, 1996).

Experimental Design: This study will utilize a multiple baseline single-case experimental design (SCED) to assess how natural versus structured contexts affect inc-BiN acquisition in children with ASD who exhibit language delays. Baseline phases will be staggered across participants to minimize threats to internal validity, including maturation.

Results: This study is ongoing and in the process of data collection.

Conclusion: This study is ongoing, and more data is needed to reach a conclusion.

Abstract 33

Stress Signaling Shapes Immunity and Biofilm Persistence in S. aureus Craniotomy Infection

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Background: Craniotomy, a neurosurgical procedure performed to treat conditions such as tumors, epilepsy, and cranial bleeds in both adult and pediatric populations, carries a 1-7% risk of infection. Most are caused by Staphylococcus aureus (S. aureus), which forms a biofilm on the bone flap surface, rendering infections highly recalcitrant to antibiotics and immune clearance. As a result, patients frequently require multiple revision surgeries, increasing morbidity and reinfection risk. To address these challenges, our laboratory developed a mouse model of S. aureus craniotomy infection that closely mimics the human condition, enabling investigation of biofilm persistence and host-pathogen interactions. However, the molecular mechanisms driving immune dysfunction during craniotomy infection remain poorly defined. The integrated stress response (ISR), mediated by phosphorylation of eIF2α (eIF2α-P), is a key cellular pathway that suppresses global translation while inducing selective stress-adaptive genes, including the activating transcription factor 4 (ATF4).

Significance: The ISR is induced in several pediatric conditions such as rotavirus infection, and genetic defects in eIF2B subunits cause childhood leukodystrophies, underscoring its importance in pediatric central nervous system vulnerability. While transient ISR activation promotes survival, sustained activation can drive immune dysfunction and/or cell death.

Hypothesis: We hypothesize that the ISR contributes to infection persistence and altered immune function during S. aureus craniotomy infection.

Experimental Design: Single-cell RNA sequencing of mouse and human craniotomy infection samples was performed to assess transcriptional changes associated with the ISR. To validate ISR activation at protein level, Western blot analysis was conducted on brain and galea tissues collected at day 7 post-infection, corresponding to mature biofilm formation. In parallel, leukocytes were exposed in vitro to planktonic and biofilm S. aureus to evaluate direct ISR induction by flow cytometry.

Results: RNA sequencing revealed upregulation of ISR-regulated genes, with elevated eIF2a-P and ATF4 expression in anti-inflammatory granulocytic myeloid-derived suppressor cells, neutrophils, and macrophages – the major immune populations at the infection site. Western blot analysis confirmed strong eIF2a-P induction in both brain and galea tissues during infection. Pharmacologic ISR induction by salubrinal reduced bacterial burdens, whereas ISR inhibition enhanced bacterial persistence, suggesting a protective ISR role during acute infection. In vitro, S. aureus exposure elicited time-dependent increases in eIF2a-P and ATF4 expression in leukocytes confirming direct activation of the ISR by infection.

Conclusions: These findings identify the ISR as a key regulator of immune dynamics and biofilm persistence during S. aureus craniotomy infection. Understanding how stress-adaptive pathways influence leukocyte function may uncover new immunomodulatory strategies to combat these chronic, treatment-refractory infections.

Abstract 34

Pediatric Radial Neck Fractures: Management And Outcomes

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BACKGROUND: Pediatric radial neck fractures are uncommon, accounting for ~1% of childhood fractures and 5–10% of elbow injuries. While most are minimally displaced and managed nonoperatively with favorable outcomes, higher-grade fractures may result in persistent functional deficits, especially restricted forearm rotation. Existing literature is limited, with most studies small in terms of patient populations, treatment approaches, and outcome measures. This study evaluates clinical and radiographic outcomes of pediatric radial neck fractures and identifies factors associated with functional recovery.

SIGNIFICANCE: Identifying factors associated with outcomes is critical to guide management and improve prognostication. This study provides one of the largest single-center cohorts with contemporary outcome data.

HYPOTHESIS: Fracture severity, as defined by the O'Brien classification, determines management and outcomes, with higher-grade fractures more likely to require surgery and associated with increased complications and worse forearm motion.

DESIGN: We performed a retrospective review of pediatric patients with radial neck fractures treated at a single tertiary care center from July 2011 to May 2024. Fractures were classified using the O'Brien system (Types I–III). Demographics, injury mechanism, and treatment modality were recorded. Clinical outcomes, including elbow and forearm range of motion and complications, were assessed at final follow-up. Radiographs were reviewed to evaluate fracture healing and alignment.

RESULTS: A total of 163 patients were included; mean age was 8.0 years (median 7.0; range, 1.3–18.0 years), and 63.2% were female. All fractures were closed (Table 1). Among classified fractures (n=134), 122 (91.0%) were O'Brien Type I, 9 (6.7%) Type II, and 3 (2.2%) Type III. Overall, 142 patients (87.1%) were managed nonoperatively, while 21 (12.9%) underwent operative intervention, predominantly closed reduction with or without pinning (18/21, 85.7%), with only 3 patients (14.3%) requiring open reduction (Table 2). Treatment differed significantly by fracture type ($p<0.001$), with 95.1% of Type I fractures managed nonoperatively compared with 22.2% of Type II and 33.3% of Type III fractures (Table 3).

Median follow-up was 3.6 weeks (range, 0–523.6 weeks). Full flexion was achieved in 84% of patients, full pronation in 86%, and full supination in 84%, while extension deficit was present in 71%. Pronation deficits were more common in Type II/III fractures compared with Type I ($p=0.026$) (Table 4). Pain at final follow-up was reported in 24% of patients.

Complications occurred in 4 patients (3.6%) and were confined to the operative cohort (19.0% vs 0%; $p<0.001$). These included posterior interosseous nerve palsy (n=2), heterotopic ossification (n=1), cast-related complication (n=1), and residual hand stiffness (n=1). Higher-grade fractures (Type II/III) demonstrated increased complication rates compared with Type I fractures (22.2% vs 1.2%; $p=0.024$) (Table 4).

CONCLUSION: Pediatric radial neck fractures are predominantly low-grade injuries that can be effectively managed nonoperatively with favorable early outcomes. Fracture severity remains the primary determinant of management and prognosis, with higher-grade fractures more frequently requiring surgery and associated with increased complication rates and greater limitation in forearm rotation, particularly pronation. This represents one of the largest single-center series to date and provides clinically relevant data to guide management.

Abstract 35

Low Risk Of Developmental Dysplasia Of The Hip In Infants With Idiopathic Clubfoot: A Regional Cohort Study

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BACKGROUND: The association between idiopathic clubfoot and developmental dysplasia of the hip (DDH) remains unclear, with conflicting evidence in the literature. This study aimed to determine the incidence of DDH in infants with idiopathic clubfoot in a regional population (Nebraska and western Iowa) and evaluate the need for routine hip screening in this population.

SIGNIFICANCE: Clarifying the true risk of DDH in idiopathic clubfoot may guide efficient, risk-based screening strategies and reduce unnecessary imaging in this population.

HYPOTHESIS: We hypothesized that idiopathic clubfoot does not significantly increase the risk of DDH compared with the general population, and that routine hip screening may not be required in all patients.

DESIGN: We retrospectively reviewed infants with idiopathic clubfoot treated at a single tertiary center between 2000 and 2025 who underwent hip imaging within the first 6 months of life. Of the 468 patients (701 affected feet), 90 underwent imaging (87 ultrasound, 3 pelvic radiographs). DDH was defined using age-appropriate ultrasonographic and radiographic criteria. Demographic and clinical risk factors, including sex and breech presentation, were analyzed.

RESULTS: DDH was identified in 4 patients (0.85%, 95% CI: 0.02–1.69%), all of whom were treated with bracing, with no surgical intervention required. Two cases were bilateral and two unilateral, and one patient had a breech presentation. The mean age at first imaging for DDH cases was 0.2 years (range 0.1–1.8 years) (Table 1).

Ten patients (11.5%) demonstrated initial ultrasound abnormalities that resolved without intervention. The mean age at first ultrasound for these false positives was 0.14 years (range 0.1–0.35 years), with normalization at a mean age of 0.25 years (range 0.2–0.35 years). There was no significant association between age at initial ultrasound and transient findings ($p = 0.148$). The mean age at first ultrasound for true positives was 0.15 years (range 0.1–0.3 years) and for true negatives was 0.2 years (range 0.1–0.35 years). Analysis of potential risk factors revealed no significant association between DDH and sex (male: 0.65%, female: 1.25%; $p = 0.503$) or breech presentation ($p = 0.926$) (Table 2).

CONCLUSION: In this regional cohort from Nebraska and Western Iowa, the incidence of DDH among infants with idiopathic clubfoot was low (0.85%), comparable to the general population (~1–2%). All affected infants were successfully managed with bracing, with no surgical intervention required. These findings indicate that idiopathic clubfoot alone does not confer a clinically meaningful increased risk of DDH, supporting targeted, risk-based hip screening guided by standard population-based factors rather than routine imaging for all patients.

Abstract 36

Targeting B7-H3 with a Small-Molecule Inhibitor in Group 3 Medulloblastoma

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Background: Medulloblastoma (MB), the most prevalent malignant pediatric brain tumor, is a leading cause of cancer-related childhood mortality. Four molecular subgroups exist, yet all patients receive identical treatments: maximal surgical resection, craniospinal irradiation, and combination chemotherapy. This uniform approach fails Group 3 (G3MB) patients, the most aggressive subgroup, where survival remains below 50%, compared to 75-90% for the other subgroups. High-dose chemoradiation drives toxicity while failing to prevent recurrence, and currently no G3MB-specific therapies exist. Notably, Nebraska ranks among the top ten states for MB incidence, making this a regional priority.

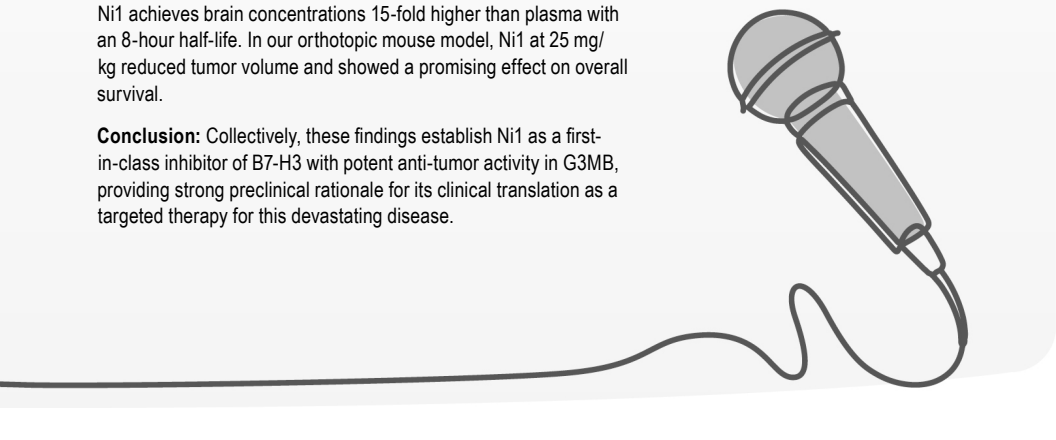
Significance: Among the B7 immune checkpoint family, B7-H3 (CD276) is the only member uniquely and selectively enriched in G3MB tumors. Mechanistically, B7-H3 drives immune evasion, invasion, and metastasis through JAK2/STAT3 signaling. Existing B7-H3 immunotherapies cannot cross the blood-brain barrier, and there are no effective small-molecule inhibitors of B7-H3. To address this, Ni1 was identified through a virtual screen of 100,000 compounds prioritized for B7-H3 binding, CNS penetration, and oral bioavailability.

Hypothesis: We hypothesized that Ni1, the first-in-class small-molecule inhibitor of B7-H3, induces high cytotoxicity and suppresses G3MB tumor growth by inhibiting B7-H3-mediated JAK2/STAT3 signaling.

Experimental Design: To test this hypothesis, we treated two normal and three G3MB cell lines with Ni1 in triplicate independent experiments to assess cytotoxicity, apoptosis, colony formation, and wound healing. Western blotting evaluated downstream signaling changes. Synergy between Ni1 and cisplatin was assessed using the HSA synergy model. Pharmacokinetic studies evaluated CNS penetration, and therapeutic efficacy was tested in a pilot orthotopic G3MB mouse model.

Results: Ni1 demonstrated low micromolar cytotoxic activity (IC50 1.5-2.0μM) across all G3MB cell lines, with higher IC50 values in primary astrocytes and iPSCs. Ni1 also induced dose-dependent late apoptosis (82.7% at 4μM), abolished colony formation, and significantly impaired wound healing. Western blotting demonstrated induction of apoptotic markers (cleaved caspase 3, cleaved PARP) and suppression of JAK/STAT signaling (JAK2, p-JAK2, STAT3, p-STAT3, N-Cadherin, Vimentin, and SLUG). Sequential treatment with cisplatin followed by Ni1 produced strong synergistic cytotoxicity (HSA synergy scores ~12). Pharmacokinetic studies confirmed Ni1 achieves brain concentrations 15-fold higher than plasma with an 8-hour half-life. In our orthotopic mouse model, Ni1 at 25 mg/kg reduced tumor volume and showed a promising effect on overall survival.

Conclusion: Collectively, these findings establish Ni1 as a first-in-class inhibitor of B7-H3 with potent anti-tumor activity in G3MB, providing strong preclinical rationale for its clinical translation as a targeted therapy for this devastating disease.



Abstract 37

Large Axillary Cystic Lymphangioma in Neonate: A Case Report

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A male neonate was born at 38 weeks gestation with large cystic mass most notable in the right axilla. Further MRI imaging demonstrated involvement of the right anterior supraclavicular region that extended inferiorly to involve the right infraclavicular space, the axilla, and the lateral chest wall to the level lower heart measuring 8.1 cm CC x 7.2 cm AP x 2.9 cm TR, suspicious for a lymphatic malformation. The infant subsequently underwent surgical resection of the lesion at 3 months of age, with pathology confirming the mass as a cystic lymphangioma. Here we present a unique case of a large axillary cystic lymphangioma, along with a review of current literature on cystic lymphangiomas and their management.

Abstract 38

Differences in Contralateral Tibial Morphology in ACL Reconstruction: 3D Analysis of Condyle Geometry and the Limits of Automated Posterior Tibial Slope Measurement

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Background: Posterior tibial slope (PTS) is a commonly accepted risk factor for primary ACL injury and ACL reconstruction (ACLR) graft failure. Traditional single-parameter PTS measurements may inadequately capture the complex 3D morphological variations that influence knee biomechanics and outcomes. Due to pre-existing tibial morphology differences that may contribute to ACL injury risk, we expected to find significant differences in condyle PTS between ACLR patients and controls, and examined whether automated 3D PTS measurement adequately agrees with validated manual techniques.

Significance: Traditional 2D measurements do not capture the morphology of the tibial plateau and may be insufficient for identifying injury risk. A shallower lateral condyle depth may reduce the "socket" effect of the tibia, potentially increasing rotatory instability. Automated 3D PTS calculation can enable large-scale research or clinical workflows that stratify morphological risk.

Hypothesis: We hypothesized that morphological differences exist between contralateral tibiae of ACLR patients and controls, and that automated 3D PTS measurements would demonstrate adequate agreement with manual ICP-based calculations across both condyles.

Experimental Design: Nineteen participants with knee MRI were analyzed: 9 unilateral ACLR (4 adolescent, 5 adult) and 10 adult controls. Contralateral limbs were segmented to approximate premorbid tibial geometry. Iterative back projection generated super-resolution images (0.3 mm isotropic) from coronal and sagittal proton-density sequences. ICP alignment registered all tibiae to a template. Condyle planes were fitted via singular value decomposition, and PTS was defined as rotation about the medial-lateral centroid axis. Automated 3D medial and lateral PTS and condyle depth were computed from a reference coordinate system. Independent-samples t-tests compared ACLR and control groups; paired-samples t-tests compared manual versus automated methods, with 95% confidence intervals and Cohen's d reported for all comparisons.

Results: No significant PTS differences were identified between ACLR and control groups ($p > 0.05$). However, the ACLR group demonstrated shallower lateral plateau depth approaching significance ($p = 0.056$) with a large effect size ($d = 0.94$). Method comparison found reasonable agreement in lateral PTS ($r = 0.68$), but not medial PTS ($r = 0.22$). The medial-lateral PTS difference also showed weak negative correlation with manual methods ($r = -0.34$).

Conclusion: Lateral condyle depth, rather than PTS, may be a more sensitive 3D morphological risk factor for ACL injury. Automated medial PTS calculation is currently inadequate for research or clinical application and requires coordinate system refinement before replacing manual analysis. Prospective investigation in a larger cohort with improved
automated workflows is warranted.

Abstract 39

Impact of Eccentric Isokinetic Training Protocols for Knee Rehabilitation: A Systematic Review

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Introduction/Background: Anterior cruciate ligament (ACL) injuries are common and consequential musculoskeletal injuries, particularly in adolescent and young adult athletes. Despite established rehabilitation protocols, optimal recovery strategies remain unclear, as reflected by high reinjury rates and early post-traumatic osteoarthritis. Persistent quadriceps weakness—documented more than three years after ACL reconstruction (ACLR)—is a major contributor to these outcomes. Eccentric isokinetic training offers a controlled, high-intensity modality for strengthening; however, the comparative effectiveness of specific protocols remains poorly defined.

Significance of the Problem: ACL injuries lead to high rates of reinjury and long-term morbidity, driven in part by persistent quadriceps weakness despite current rehabilitation strategies. The lack of standardized, evidence-based eccentric training protocols—particularly in pediatric populations—limits optimal recovery and may contribute to preventable functional deficits and early joint degeneration.

Question/Hypothesis: We hypothesized that targeted eccentric isokinetic training protocols would improve quadriceps strength following knee injury or reconstruction.

Materials and Methods: A systematic review was conducted in accordance with PRISMA 2020 guidelines. PubMed and Scopus were searched for studies evaluating eccentric isokinetic knee rehabilitation protocols. After removal of duplicates, studies underwent structured screening and eligibility assessment by four reviewers. Included studies reported defined eccentric isokinetic protocols with strength-related outcomes. Data extracted included angular velocity, range of motion, protocol characteristics, and participant demographics. Hedges' g effect sizes were used to standardize comparisons across studies, with subgroup analyses performed for 60°/s direct and cross-education protocols.

Results: Seventeen studies met inclusion criteria. Subgroup analysis of 60°/s protocols demonstrated a positive but non-significant pooled effect on quadriceps strength for direct training. Cross-education protocols demonstrated stronger overall effects. Substantial heterogeneity in protocol design and angular velocities (30–300°/s) limited broader comparisons. Notably, no studies included participants under 18 years of age, highlighting a critical gap in the pediatric literature.

Discussion: Eccentric isokinetic training appears beneficial for improving quadriceps strength following knee injury; however, optimal protocols remain unclear due to heterogeneity in study design. Cross-education may provide advantages when direct limb loading is limited. The absence of pediatric data is particularly concerning given the high risk of ACL injury and reinjury in adolescents. Future research should prioritize standardized protocol design and inclusion of pediatric populations to improve rehabilitation outcomes and reduce long-term morbidity.

Abstract 40

VARIABLE NEUROANATOMIC AND RETINAL INVOLVEMENT IN HOMOZYGOUS CEP164 p.R576* NEPHRONOPHTHISIS-RELATED CILIOPATHY

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Background: CEP164 encodes a centrosomal distal appendage protein required for primary ciliogenesis. Biallelic CEP164 variants are associated with rare, autosomal recessive nephronophthisis-related ciliopathies with renal, retinal, and neurologic involvement. Less than 15 cases have been reported in the literature. More recently, features of motile ciliopathy have also been described. Homozygous truncating variants have been reported in the context of severe phenotypes, including retinal degeneration and cerebellar vermis hypoplasia, though detailed phenotypic descriptions across diverse patient populations remain limited.

Case Presentation: We report a 4-year-old male with homozygous CEP164 c.1726C>T (p.R576*) presenting with nephronophthisis-related end-stage renal disease, global developmental delay, and sinopulmonary involvement (bronchiectasis, paranasal sinus disease). He was born at term to reportedly non-consanguineous parents from the same geographical region of Guatemala. Brain MRI demonstrated prominence of extra-axial CSF spaces and ventricles, raising concern for decreased brain volume. Notably, there was no evidence of cerebellar hypoplasia. Ophthalmologic evaluation, including dilated fundoscopic exam, revealed no signs of retinal degeneration. Additional features included short stature, obesity, macrocephaly, midface retrusion, two posterior hair whorls, and brachydactyly without polydactyly.

Discussion: In contrast to a previously reported case of homozygous p.R576* demonstrating cerebellar vermis hypoplasia and retinal degeneration, this patient lacks classic hindbrain malformations and has preserved retinal structure despite a truncating genotype. Neuroimaging findings instead suggest more global cerebral volume loss without focal malformations. These observations support phenotypic variability in CEP164-related disease, particularly with respect to central nervous system and retinal involvement.

Conclusion: Homozygous CEP164 p.R576* may present with variable neurologic and retinal findings. The absence of retinal degeneration and ciliopathy-associated cerebellar abnormalities does not exclude this diagnosis and may broaden the recognized phenotypic spectrum. This case of CEP164 nephronophthisis-related ciliopathy in the first patient of Guatemalan descent reinforces the need to consider ciliopathy-related diagnoses even in the absence of classic syndromic features, particularly in diverse patient populations.

Abstract 41

Flicker Sensitivity in Migraine: A Mechanistic Review Proposing a Convergent Pathophysiology Framework

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Background: While traditionally conceptualized as a primary headache disorder, migraine is fundamentally characterized by abnormal sensory processing, with reduced habituation and heightened sensitivity to environmental cues. The modern lighting environment presents novel challenges for people, especially those with migraine. The widespread adoption of light-emitting diode (LED) technology and digital displays has made temporal light modulation (TLM), colloquially known as flicker, pervasive. TLM is the rapid fluctuation in light intensity (or color) which may have different frequency, modulation depth, shape, and duty cycle. Recent neuroscience paradigms suggest these phenomena share more than superficial similarity. Both conditions implicate aberrant processing within visual cortical areas, thalamocortical relay circuits, and brainstem networks responsible for sensory filtering and pain modulation. We examined neural pathways implicated in each condition, identifying points of convergence and shared vulnerability.

Significance: Migraine affects over one billion people worldwide and is associated with hypersensitivity to environmental stimuli such as light. TLM or flicker from LED lighting and digital displays, is an emerging migraine trigger, yet TLM sensitivity remains poorly defined and lacks diagnostic criteria. We propose that TLM sensitivity and migraine may share overlapping neural mechanisms, positioning TLM as both a trigger and a potential diagnostic probe. Clarifying this relationship could support development of targeted environmental modifications and preventative interventions that address underlying neurological processes.

Hypothesis: TLM sensitivity and migraine susceptibility arise from overlapping neural circuit dysfunctions.

Experimental Design: A narrative synthesis of migraine and TLM neurobiology was conducted, focusing on convergent mechanisms within visual, thalamocortical, and brainstem circuits. Literature from randomized and observational studies was integrated with team-based discussions to refine operant definitions and diagnostic considerations.

Results: Migraine and TLM sensitivity share dysfunction across several circuits: (1) visual cortex hyperexcitability with impaired habituation, (2) thalamocortical dysregulation involving the thalamic reticular and lateral geniculate nuclei, (3) altered brainstem modulation through the superior colliculus and periaqueductal gray, and (4) top-down control deficits involving prefrontal and limbic systems. These patterns reflect reduced inhibition, abnormal oscillatory states, and heightened sensory gain. Susceptibility varies with developmental stage: children appear vulnerable due to immature inhibitory networks, while adults may have trauma-mediated susceptibility. TLM sensitivity is rarely isolated, instead co-occurring with broader network dysfunctions and comorbid disorders.

Conclusions: The convergence of migraine and TLM sensitivity supports light modulation as both a mechanistic trigger and biomarker of neural vulnerability. This framework may guide the development of diagnostic tools, environmental modifications, and targeted interventions that address underlying circuit dysfunction rather than symptoms alone.

Abstract 42

Pediatric Central Nervous System Tumors: An Analysis of Patients Treated at Children's Nebraska Over a 10-Year Period

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Background: Central nervous system (CNS) tumors are the second most diagnosed malignancy in childhood and the leading cause of cancer death among children under 20 years of age.

Significance: Nebraska has consistently had rates of pediatric CNS Neoplasms above the national average.

Hypothesis: The study was an exploratory analysis using clinical data to characterize pediatric CNS tumors treated at Children's Nebraska or Nebraska Medicine over a 10-year period.

Experimental Design: Electronic health records were reviewed to identify patients diagnosed with a CNS tumor, aged 0-18 years, and treated at Children's Nebraska or Nebraska Medicine from 2013 to 2023. Data collected included demographics, clinical characteristics, and genetic testing information. ICD-0-3 codes were used to identify patients with a CNS tumor diagnosis. Diagnoses were classified according to the 2016 World Health Organization (WHO) Classification of Tumors. Zip codes were used to identify the Rural Urban Continuum Code (RUCC) of the patient's county of residence to determine urbanicity. The study population characteristics were summarized and descriptively compared by urbanicity, with chi-squared testing to determine significance.

Results: A total of 172 patients aged 0-18 years were diagnosed with a primary CNS tumor from 2013-2023. A greater proportion of patients were diagnosed at a younger age, with median age at diagnosis of 7 years. The study population was predominantly female (55.81%; n=96), alive (77.33%; n=133), non-Hispanic White (72.09%; n=124), and from a metropolitan-designated county (70.93%; n=122). Most diagnoses were malignant (87.21%; n=150) and made at the local stage (96.49%; n=165). Gliomas were the most diagnosed (65.12%; n=112) followed by embryonal tumors (16.86%; n=29). Most tumor locations were reported as the brain stem (22.67%; n=39) or cerebellum (21.51%; n=37). Genetic testing data was available for 30 patients. Most gene alterations involved chromosome gain, loss, or mutation. There were minimal variations in demographic and clinical characteristics between metropolitan and non-metropolitan areas. The proportion of malignant diagnoses (p=0.0271) and CNS tumor incidence (p=0.001) was higher non-metropolitan areas than metropolitan areas.

Conclusion: Given the relative rarity of pediatric CNS tumors, data over an extended time are required to accurately describe the disease and the population in which it occurs. In this analysis, we described the population of pediatric CNS tumor patients treated at Children's Nebraska and Nebraska Medicine. These methods can be expanded to include additional diagnostic years, clinical characteristics, or predictors, such as environmental exposures to gain a better understanding of the trends in pediatric CNS tumors.

Abstract 43

Targeting Biofilm-Induced Immunosuppression in Pediatric Neurosurgical Infections

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Background: Pediatric neurological conditions—such as brain tumors, traumatic injuries, epilepsy, hydrocephalus, and intracranial hemorrhage—often require a craniotomy for treatment. However, these procedures carry an infection risk of up to 15%, primarily due to Staphylococcus aureus (S. aureus) biofilms. Biofilms are difficult to treat because they tolerate antibiotic therapy and establish immunosuppressive environments that impair host immune responses. Granulocytic myeloid-derived suppressor cells (G-MDSCs) are key contributors to this immunosuppression and accumulate alongside neutrophils (PMNs) at infection sites. G-MDSCs inhibit T cell proliferation, secrete anti-inflammatory mediators, and diminish PMNs bactericidal activity.

Significance: Understanding and disrupting the mechanisms that drive G-MDSC accumulation and function may provide a new therapeutic avenue for treating biofilm-associated infections in pediatric neurosurgical patients. This is particularly urgent in neonates, who have underdeveloped immune systems and elevated G-MDSC responses during infections such as neonatal sepsis and intra-amniotic inflammation.

Hypothesis: We hypothesize that S. aureus biofilms reprogram PMNs into G-MDSC-like cells through Toll-like receptor 2 (TLR2) signaling, and that targeting this pathway will reduce G-MDSC accumulation and restore effective immune responses against biofilm infections.

Experimental Design: Bone marrow-derived PMNs were exposed to S. aureus biofilms in vitro to evaluate phenotypic and functional changes. RNA sequencing and genetic knockout models (TLR2- and MyD88-deficient mice) were used to identify signaling pathways mediating G-MDSC transition. Additionally, a screen of the Nebraska Transposon Mutant Library (NTML), consisting of 1,920 unique S. aureus mutants, was used to characterize bacterial ligands responsible for activating TLR2 signaling.

Results: PMNs exposed to biofilms exhibited elevated expression of G-MDSC markers, including CD11b, CD14, and PD-L1, along with diminished bactericidal activity and the ability to suppress T cell proliferation. These effects were significantly reduced in TLR2-deficient PMNs and completely abrogated in MyD88 knockout PMNs, implicating TLR2 and other MyD88-dependent receptors in the reprogramming process. NTML screening confirmed that specific S. aureus-derived TLR2 ligands are essential for this transition.

Conclusion: Our findings reveal that S. aureus biofilms exploit TLR2-MyD88 signaling to convert PMNs into immunosuppressive G-MDSCs, enabling infection persistence. Targeting this pathway represents a promising therapeutic strategy to counteract biofilm-induced immunosuppression, especially in vulnerable pediatric populations undergoing neurosurgical procedures.

Abstract 44

Capacity Building in Pediatric Gastroenterology: A Global Health Workshop in Panama with Sustained Knowledge Retention and High Implementation Rates at 6-Month Follow-up

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Background: Pediatric gastroenterology services in Panama are concentrated in the capital, limiting subspecialty access for children with neonatal cholestasis, food allergies, obesity, and failure to thrive. Capacity-building workshops may improve clinical competencies, but data on sustained knowledge retention and implementation remain limited.

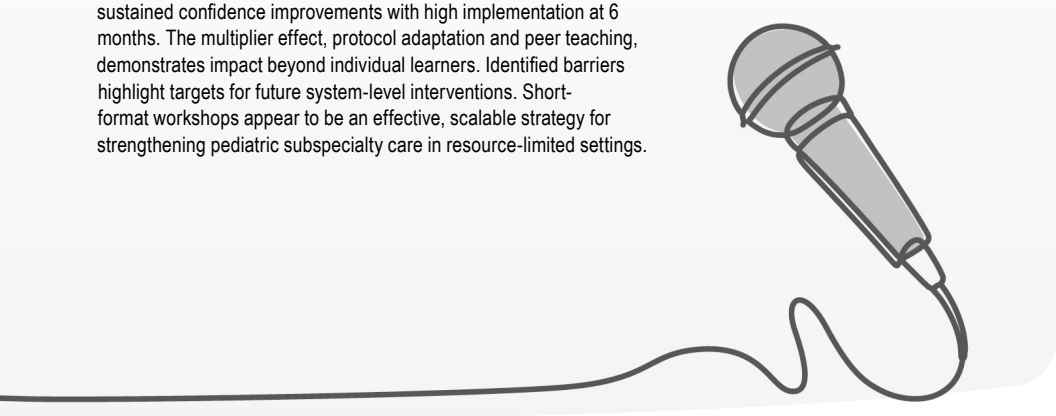
Significance: Few studies have evaluated both durability of knowledge gains and real-world implementation following short-format educational interventions.

Hypothesis: A 2-day pediatric gastroenterology workshop will produce sustained improvements in self-reported confidence with high rates of clinical implementation.

Experimental Design: A prospective cohort study was conducted with surveys at three time points: pre-workshop (n=30), post-workshop (n=29), and 6-month follow-up (n=27; 90% retention). The 2-day workshop in Panama City (August 2025) covered six domains: neonatal cholestasis, pediatric food allergy, obesity management, failure to thrive, nutrition in chronic liver disease, and global health applications. Participants included pediatric gastroenterologists (7.4%), pediatricians (37%), residents (37%), general practitioners (3.7%) and trainees (14.8%). Confidence was assessed using a 5-point Likert scale across 40+ competency items.

Results: Confidence improved across all domains from pre- to post-workshop and was sustained at 6 months: neonatal cholestasis (3.1→3.8→3.6), food allergy (3.4→4.0→3.6), obesity (3.1→3.7→3.5), failure to thrive (3.1→3.8→3.6), liver nutrition (2.8→3.5→3.4), and global health (2.8→3.6→3.6), with the largest sustained improvement in global health (+0.8). Post-workshop, 86% rated content clinically relevant and 100% intended to apply learnings. At 6 months, 88% reported clinical application, including food allergy counseling (74%), obesity management (65%), and cholestasis referral (61%). A multiplier effect was observed: 67% adapted clinical protocols and 63% taught colleagues. Barriers included time limitations or staffing (59%), limited diagnostic access (37%), and administrative support (26%). The majority of participants (78%) indicated that the use of clinical guidelines helps them retain acquired knowledge and enhances its clinical applicability. Interest in future workshops was universal (100%).

Conclusion: A 2-day pediatric gastroenterology workshop produced sustained confidence improvements with high implementation at 6 months. The multiplier effect, protocol adaptation and peer teaching, demonstrates impact beyond individual learners. Identified barriers highlight targets for future system-level interventions. Short-format workshops appear to be an effective, scalable strategy for strengthening pediatric subspecialty care in resource-limited settings.



Abstract 45

Three-Dimensional CT Distance Mapping Demonstrates High Prevalence of Potential Occult Syndesmotic Injury in Pediatric Salter-Harris Ankle Fractures: A Retrospective Cohort Study

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Background: Syndesmotic injuries in children are underrecognized, and no pediatric-specific diagnostic criteria exist. Radiographic parameters validated in adults are unreliable in skeletally immature patients; Bozic et al. demonstrated that 23% of normal children exceed the adult tibiofibular clear space threshold [1]. Three-dimensional CT distance mapping with contralateral referencing enables paired syndesmotic comparison without reliance on age-dependent thresholds but has never been applied to pediatric populations.

Significance: Ankle fractures are the most common lower extremity physeal injury in children. Unrecognized syndesmotic instability in adults produces altered joint contact mechanics, chronic pain, and degenerative change. The prevailing assumption that physeal failure protects the syndesmosis has been challenged by evidence of viscoelastic stiffening at traumatic loading rates, which narrows the strength differential between the physis and adjacent ligaments. No evidence-based guidelines address syndesmotic assessment in pediatric ankle fractures.

Hypothesis: We hypothesized that measurable syndesmotic widening exists in pediatric Salter-Harris ankle fractures when assessed by three-dimensional CT distance mapping with contralateral referencing.

Experimental Design: One hundred seven pediatric patients (mean age 12.2 ± 2.1 years; 67 male) with unilateral tibial Salter-Harris type II to IV fractures and bilateral ankle CT were retrospectively identified. Three-dimensional tibial and fibular surface models were generated; ICP registration aligned injured anatomy to the contralateral control, with per-vertex offset correction applied for fracture fragment displacement into the syndesmosis. Syndesmotic distances were computed at 1, 3, and 5 cm proximal to the tibial plafond. Paired differences were assessed using Wilcoxon signed-rank tests with Holm-Bonferroni correction.

Results: The injured ankle demonstrated significantly greater syndesmotic distances at all levels (all $P < 0.001$). Corrected mean overall difference was +0.57 ± 0.60 mm at 1 cm (Cohen's $d = 0.95$), with the injured side wider in 88 of 107 patients (82.2%). Corrected anterior difference was +0.57 ± 0.82 mm at 1 cm ($d = 0.69$) and +0.90 ± 1.02 mm at 3 cm ($d = 0.88$); the injured side was wider anteriorly in 79.4% of patients. Widening did not differ significantly by fracture type ($P = 0.074$), sex, or age.

Conclusion: Pediatric Salter-Harris ankle fractures demonstrate consistent, statistically significant syndesmotic widening relative to the contralateral control, with large effect sizes and the injured side wider in approximately 80% of patients. These findings challenge the assumption that physeal failure protects the syndesmosis and suggest occult syndesmotic injury accompanies pediatric ankle fractures more frequently than currently recognized. Prospective investigation with MRI correlation is warranted.

Abstract 46

Maresin 1 Selectively Enhances Pro-reparative IL-22 Production in Alveolar Macrophages Following Organic Dust Exposure: Implications for Childhood Respiratory Health

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Background: Respiratory diseases in children, particularly those associated with environmental exposures, are an increasing public health concern. Children are uniquely vulnerable to airborne pollutants due to their developing immune systems, higher respiratory rates, and ongoing lung growth, which together increase susceptibility to dysregulated inflammatory responses and long-term respiratory morbidity such as asthma. Organic dust exposure (ODE), common in agricultural environments, contains endotoxins and microbial components that activate innate immune pathways and drive sustained pulmonary inflammation. Children living near agricultural operations or attending schools in close proximity to farming activities may therefore be at heightened risk during critical windows of lung development.

Significance: Effective resolution of inflammation is essential for preserving lung structure and function, yet this process may be impaired by dietary and metabolic factors. Specialized pro-resolving mediators (SPMs), derived from omega-3 fatty acids, actively promote resolution of inflammation and tissue repair. However, Western diets are often characterized by an imbalanced omega-6 to omega-3 ratio, potentially limiting endogenous SPM biosynthesis. Our laboratory has identified alveolar macrophages as a source of the pro-reparative cytokine IL-22, which plays a critical role in maintaining epithelial barrier integrity and promoting lung repair following dust-induced injury. The present study investigated whether specific SPMs modulate IL-22 signaling in alveolar macrophages following ODE.

Hypothesis: We hypothesize that SPMs differentially regulate alveolar macrophage inflammatory and pro-reparative responses following ODE.

Experimental Design: MH-S cells (immortalized murine alveolar macrophages) were pretreated for 1 hour in vitro with Maresin 1 (MaR1), Maresin 2 (MaR2), or Maresin Conjugates in Tissue Regeneration (MCTR1, MCTR2, MCTR3) at concentrations of 1–100 nM prior to exposure to 1% dust extract for 5 hours. Cytokine levels (IL-10, IL-22, TNF-α, and IL-6) were quantified by ELISA. Data were analyzed using two-way ANOVA with Tukey's HSD's test.

Results: All SPMs significantly suppressed proinflammatory cytokines TNF-α and IL-6 in a dose-dependent manner. Notably, MaR1 uniquely enhanced anti-inflammatory IL-10 and pro-reparative IL-22 production following ODE, with peak effects at 10 nM, whereas MaR2 and MCTRs failed to induce similar pro-reparative responses and instead suppressed IL-22.

Conclusion: These findings reveal distinct functional roles among maresins and their biosynthetic derivatives in shaping macrophage responses to organic dust. The selective ability of MaR1 to augment IL-22 suggests a receptor-mediated mechanism and highlights a potential LGR6 pathway through which omega-3–derived mediators may support lung repair. Elucidating these mechanisms may inform strategies to protect the developing lung from environmentally driven inflammatory injury.

Abstract 47

Evaluating the Relationship Between Maternal Depression Scores and Preterm Infant Enteral Feeding Outcomes

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Background & Significance: Maternal depression affects 7% of pregnant women in the United States and is more prevalent and severe among mothers of hospitalized preterm infants. Maternal depression and associated antidepressant use have been linked to alterations in the maternal & infant microbiome, higher risk of preterm labor and spontaneous abortion, and impairments in gastrointestinal function. A key outcome for preterm infants is the time needed to reach full enteral feeding volume, which is progressed incrementally due to immature gastrointestinal function. Prolonged parenteral nutrition (PN) is associated with increased infection risk, intestinal atrophy, and significant hospital costs. However, few studies have examined how maternal depression affects preterm infant feeding outcomes, especially for extremely low birth weight (ELBW) (<1000g) neonates, and small sample sizes limit existing evidence. This study aims to understand the relationship between maternal depression scores and time for ELBW preterm infants to reach goal volume, fully fortified enteral feedings.

Hypothesis: We hypothesized that higher maternal depressive scores would be associated with an increase in the duration of time required for ELBW infants to reach goal enteral feeding volume.

Experimental Design: We analyzed enteral feeding data for infants born <1000g. Data was collected from the electronic medical records of the infants to collect maternal Edinburgh Postnatal Depression Scale (EPDS) scores throughout infant hospitalization in the neonatal intensive care unit (NICU). Non-parametric statistical analyses were completed.

Results: A total of 44 mother-infant dyads were included. Spearman correlation revealed that higher EPDS scores within the first month post-partum were associated with longer time to FEF ($p = 0.329$, $p = 0.038$), however, this association was no longer significant once adjusted for infant CRIB-II scores. Days to FEF did not differ significantly by infant sex, maternal race, SSRI use or psychiatric diagnoses.

Conclusion: In this cohort of extremely low birth weight preterm infants, higher maternal EPDS scores within the first post-partum month were associated with longer time to achieve full enteral feeding, though this effect became insignificant after accounting for infant illness severity. These findings suggest that maternal depression scores have no observed relationship with the timing of their infant reaching full enteral feeding, though higher scores were observed among mothers of more critically ill infants. Limitations of this study include small sample size, single-site design, and data collection prior to the COVID-19 pandemic, which had significant impacts on mental health.

Abstract 48

Ecological Analysis of Select Birth Defects and Agrochemicals in the United States 2000-2020

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Background: Birth defects etiology remains poorly understood, and many established risk factors are non-modifiable. Certain pesticides and nitrate have been linked to specific defects, but findings are inconsistent.

Significance: A major challenge in this area of research is the lack of individual-level exposure data and sufficient case counts. Although ecological studies cannot establish causality, they can be efficiently implemented and may highlight new areas for investigation.

Hypothesis: We hypothesized that we could use U.S. state-level estimates to identify correlations between pesticide application and nitrate in drinking water and certain birth defects as well as regional differences, to generate new hypotheses for future, more detailed analyses linking these environmental exposures to birth defects.

Experimental Design: Using U.S. state-level data from 2000–2020, we assessed correlations between pesticide application and nitrate in drinking water and spina bifida, hypospadias, and gastroschisis (three "core/level 1" defect types according to the National Birth Defects Prevention Network). Average birth defect prevalence estimates were obtained from state registries. For pesticide application, county-level data were retrieved from USGS Pesticide National Synthesis Project. Principal component (PC) analysis was conducted on the 30 most-applied pesticides, and the first five PCs with eigenvalues ³ 1 were averaged across counties to create state-level estimates. For nitrate, the number of individuals affected by violations recorded in the Safe Drinking Water Information System was divided by the state population to estimate the proportion of the population impacted, considering community, non-transient non-community, and transient non-community sources. Bivariate mapping of each exposure measure and each birth defect was used to assess correlation strength and spatial patterns.

Results: For all three defects, the strongest correlations were observed for pesticide PC1 and PC4, which showed higher loadings for acetochlor, clethodim, imazethapyr, chlorimuron, metribuzin, thifensulfuron, tribenuron methyl, and trifluralin. Additionally, PC1 was the only component with high loadings for atrazine, pendimethalin, metsulfuron, picloram, and dimethoate. Nitrate-birth defect patterns varied by water source, with certain central states and California showing the strongest correlations with community system violations.

Conclusion: Despite limited granularity and ecological design, these findings identify potential agrochemicals and spatial patterns warranting more detailed investigation in future birth defects research.

Abstract 49

U.S. Geospatial Variation in Adverse Infant Birth Outcomes 2016-2020

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Background: It is well-established that disparities in infant birth outcomes, such as preterm delivery, exist across the United States (U.S.) and demographic subgroups of the population. For instance, preterm delivery is 1.5x more common among Black birthing individuals. Other known risk factors include younger and more advanced maternal age, obesity, and lower socioeconomic status, for which education is often used as a proxy.

Significance: Limited studies have evaluated county-level patterns to investigate potential geographic clustering of adverse birth outcomes. Geographic variation among all births may be highly driven by differences in the distribution of known demographic risk factors, such as racial identity and maternal body-mass-index. However, analyses restricted to only the lowest risk subgroup of the population may suggest other factors related to clustering.

Hypothesis: We hypothesized that geographic clustering observed among all U.S. births will differ from those we observe when restricted to the lowest risk subgroup of the population. These other clusters may be attributed to other factors, such as environmental pollutants, warranting further investigation.

Experimental Design: Using U.S.-wide birth certificate data from 2016–2020, we assessed geospatial patterns across county for the following adverse infant birth outcomes: preterm birth (<37 weeks' gestation), early preterm birth (<32 weeks'), spontaneous preterm birth (spontaneous labor + preterm birth), low birth weight (<2500 grams), and neonatal intensive care unit (NICU) admission. We averaged across the 5-year period to stabilize incidence estimates for smaller population counties. Incidence was expressed as number of cases per 1,000 births. We also evaluated geospatial patterns restricted to birthing persons who were White non-Hispanic, were 25 to 29 years, had normal BMI (18.5 to <25 kg/m2), and had a bachelor's degree or higher educational attainment.

Results: When evaluating patterns among all births, most clusters indicating higher incidence for all adverse infant outcomes, except NICU admission, occurred throughout the Southern U.S. For instance, many neighboring Southern counties had preterm birth incidence of ≥127 per 1,000 births. NICU admission clusters were more spread out throughout the U.S. and included areas in central and western Nebraska. When restricted to the lowest risk subgroup, different clusters were identified throughout various areas in the U.S. For instance, for preterm birth rates were higher in central and western Nebraska, along with parts of the Mississippi river bordering Louisiana and Mississippi demonstrated higher incidence with an average of ≥231 cases per 1,000 births.

Conclusion: The clusters observed in the Southern U.S. among all U.S. births were somewhat expected, as these areas tend to have higher risk populations based on their distribution of demographic characteristics. The clusters observed among the lowest risk subgroup of the U.S. population differed from overall patterns and warrant further investigation.

Abstract 50

RELIABILITY OF POINT-OF-CARE HEMOGLOBIN VALUES IN EXTREMELY LOW BIRTH WEIGHT INFANTS

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Background: Extremely low birth weight (ELBW)(less than 1000 grams) neonates require close monitoring of hemoglobin as significant anemia increases morbidity and mortality. To reduce iatrogenic anemia, neonatal intensive care units (NICUs) utilize point-of-care (POC) devices. For example, the i-STAT 1 (Abbott Diagnostics, Abbott Park, Illinois) with the CG8+ cartridge is utilized in the CHI CUMC Bergan NICU. Using this device, providers can obtain hemoglobin/hematocrit values from <0.1 mL of blood from arterial, venous, or capillary circulation. Previous data shows POC use reduces red blood cell transfusions in this population.

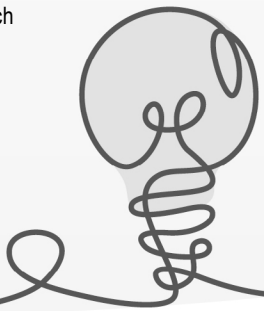
Significance: Despite frequent use, there is conflicting data regarding the reliability of hemoglobin values obtained from these devices in infants admitted to the NICU. Moreover, these studies did not include ELBW infants and did not utilize the i-STAT 1. Therefore, the reliability of hemoglobin results obtained from this device in ELBW infants is unknown.

Question: Is there statistical difference between central lab draws and POC hemoglobin measurements in ELBW neonates, and is this bias associated with clinical variables?

Experimental Design: A retrospective chart review was conducted using the Electronic Medical Record to collect paired hemoglobin values. Patients were identified by logbooks from CHI Bergan Mercy's NICU where medical records of maternal-infant dyads born at CHI CUMC Bergan Mercy from July 2020 to September 2024 were used. Inclusion criteria were infants born <1000 grams and admitted to the NICU. Exclusion criteria were infants admitted for comfort care or those who did not survive from delivery room to NICU admission. Additional variables collected included: birthweight, birthweight percentile, gestational age at birth, sex, specimen source, respiratory support at time of collection, ionotropic/vasotropic support at time of collection, and antibiotics at time of collection. Blood samples with simultaneous central lab and POC values were used.

Results: Paired t-test was utilized for analysis with a p-value of <0.05 for significance. There was positive bias comparing POC to serum hemoglobin, with a mean difference of 0.56 gm/dl (95% CI: 0.43 to 0.69 gm/dl). Birth weight percentile, gestational age, and capillary source were the only independent variables with statistically significant impact on mean bias (p = 0.005, <0.001, 0.009).

Conclusion: In this cohort, hemoglobin measurements obtained via the i-STAT 1 device consistently overestimated the serum hemoglobin by approximately 0.56 gm/dl. Research is ongoing to determine the impact of solely using POC hemoglobin to decide whether a red blood cell transfusion is warranted based on recommended transfusion thresholds.



Abstract 51

Arthrogryposis Multiplex Congenita in a Male Neonate after Previable Premature Rupture of Membranes and Longstanding Oligohydramnios

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A male infant is born at 33 weeks 6 days via scheduled c-section and is noted to have profound hypotonia and contractures in multiple extremities. The pregnancy was complicated by previable premature rupture of membranes (pPPROM) at 18 weeks 6 days with subsequent development of oligohydramnios. The infant was intubated and placed on mechanical ventilation immediately after birth. An extensive diagnostic work-up was performed because of the clinical presentation including brain/spine MRI, metabolic testing, trio whole genome sequencing, and all results returned negative. He is now term corrected and has been extubated to room air. With extensive support from the neonatal therapy (physical, occupational, speech) teams, his tone and contractures are improving, making the diagnosis of arthrogryposis multiplex congenita resulting from longstanding oligohydramnios the most likely etiology for his presentation.

Abstract 52

The Missing Supplement: Severe Hypocalcemia

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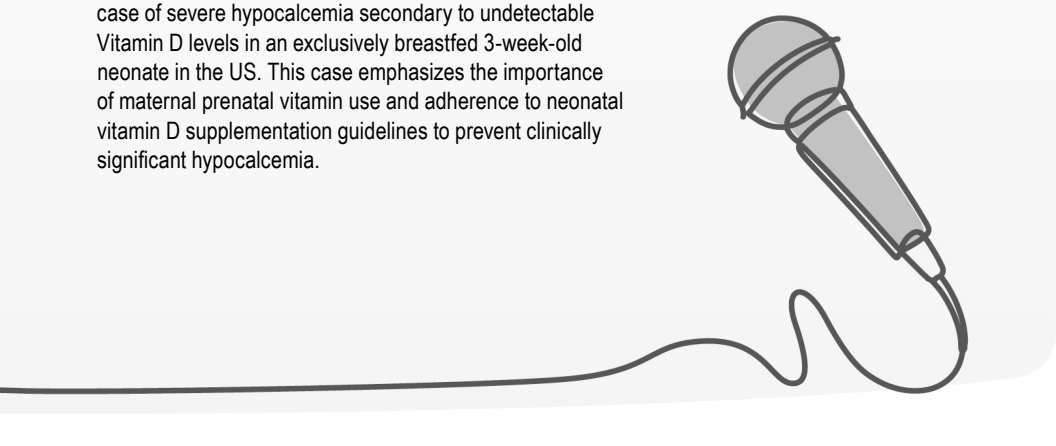
Case Presentation: A 3-week-old male presented with fever and irritability. On initial workup, meningitis/encephalitis panel was positive for parechovirus, and UA demonstrated presence of a UTI. Notably, CMP revealed incidental finding of hypocalcemia of 5.8. Ceftazidime and ampicillin were started, and he was admitted for ongoing management. Initial differential diagnoses for incidental hypocalcemia included PTH suppression in the setting of illness, hypomagnesemia, and congenital hypoparathyroidism (DiGeorge). Additional labs/imaging were collected, and endocrinology was consulted for further investigation. Cardiac evaluation, including EKG, echocardiogram, and chest X-ray, was unremarkable. Intact PTH was inappropriately normal, with normal serum phosphate and magnesium. 25-hydroxy vitamin D was undetectable (<12.8). Physical exam showed no signs of rickets or bone deformities. Further history revealed no maternal prenatal vitamin use and exclusive breastfeeding without vitamin D supplementation. The patient was kept on telemetry and started on vitamin D, oral calcium carbonate, and IV calcium gluconate with IV calcium being held once levels exceeded 7. Calcium was monitored every 6 hours due to concern for hungry bone syndrome. Despite multiple IV calcium infusions and increased oral supplementation, calcium remained <7 until hospital day 3 when levels began to rise. Due to concern for hungry bone syndrome, an osseous survey was obtained but was unremarkable. Calcium stabilized >8 for 24 hours by day 6, and the patient was discharged on vitamin D and calcium. At 2-week follow-up, calcium was 10.1 with mild residual vitamin D deficiency. Final diagnosis was severe hypocalcemia secondary to vitamin D deficiency due to lack of supplementation.

Discussion: Neonatal late-onset hypocalcemia is defined as hypocalcemia developed after postnatal 3 days with common causes including hypoparathyroidism, hypomagnesemia, maternal hyperparathyroidism, or vitamin D deficiency.1 Exclusively breastfed infants without vitamin D supplementation are at increased risk of deficiency, which may precede rickets and present with hypocalcemic seizures, growth failure, and irritability.2 While severe vitamin D deficiency may cause rickets in infants or children, it is now considered uncommon in developed countries like the US.3 Low serum 25-hydroxyvitamin D has been described as preventable and remains an important public health priority due to its associated adverse outcomes.4

Conclusions: The purpose of this case is to describe a rare case of severe hypocalcemia secondary to undetectable Vitamin D levels in an exclusively breastfed 3-week-old neonate in the US. This case emphasizes the importance of maternal prenatal vitamin use and adherence to neonatal vitamin D supplementation guidelines to prevent clinically significant hypocalcemia.



Abstract 53

Demographic Characteristics of Patients Choosing Water Birth

Josie Reed[1], Terence Zach, MD[1]
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Background: Water immersion during labor has become an increasingly popular option in the United States due to perceived benefits such as reduced pain, relaxation, and increased autonomy. While immersion during the first stage of labor is generally considered safe, the safety of underwater delivery remains controversial. The American College of Obstetricians and Gynecologists states there is insufficient evidence to recommend for or against water birth during the second stage of labor and emphasizes the importance of counseling patients on potential risks and benefits. Although rare neonatal complications have been reported, large studies and meta-analyses have not demonstrated increased maternal or neonatal risk when water birth is appropriately managed.

Significance: Prior studies suggest patients electing water birth are more likely to be older, multiparous, white, and of higher socioeconomic status. However, despite increasing utilization, it remains unclear whether these trends persist across different populations and geographic settings. This study aims to evaluate the demographic characteristics of patients electing water birth in the greater Omaha area.

Hypothesis: We hypothesized patients electing water birth would differ demographically from those undergoing spontaneous vaginal delivery (SVD), with higher age, marriage rates, and multiparity.

Experimental Design: This retrospective cohort study included patients undergoing water birth at CHI Immanuel Hospital in 2024. Each case was matched with a randomly selected SVD control within one week. Demographic data was collected from the Epic electronic medical record and included age, marital status, gravidity, race/ethnicity, and preferred language. Variables were compared between groups using appropriate statistical analyses.

Results: Patients undergoing SVD were more likely to be experiencing their first pregnancy compared to those electing water birth. No statistically significant differences were observed between groups in age, marital status, race/ethnicity, or preferred language. These findings differ from prior data at the same institution (2019–2022), which demonstrated patients choosing water birth were older, more likely to be married, multiparous, and white. In both datasets, however, individuals electing water birth were consistently less likely to be primigravid.

Conclusion: Multiparity remained the strongest factor associated with water birth selection. Other previously identified demographic differences were not observed, suggesting the population electing water birth is becoming more like those undergoing SVD. Alternatively, these findings may reflect limited statistical power or increased regional availability of water birth services. Further research with larger sample sizes is needed to better characterize evolving patterns in water birth utilization.

Abstract 54

Distance Traveled by Patients Choosing Water Birth: A Retrospective Analysis of Access

Josie Reed[1], Terence Zach, MD[1],
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Background: Water immersion during labor has become an increasingly popular option in the United States due to perceived benefits such as reduced pain, relaxation, and increased autonomy. While immersion during the first stage of labor is generally considered safe, the safety of underwater delivery remains controversial. The American College of Obstetricians and Gynecologists states there is insufficient evidence to recommend for or against water birth during the second stage of labor and emphasizes the importance of counseling patients on potential risks and benefits. Although rare neonatal complications have been reported, large studies and meta-analyses have not demonstrated increased maternal or neonatal risk when water birth is appropriately managed.

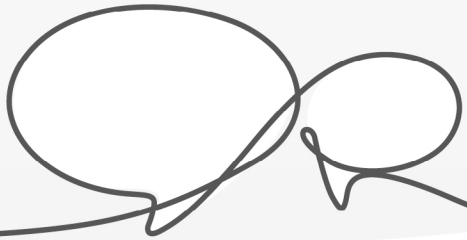
Significance: As interest in water birth increases, access to facilities offering this option remains variable by region. Prior studies suggest patients electing water birth are more likely to be older, multiparous, white, and of higher socioeconomic status. However, geographic access and distance traveled remain poorly characterized. Understanding travel patterns may provide insight into disparities in access and inform expansion of services.

Hypothesis: We hypothesized patients electing water birth would travel greater distances than those undergoing spontaneous vaginal delivery (SVD), reflecting limited regional availability.

Experimental Design: This retrospective cohort study included patients undergoing water birth at CHI Immanuel Hospital in 2024. Each case was matched with a randomly selected SVD control within one week. Home zip codes were obtained from the Epic electronic medical record. Geographic distributions were mapped and categorized as Omaha, surrounding Nebraska cities, or out-of-state. Groups were compared using chi-square analysis.

Results: A total of 50 water birth patients and 48 control patients were included. Among water birth participants, 54% resided within Omaha compared to 68.8% of controls ($\chi^2 = 1.66$, $p = 0.197$). Patients from surrounding Nebraska cities comprised 34% of the water birth group and 25% of controls ($\chi^2 = 0.57$, $p = 0.45$). Additionally, 12% of water birth patients traveled from outside Nebraska compared to 6.25% of controls ($\chi^2 = 0.40$, $p = 0.52$). Visual mapping demonstrated a broader geographic distribution among water birth patients.

Conclusion: Although differences were not statistically significant, visual mapping suggests patients electing water birth may travel farther than those undergoing SVD. This trend may reflect limited regional access to water birth services. Expanding availability and improving patient education may better align care with patient preferences. Future research with larger sample sizes is needed to strengthen these findings and assess feasibility and safety of expanding water birth services.



Abstract 55

Neonatal Temperature and Hypothermia in the First 24 Hours After Birth: A Retrospective Chart Review at Lakeside Hospital

Elliot Riforgiate[1], Terence Zach, MD[1]
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Background: Neonates have immature thermoregulatory mechanisms, increasing risk of hypothermia in the first 24 hours of life. Hypothermia increases metabolic demand and may contribute to neonatal hypoglycemia. Lakeside Hospital aims for ≥85% normothermia among term and near-term infants.

Significance: Neonatal hypothermia is associated with increased risk of adverse outcomes. Despite prevention protocols, it remains a common issue in early newborn care. Understanding local patterns may help guide targeted quality improvement efforts at Lakeside Hospital.

Question: What are the rates of hypothermia in neonates ≥35 weeks gestation and is hypothermia associated with birth weight, gestational age, sex, Apgar scores, and hypoglycemia?

Study design: We conducted a retrospective chart review of 220 neonates born ≥35 weeks gestation at Lakeside hospital. Lowest temperature within 24 hours of birth was noted as hypothermic (<36.5°C) or normothermic (36.5-37.4°C). Demographic and clinical data was recorded and analyzed using chi-squared tests. Continuous variables were compared using t-tests, and categorical variables using chi-squared as appropriate.

Data/results: 81/220 (36.8%) experienced hypothermia, predominantly mild. Of the 220 neonates, only 73 had their blood sugar tested. Hypoglycemia was common amongst both hypothermic and normothermic groups but, notably, normothermic neonates showed higher rates of hypoglycemia. Hypothermic groups had lower birth weight and lower gestational age.

Conclusion: Hypothermia affected 36.8% of neonates ≥35 weeks gestation, below the institutional goal of ≥85% normothermia. These findings highlight the need for improved management of neonatal temperatures at Lakeside hospital. Larger studies are needed to confirm risk factors such as lower gestational age and birth weight, which could be used to improve clinical guidelines.

Abstract 56

STAT3-CDK9 axis drives an ADAM9-IL-6/gp130 feed-forward loop in pediatric Medulloblastoma

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Background: Medulloblastoma (MB) is the most common malignant pediatric brain tumor and comprises four subgroups: WNT, SHH, Group 3 (G3MB), and Group 4. G3MB constitutes 25–30% of cases, with MYC overexpression, enhanced chemoresistance, frequent metastasis, and a 5-year survival of approximately 50%. STAT3 is constitutively activated in MB and drives oncogenic transcriptional programs, whereas CDK9 supports transcriptional elongation through phosphorylation of RNA polymerase II. Although both are aberrantly activated and overexpressed in MB, their mechanistic interplay remains unclear.

Significance: MB survivors often face substantial long-term neurocognitive and developmental complications due to their treatments; highlighting the need for improved therapeutic strategies. Our laboratory's prior work suggests that co-targeting STAT3 and CDK9 may provide a promising therapeutic strategy for overcoming MYC-driven tumorigenesis in MB.

Hypothesis: Activated STAT3 interacts with CDK9 and induces expression of oncogenic targets, including MYC, leading to MB tumorigenesis.

Experimental Design: To characterize the STAT3-CDK9 interaction, we performed co-immunoprecipitation and proximity ligation assays to assess both their physical association and the requirement of activated STAT3 for complex formation. To determine the therapeutic potential of STAT3 and CDK9 inhibition in MB, we conducted a series of in vitro functional assays, including CellTiter-Glo luminescence assays for cell viability, colony formation assays, Annexin V staining for cytotoxicity, and spheroid formation assays to evaluate stemness. We validated RNA-seq downregulated genes by ChIP-qPCR and found that the STAT3-CDK9 axis upregulates ADAM9 (A Disintegrin and Metalloproteinase 9), a membrane-anchored protein not previously characterized in MB. Finally, we assessed the in vivo efficacy of targeting STAT3 and CDK9 in combination in G3MB mouse models both subcutaneously and intracranially.

Results: We identified a direct interaction between STAT3 and CDK9 and demonstrated that inhibiting STAT3 activation significantly reduced their colocalization in MB cells. Dual targeting of STAT3 and CDK9 produced synergistic suppression of MB cell viability and colony formation by promoting apoptosis, impaired spheroid growth, and decreased expression of genes associated with proliferation. Mechanistically, RNA-seq analysis identified ADAM9 as a STAT3-CDK9-dependent transcriptional target that enhances IL-6-gp130 feed-forward signaling and promotes proliferation, epithelial-mesenchymal transition and angiogenesis. In vivo, combined treatment of STAT3 and CDK9 markedly attenuated MB tumor growth both in subcutaneous and intracranial tumors, and downregulation of Ki67, MYC and ADAM9 expression, without evidence of systemic toxicity.

Conclusion: Collectively, these findings identify STAT3-CDK9 as an oncogenic axis in G3MB and support co-targeting STAT3 and CDK9 as a promising therapeutic strategy, in part by disrupting a STAT3-CDK9-ADAM9 feed-forward circuit.

Abstract 57

Trogocytosis Mediated Acquisition of Immune - Derived Molecules in Medulloblastoma

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Background: Trogocytosis is a rapid contact-dependent process through which cells exchange plasma membrane fragments, proteins, and even genetic material while maintaining functional integrity. This dynamic membrane transfer is a key mechanism in immune cell communication. In the context of cancer, it has been increasingly recognized as an important regulator of tumor-cell interactions, although its underlying molecular mechanisms remain poorly understood. Our previous work across multiple solid tumours has shown that tumour cells can acquire immune regulatory and lineage-defining molecules, as well as chromosomal DNA, from leukocytes, generating a fusion-like phenotype that can enhance immune evasion and survival. Building upon these findings, we investigated whether pediatric medulloblastoma (MB), which develops in profoundly immunosuppressive environments, exploits trogocytosis as a mechanism for immune escape.

Significance and Hypothesis: MB arises and thrives within myeloid-enriched, T cell-exhausted niches. We hypothesized that MB tumour cells exploit trogocytosis to acquire immune-derived proteins from surrounding leukocytes, thereby adopting an immune-like phenotype that promotes survival within immunosuppressive microenvironments.

Experimental Design: Two molecular subtypes of MB cell lines, the SHH subtype (ONS76) and group 3 (HDMBO3 and D425), were cocultured with primary human CD3+ T cells or THP-1 monocytes under both direct contact and transwell conditions. Immune cell marker acquisition was assessed by flow cytometry and immunofluorescence using pan-leukocyte marker CD45. To assess broader proteome transfer, T cells or THP-1 cells were surface labeled with biotin, and biotin-positive tumor cells were subsequently detected by streptavidin staining. Patient-derived formalin-fixed paraffin-embedded (FFPE) MB tumor sections were analyzed for tumor cells co-expressing tumor marker synaptophysin and CD45 to confirm trogocytic tumor populations in situ.

Results: Direct coculture of MB tumor cells with T cells or THP-1 cells resulted in intracellular punctate localization of acquired CD45 and biotinylated proteins. No acquisition was detected in trans well-separated or monoculture controls, confirming the requirement for direct cell-cell contact. Analysis of patient tumor tissues corroborated these findings, revealing trogocytic tumor cells co expressing tumor specific and immune lineage-specific markers.

Conclusion: These results establish that pediatric brain tumor cells engage in trogocytosis to steal immune-derived molecules, potentially promoting immune evasion and survival. This study uncovers a novel adaptive mechanism in immunologically cold brain tumors and provides a framework for understanding tumor-immune communication. Our findings position trogocytosis as a potential therapeutic strategy to disrupt acquired immune mimicry and improve immunotherapy responsiveness in pediatric brain tumors, warranting further investigation into its underlying mechanisms.

Abstract 58

Well-Child Check Rates for Nebraskans in Their First Year of Life

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Background: Well-child checks (WCCs) are crucial to the health of babies, giving opportunities for regular screenings, tracking development, and immunizations. Assessing WCC attendance at a population level is important to help understand how often caregivers follow up on these visits and study potential disparities, which have previously been shown to exist in this context.

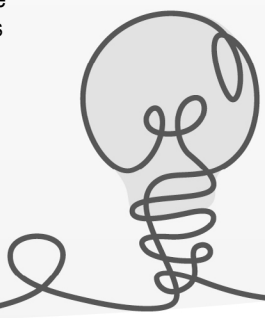
Significance: Being able to track WCCs at the state level would allow for local, tailored interventions, including targeted interventions, if disparities exist. If Nebraska's Health Information Exchange (HIE) can provide a clear picture of the status of WCCs in Nebraska, this would be a valuable source to track this data over time.

Research Questions: Can WCC rates be estimated using data from Nebraska's HIE, and do these rates differ when compared across demographic groups?

Experimental Design: This study is an analysis of retrospective, clinical data from children born in 2022-2023 with a documented encounter in Nebraska during their first two weeks of life using data from Nebraska's HIE. Rates of attendance for WCCs on the American Academy of Pediatrics Periodicity Schedule in the first year of life (1-, 2-, 4-, 6-, 9-, and 12-month, each +/- an associated buffer) were calculated, as well as having any visit after the first week of life up until 56 weeks (allowing for a 4-week buffer on the one-year visit). Rates were also compared across demographic groups (e.g., year of birth, rurality, language, etc.) using chi-square tests.

Results: The overall rate of having at least one WCC between 1 and 56 weeks was 87% using Nebraska's HIE data, not far from a national estimate of Nebraska's rate of 93%. Rates for specific recommended WCCs varied from 52% (1-month visit) to 69% (2-month visit). The rate of having at least one WCC between 1 and 56 weeks was significantly lower for patients born in 2023 (85%) relative to 2022 (88%; $p < 0.001$), from metro (86%) vs. non-metro areas (89%; $p < 0.001$), and whose parents are non-Spanish speaking (Other (88%); English (89%); Spanish (96%); $p < 0.001$).

Conclusion: WCC data from Nebraska's HIE appears to be a decent proxy for what is seen in national estimates. While this analysis has limitations, including potential missingness, undocumented visit types, and issues with loss to follow up, this data source may be a valuable tool to help identify where resources can be optimally allocated to ensure healthy starts for Nebraska's youngest population.



Abstract 59

Delivery Room Respiratory Support Patterns in Term Newborns Across Two Hospital Staffing Models

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Background: Approximately 5% of term newborns require respiratory support in the delivery room, most commonly continuous positive airway pressure (CPAP) or positive pressure ventilation (PPV). Neonatal nurse practitioners (NNPs) are frequently involved in delivery room care and may influence resuscitation practices. However, the impact of staffing models on delivery room respiratory support patterns in term newborns is not well understood. The delivery room at CHI Health Lakeside is staffed by NNPs, while CHI Health Immanuel's is not. This study evaluates whether delivery room respiratory support patterns differ between term newborns at these hospitals.

Significance: The impact of staffing models on delivery room respiratory support practices is understudied. This research aims to improve understanding of how staffing may influence delivery room care.

Research Question: Do delivery room respiratory support patterns differ between term newborns at hospitals with different staffing models?

Experimental Design: This retrospective chart review included 328 infants born at ≥36 0/7 weeks gestation at CHI Health Immanuel (n=114) and CHI Health Lakeside (n=214) between February 1, 2024 and April 20, 2024. Baseline characteristics, frequency of resuscitation, duration of respiratory support, and postnatal outcomes were collected. Continuous variables were analyzed using the Mann–Whitney U test, and categorical variables using chi-square or Fisher's exact tests, with significance defined as $p<0.05$

Results: Baseline newborn characteristics were comparable between sites. The frequency of delivery room resuscitation was similar at both hospitals. A trend toward shorter duration of respiratory support, including both CPAP and PPV, was observed at the NNP-staffed site (CHI Lakeside) compared to the non-NNP site (CHI Immanuel). Median CPAP duration was shorter at CHI Lakeside compared to CHI Immanuel (4 vs 10 minutes), and median PPV duration was similarly reduced (1.5 vs 7 minutes).

Conclusion: Delivery room respiratory support duration differed between hospital sites, with shorter durations of both CPAP and PPV being observed at the NNP-staffed site. However, these differences were not associated with changes in short-term neonatal outcomes. These findings suggest that variation in respiratory support practices may reflect differences in clinical approaches rather than quality of care. Differences in training, experience, or comfort with respiratory support may help explain these trends. Further studies with larger sample sizes across multiple hospital sites are needed to better understand these patterns.

Abstract 60

Neural Circuits Underlying Sleep Impairments in Fragile X Syndrome

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Background: Sleep disturbances are one of the most common comorbidities of Fragile X syndrome (FXS), a neurodevelopmental disorder, yet the neural mechanisms underlying the sleep impairments are unknown. We found that a mouse model of FXS (Fmr1 KO) displays fragmented sleep due to increase in microarousals. The sleep-wake cycle is regulated by multiple brain structures including locus coeruleus (LC, wake-active) and oculomotor nucleus (III, sleep-active). Additionally, LC acts as the primary source of norepinephrine (NE) in the brain and can regulate microarousals during sleep.

Significance: Sleep is crucial for cognitive development, but the mechanisms underlying sleep disruption in FXS are vastly unexplored. The mouse model allows us to interrogate neural activity patterns important for sleep-wake cycle that might be impaired in FXS.

Hypothesis: We hypothesize that dysregulated activity in sleep-wake brain regions underlies sleep disruption in FXS.

Experimental Design: To identify dysregulated sleep/wake regulating brain regions in FXS, we used a sleep deprivation (SD) paradigm that forces wake regions to be active, followed by restoration sleep (RS) for increased activity in the sleep regions. SD and RS were performed in TRAP2/Ai14/Fmr1 KO and control mice to permanently label wake or sleep-active neurons with the reporter tdTomato following 4-hydroxytamoxifen injection either prior to SD or at the beginning of subsequent sleep, respectively. Number of tdTomato positive cells (marking active neurons) within each region are quantified. In the second approach, the activity of LC neurons during different sleep states was measured. Dbh-cre animals were injected with AAV9-CAG-FLEX-jGCaMP8s-WPRE to express the calcium indicator specifically in LC-NE neurons and were implanted with an optical fiber and EEG/EMG devices. Simultaneous fiber photometry and EEG/EMG recordings were then obtained to investigate LC activity during different sleep stages.

Results: Preliminary results indicate that animals followed the SD paradigm, but on-going work is quantifying active neurons in sleep and wake-active regions. The fiber photometry experiments indicate that LC activity is high during wake and microarousals, moderate during non-rapid eye movement (NREM) sleep, and is mostly silent during REM sleep. We also found that sleep deficits in the Fmr1 KO were observed at 2.5months and 5 months but not observed at 3-3.5months.

Conclusion: Our preliminary data indicate that the methodology used to capture the activity of neurons during natural sleep and following SD, coupled with the sleep impairments displayed by the Fmr1 KO mice, will shed light on the neuronal mechanisms that underlie sleep impairment in FXS.

Abstract 61

Characterizing the Utility of Hospital Price Estimator Tools for Common Pediatric Services

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Background: In the US, almost 5 million children are uninsured. For the families of these children, transparent, upfront pricing is crucial to save costs and to avoid unexpected medical bills. In early January 2021, CMS implemented the Hospital Price Transparency rule, requiring hospitals to make their prices publicly available through two formats: a machine-readable file and a patient price estimator tool for 70 CMS-required "shoppable" services.

Significance: Numerous studies on price transparency have been conducted using machine readable files. However, there is a paucity of investigation analyzing the utility of the patient facing price estimator tools. This study takes a patient-first approach in characterizing the experience of families comparing prices for pediatric services using a hospital's price estimator tool.

Hypothesis: We hypothesized that price estimator tools would vary widely amongst hospitals and would display wide price variation for common pediatric services, limiting the utility of them for families.

Experimental Design: A cross-sectional analysis of price estimates for six different pediatric services (T&A <12 yrs, Brain MRI w/ and w/o contrast, Colonoscopy w/ Biopsy, EGD w/ Biopsy, CBC, and CMP) was conducted using publicly available price estimator tools for ten major, geographically distinct, academic children's hospitals spanning six U.S. regions (Northeast, Mid-Atlantic, Midwest, Rocky Mountain, Pacific, and Southwest).

Results: All hospitals had price estimator tools available on their websites without needing an account or registration. However, one hospital required patient identifiers and half required CAPTCHA verification to utilize the tool. Prices were retrievable for 70–90% of procedure-hospital combinations, with EGD having the lowest availability (70%). The median self-pay prices (IQR) for the services include the following: T&A $14,134 ($9,416); MRI Brain $6,031 ($3,949); Colonoscopy $17,121 ($12,239); EGD $10,212 ($10,844); CBC $120 ($401); CMP $343 ($563). Max:min price ratios were T&A 9.0x; MRI Brain 4.5x; colonoscopy 14.0x; EGD 30.6x; CBC 18.3x; CMP 13.0x. Price estimators were not standardized across hospitals; no hospitals confidently displayed all-inclusive pricing, and service component breakdowns were variable.

Conclusion: While the current study includes only a small portion of all US pediatric hospitals, the drastic variation in price along with a lack of standardization within the estimators themselves make it difficult for families to be well informed and comfortably shop for these services. These findings suggest that, in their current form, price estimator tools may obscure rather than clarify the true cost of care for families trying to shop for common pediatric services.

Abstract 62

Use of Donor Breast Milk in Newborn Nurseries at CHI Lakeside & CHI Immanuel Hospital

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Background: The unanimous recommendation by the American Academy of Pediatrics, World Health Organization, and Center for Disease Control is to exclusively breastfeed infants for the first 6 months of life. This prompted the Common Spirit Health objective that 65% of full-term neonates in the newborn nurseries will be exclusively breastfed, defined as receiving only maternal breastmilk (MBM) and/or donor breastmilk (DBM).

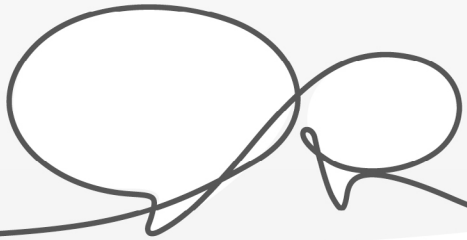
Significance: The purpose of this study is to obtain baseline data regarding maternal & neonatal factors influencing the use of donor breastmilk at the newborn nurseries at CHI Immanuel Hospital and CHI Lakeside Hospital. This study seeks to understand shortcomings of meeting the 65% goal of exclusive breast feeding.

Hypothesis: We hypothesized that a multidimensional combination of maternal and neonatal factors including maternal ethnicity, maternal race, and neonatal birth weight will most strongly influence the use of DBM during the infant's time in the newborn nursery.

Experimental Design: This retrospective cohort study reviewed records of full-term neonates admitted into the newborn nurseries at CHI Immanuel (n=175) and CHI Lakeside (n=297) between September 2024 and December 2024. Data extracted from neonate electronic medical records included lactation records, birth weight, gestational age, gravida/para, as well as maternal age, race, ethnicity, and marital status. Characteristics of those receiving DBM were compared against non-DBM recipients utilizing chi-square tests to determine statistical significance.

Results: Of the 297 newborns born at CHI Lakeside, 57 (19.19%) received DBM. Significant predictors of DBM recipients included first-time motherhood (p=0.019), defined as gravida 1/ para 0, and gestational age (p=0.0034). Similarly, 27 (15.42%) of the 175 newborns born at CHI Immanuel received DBM. First-time motherhood (p=0.045) and gestational age (p=0.013) were the most significant predictors once again. At CHI Lakeside, insignificant predictors of DBM recipients included race (p=0.93), ethnicity (p=0.86), marital status (p=0.56), maternal age (p=0.29), and birthweight (p=0.8). This statistical insignificance was replicated at CHI Immanuel, where race (p=0.08), ethnicity (p=0.26), marital status (p=0.36), maternal age (p=0.47), and birthweight (p=0.14).

Conclusion: Results from both CHI Lakeside and CHI Immanuel demonstrated that gestational age and first-time motherhood were the strongest predictors of neonates receiving DBM, suggesting the importance of the early post-partum period and maternal developmental factors. For future study, a larger sample size including newborn nurseries at all CHI hospital locations should be utilized to further evaluate the significance of socioeconomic predictors.



Abstract 63

Timing of Vitamin K Administration in Circumcision Among CHI Hospitals

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Background and Significance: The American Academy of Pediatrics (AAP) states that the benefits of circumcision slightly outweigh the risks, with bleeding being the most common complication. Neonates are deficient in vitamin K—and consequently prothrombin and factor VII—placing them at risk for vitamin K deficiency bleeding (VKDB). To prevent VKDB, the AAP recommends intramuscular vitamin K within 6 hours of birth. At CHI hospitals, vitamin K is typically given 1 hour after birth, but delays for family bonding create variability in administration timing and the prophylaxis to circumcision interval. Circumcision is delayed at least 12 hours after birth to reduce bleeding risk, but national guidelines do not clearly define the optimal interval between vitamin K administration and circumcision.

Hypothesis: The timing of vitamin K administration and prophylaxis to circumcision interval differ by birthing center, delivery mode, and birth weight percentile.

Experimental Design: In this retrospective multicenter cohort study, we used EPIC to identify male neonates born at CUMC–Bergan Mercy (n=120), Lakeside (n=100), and Immanuel (n=103) who received vitamin K. Of these, 68, 84, and 75 neonates, respectively, underwent circumcision. Eligible infants were born between 36–42 weeks beginning July 2024. Independent variables included birth center, delivery mode, and birth weight percentile. Dependent variables were timing of vitamin K administration and circumcision. Exclusion criteria were NICU admission and contraindications to circumcision. Kruskal–Wallis and Mann–Whitney U tests were used, with significance set at $p<0.05$.

Results: Mean age at vitamin K administration differed significantly across centers: Bergan 63.7 min, Lakeside 99.6 min, Immanuel 125.2 min ($p<0.05$). At Bergan, cesarean-born neonates received vitamin K earlier than vaginal births (25.4 vs. 79.9 min, $p<0.05$). At Lakeside, cesarean-born neonates received vitamin K later than vaginal births (117.3 vs. 91.3 min, $p=0.52$). At Immanuel, cesarean-born neonates received vitamin K earlier (84.2 vs. 132.7 min, $p=0.10$). Median timing did not differ significantly by birth weight percentile at any center. The interval between vitamin K administration and circumcision was similar across sites (~27 hours, $p=0.92$).

Conclusion: Neonates at Bergan receive vitamin K significantly earlier than those at Lakeside and Immanuel, with earlier administration also observed among cesarean births at Bergan. No significant differences were found by birth weight percentile or in the interval between vitamin K administration and circumcision. All centers administer vitamin K within AAP guidelines, and circumcision occurs roughly one day post-prophylaxis, allowing adequate hemostatic protection. Findings highlight opportunities for standardization to reduce inter-hospital variability.

Abstract 64

Timing of Neonate Circumcision and Discharge Among CHI Hospitals

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Background and Significance: In 2012, the American Academy of Pediatrics concluded that the benefits of neonatal circumcision slightly outweigh the risks, including decreased rates of urinary tract infections, sexually transmitted infections, and penile cancer, with risks such as bleeding and cold stress. While timing of circumcision is often guided by institutional policy, safe performance immediately after birth is not well defined. Across CHI hospitals, circumcision is typically delayed at least 12 hours after birth, though this is not standardized. Similarly, discharge is often delayed at least six hours post-procedure to monitor for complications, despite guidance suggesting that shorter observation periods may be sufficient. Even within a single health system, this variability raises questions about consistency in patient safety and resource utilization.

Hypothesis: Birthing center within the CHI system influences circumcision rates, timing of circumcision, and the interval between circumcision and discharge.

Experimental Design: This retrospective multi-center cohort study utilized EPIC to identify male neonates (36–42 weeks gestation) born July–December 2024 at three CHI hospitals: CUMC-Bergan Mercy (n = 121), Lakeside (n = 105), and Immanuel (n = 111), of whom 68, 84, and 75 underwent circumcision. Exclusion criteria included NICU admission and contraindications to circumcision. Outcomes included circumcision rates, age at circumcision, and time from circumcision to discharge. Kruskal–Wallis and Mann–Whitney U tests were used for non-normally distributed continuous variables, and Chi-square with Bonferroni correction for categorical comparisons ($p < 0.05$).

Results: Circumcision rates differed across hospitals ($p < 0.001$): Bergan 56.2%, Lakeside 80.0%, and Immanuel 67.6%, driven by higher rates at Lakeside compared to Bergan ($p < 0.001$). Median age at circumcision was similar across hospitals ($p = 0.66$): Bergan 26.4 (21.6–33.9), Lakeside 25.3 (20.9–38.7), and Immanuel 26.3 (21.6–34.8) hours. In contrast, median time from circumcision to discharge differed significantly ($p < 0.001$): Bergan 24.2 (5.0–29.3), Lakeside 7.6 (4.6–26.8), and Immanuel 6.6 (4.6–25.3), with longer times at Bergan compared to both other hospitals ($p < 0.001$), and no difference between Lakeside and Immanuel ($p = 0.80$).

Conclusions: Even within a single health system, circumcision rates and post-procedural discharge timing vary, while timing of circumcision itself remains consistent. This suggests that institutional workflows and discharge practices—rather than clinical timing—drive differences in care. Standardizing post-procedural processes across sites may improve consistency and efficiency without compromising patient safety.

Abstract 65

Who Performs Neonate Circumcision? Provider Mix Across CHI Hospitals

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Background and Significance: In the United States, neonatal male circumcision is most commonly performed during the birth hospitalization by obstetricians and pediatricians, with family medicine physicians contributing variably depending on institutional staffing models, training pathways, and call structure. Prior studies demonstrate substantial inter-hospital variation in provider specialty, reflecting differences in provider availability and local practice norms. However, most literature describes national trends rather than variation within a single health system. Differences in provider specialty may also influence downstream care processes, including discharge timing, through variations in workflow, rounding structure, and post-procedural practices. Understanding these differences within a single health system may help identify opportunities to improve consistency in care delivery.

Hypothesis: Provider specialty differs across hospitals within the CHI system and is associated with variation in time from circumcision to discharge.

Experimental Design: This retrospective multi-center cohort study utilized EPIC to identify male neonates (36–42 weeks gestation) born July–December 2024 at CUMC-Bergan Mercy (n = 121), Lakeside (n = 105), and Immanuel (n = 111), of whom 68, 84, and 75 underwent circumcision. Provider type was categorized as OB/GYN, Pediatrics (including Med/Peds), or Family Medicine. Outcomes included provider distribution and time from circumcision to discharge (hours). Chi-square testing was used to compare provider distribution across hospitals, and Kruskal–Wallis testing was used to compare discharge timing by provider type ($p < 0.05$).

Results: Provider type differed significantly across hospitals ($p < 0.001$), with OB/GYN predominating at Lakeside (89.3%), Pediatrics contributing more at Bergan (36.8%), and Family Medicine overwhelmingly performing circumcisions at Immanuel (93.3%). Time from circumcision to discharge also differed by provider type ($p = 0.033$). Median discharge times were longer for OB/GYN (11.9 [4.6–28.9] hours) compared to Pediatrics (6.2 [3.5–27.8]) and Family Medicine (6.3 [4.6–25.6]).

Conclusion: Within a single health system, provider specialty performing neonatal circumcision varies substantially and is associated with differences in post-procedural discharge timing. In conjunction with observed variation in discharge timing across hospitals, these findings suggest that institutional workflows and provider structure contribute to variability in care. Standardizing post-procedural processes across sites may improve consistency and efficiency without compromising patient safety.

Abstract 66

Hydrops Fetalis in a Case of LZTR1-associated Noonan Syndrome

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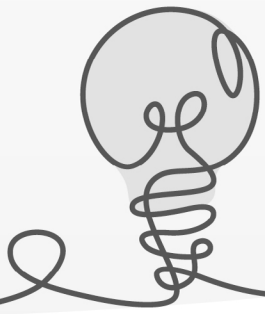
Background: At 27w6d, a male infant was born via urgent C-section due to the G1P0101 mother presenting 9cm dilated in preterm labor and the patient in breech position. Pregnancy was complicated by uterine fibroids, marginal cord insertion, and a fetus with left urinary tract dilation A1 (UTDA1) noted on the 20-week fetal anatomy ultrasound. Upon delivery, the infant was noted to be hydroptic with severe, diffuse edema of the face, scalp, chest, and abdomen. He emerged limp and without spontaneous respirations. He received standard neonatal resuscitation, ultimately requiring intubation, surfactant, bilateral pleurocentesis, and central line placement. In the NICU, he was stabilized with bilateral thoracotomy tubes and placed on the High Frequency Oscillator Ventilator. Pleural fluid analysis was consistent with chylous effusion. His hospital course was complicated by persistent bilateral chylothorax requiring chest tubes; hypotension requiring multiple vasopressors secondary to intravascular depletion and third spacing; coagulation dysfunction and anemia requiring multiple blood product transfusions.

Diagnosis: Various etiologies for immune and non-immune hydrops fetalis were investigated. As part of the work-up, Genetics was consulted. Whole genome sequencing was performed and identified a heterozygous de novo pathogenic variant in LZTR1 (c.272 T> C; p. Met91Thr), consistent with autosomal dominant (AD) Noonan syndrome (NS).

Significance: NS is one of several RASopathies, a group of developmental syndromes caused by germline mutations in genes involved in RAS/MAPKinase signaling pathways. Of all the RASopathies, NS has one of the broadest genetic heterogeneities. About 8% of NS is attributed to pathogenic variants in the LZTR1gene. However, this patient's specific variant (c.272 T> C; p. Met91Thr) has not been previously reported in the literature. Only one other variant at that codon (Met91Val) has been described as associated with AD NS [2]. This patient's missense variant in the Kelch domain is consistent with other variants resulting in AD NS. The variants in this region have been shown to impact intracellular protein binding, signaling, and downstream effects on the RAS/MAPKinase pathways.

Hydrops fetalis has been previously implicated in cases of NS with pathogenic variants in PTPN11, RAF1, RIT1, and RRAS2 genes. However, no cases of hydrops fetalis have been reported in LZTR1-associated NS. Overall, the phenotypic characteristics of NS vary in severity, age of presentation, and often have genotypic correlations [4]. This underscores the importance of reporting phenotypes associated with specific pathogenic variants – especially variants that have not been previously reported in the literature.



Abstract 67

Discovery of Pneumocephalus Post Ventricular Shunt Placement in Premature Infant

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Premature infant born at 27w5d via emergency C-section due to maternal seizures. He was intubated at birth but eventually weaned to low flow nasal cannula (LFNC). Day of life (DOL) 7 head ultrasound showed bilateral grade 3 germinal matrix hemorrhages with hydrocephalus. Neurosurgery placed reservoir on DOL 31. VP shunt placed on DOL 67.

After shunt placement, patient had little symptoms of hydrocephalus. On DOL 86-88, patient started having more events of apnea and bradycardia. Several events required intervention. He was more sleepy than previous days, but was responsive, interactive, and nursing.

The patient was responsive to touch, sound, and pain, and appeared comfortable on exam. His head circumference had grown 2 cm in about 2 days. His fontanelle was full, but soft and non-bulging. Moro reflex intact bilaterally. Babinski positive as well as toe and palmer grasp bilaterally. Rest of exam was unremarkable.

A shunt series and head CT were obtained, and neurosurgery was contacted. The CT scan showed pneumocephalus with air present in both lateral ventricles, causing ventriculomegaly with midline shift, but no signs of tension.

The shunt valve was set to the 'off' setting to avoid inward suction and possible worsening of pneumocephalus. One liter of LFNC was started to provide support and reduce the need for positive pressure ventilation which might worsen pneumocephalus.

After facility transfer, a cisternogram was completed, with an injection of radiolucent dye through the shunt reservoir performed. Serial head CT scans were completed along with repeat MRI. No definitive location of CSF leakage was identified, and skull base appeared intact. No integrity problems with original hardware were found on shunt exploration. The proximal catheter and valve were replaced. No definitive source of air was identified. The pneumocephalus was resolved on subsequent imaging.

Pneumocephalus is a rare and serious outcome, especially in neonates. It requires prompt identification and treatment. Risk factors include VP shunt placement with unknown skull defect or CNS infection (Khanolkar, S.A, 2015). Some case reports indicate that LFNC and HFNC may be a risk as well (Jasin, L.R., et. Al, 08; Sugimoto, A., et. Al, 2014). If concerned of pneumocephalus, then immediately obtain clinically relevant head imaging. Emergent management includes optimal positioning and increasing percentage of FIO2 to optimize wash-out of pulmonary nitrogen and air resorption (Siegal 2018). However, in the neonatal population, administration of increased FIO2 without exposure to increased positive airway pressure may be limited.

Abstract 68

Factors That Influence Use of Donor Breast Milk in Newborn Nurseries

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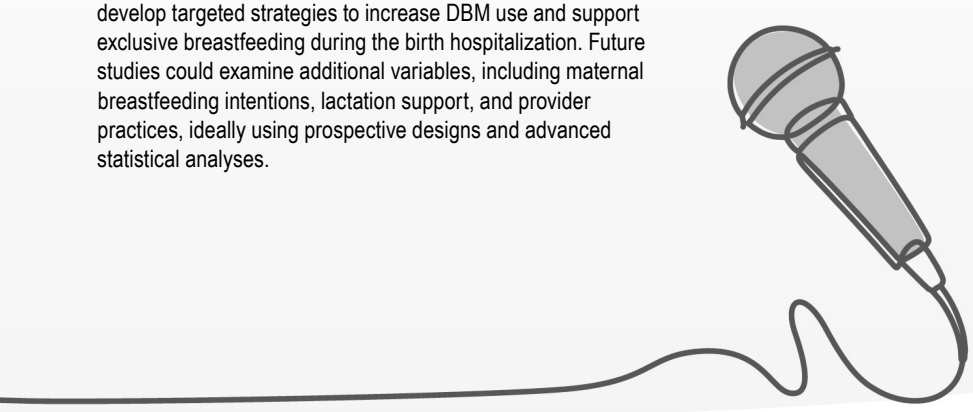
Background and Significance: Exclusive breastfeeding (EBF) for the first six months is strongly recommended by major health organizations due to its established benefits for infant health and development. Donor breast milk (DBM) is increasingly used in newborn nurseries, especially for term infants, and is counted toward EBF status at CommonSpirit Health, whereas formula use disqualifies infants from being considered exclusively breastfed. Understanding which maternal and infant characteristics influence DBM use is critical for developing strategies to support EBF in the hospital, yet data on predictors of DBM use remain limited.

Hypothesis: We hypothesized that both maternal and infant characteristics, such as gestational age, maternal age, parity, and sociodemographic factors are associated with the likelihood of DBM use during the birth hospitalization of term newborns.

Experimental Design: We conducted a retrospective chart review of 882 mothers and their term neonates born at CHI Bergan Mercy Hospital between September and December 2024. Maternal and infant data were extracted from electronic medical records, including gestational age, maternal age, parity, race, ethnicity, marital status, and birth weight. Statistical analyses included descriptive statistics, Pearson correlation coefficients, chi-square tests, and multivariable logistic regression to identify independent predictors of DBM use.

Data and Results: Of the 882 newborns, 118 (13.4%) received DBM. Simple correlations indicated weak relationships between DBM receipt and gestational age ($r = -0.16$), maternal age ($r = 0.14$), and parity ($r = -0.15$). Multivariable logistic regression demonstrated that lower gestational age (OR = 0.66, 95% CI: 0.54-0.80), higher maternal age (OR = 1.10, CI: 1.05-1.15), and lower parity (OR = 0.65, CI: 0.47-0.88) were significant independent predictors of DBM use ($p < 0.01$ for all). Race, ethnicity, and marital status were not significant predictors.

Conclusion: Our findings suggest that developmental and clinical factors, such as gestational age, maternal age, and parity, are more influential than sociodemographic characteristics in determining DBM use in term newborns. These results align with clinical expectations, as infants with lower gestational age or born to first-time mothers may require additional feeding support. Understanding these factors can help hospitals develop targeted strategies to increase DBM use and support exclusive breastfeeding during the birth hospitalization. Future studies could examine additional variables, including maternal breastfeeding intentions, lactation support, and provider practices, ideally using prospective designs and advanced statistical analyses.



Abstract 69

Coactivator Associated Arginine Methyltransferase 1 as a Therapeutic Target for Medulloblastoma

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Background. Medulloblastoma (MB) is the most common malignant pediatric brain tumor, accounting for ~20% of cases and remaining a leading cause of cancer-related death in children. Among its four molecular subgroups, Group 3 MB (G3MB) comprises ~25% of cases and has the poorest prognosis due to MYC amplification and high metastatic potential. Emerging evidence highlights widespread alterations in epigenetic regulators in MB, suggesting epigenetic dysregulation as a key driver of tumorigenesis.

Significance of Problem. Current therapies, including surgery, radiation, and chemotherapy, are associated with severe long-term toxicities, such as neurological deficits, endocrine dysfunction, and secondary malignancies. Notably, there have been no major advances in targeted therapies for MB over the past two decades, underscoring a critical need to identify novel, targetable drivers of disease progression and therapeutic resistance.

Hypothesis. We hypothesize that CARM1 triggers hypermethylation of its substrates that are critical for MB tumor progression.

Experimental Design. To investigate the oncogenic role of CARM1 and evaluate its therapeutic potential, we performed CellTiter-Glo assays and colony formation assays to assess cell viability and proliferation, and Annexin V staining and Western blot analysis to measure apoptosis, both alone and in combination with cisplatin or radiation. RNA-seq was used to define transcriptional changes following CARM1 inhibition, with key targets validated by siRNA-mediated knockdown. Western blot and ChIP-qPCR were conducted to assess changes in histone modifications, and alkaline comet assays were used to evaluate DNA damage repair following CARM1 inhibition with radiation or MMS treatment. Finally, we tested the efficacy of CARM1 inhibition alone and in combination with cisplatin in subcutaneous xenograft models.

Results/Data. A screen of 462 epigenetic inhibitors identified CARM1 as a top candidate promoting MB cell death. CARM1 was found to be overexpressed in MB cells and tumors and associated with poor patient survival. Pharmacological inhibition of CARM1 reduced cell viability and proliferation while inducing apoptosis, with enhanced effects observed in combination with cisplatin or radiation. RNA-seq and siRNA knockdown revealed that CARM1 regulates MYC and multiple DNA repair genes. Inhibition of CARM1 reduced global H3R26 methylation and altered H3K27ac mark at the Cyclin D1 promoter. Finally, CARM1 inhibition and cisplatin significantly suppressed G3MB tumor growth in vivo.

Conclusion. These findings identify CARM1 as a key epigenetic regulator of MB tumorigenesis and therapeutic resistance. Its overexpression, association with poor outcomes, and enhanced efficacy in combination with standard therapies support CARM1 as a promising adjuvant therapeutic target in MB.

Abstract 70

Tangeretin Alleviates Oxygen-Glucose Deprivation-Induced Injury in Neuro2a Cells Through Akt Phosphorylation

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Background: Hypoxic-ischemic brain injury (HIBI) is a serious condition that happens when the brain is deprived of oxygen (hypoxia) and blood supply (ischemia). Tangeretin is a polymethoxylated lipophilic flavonoid isolated from peel of citrus plants. It has potent antioxidant, anti-inflammatory, and anti-ischemic effects in adult injuries.

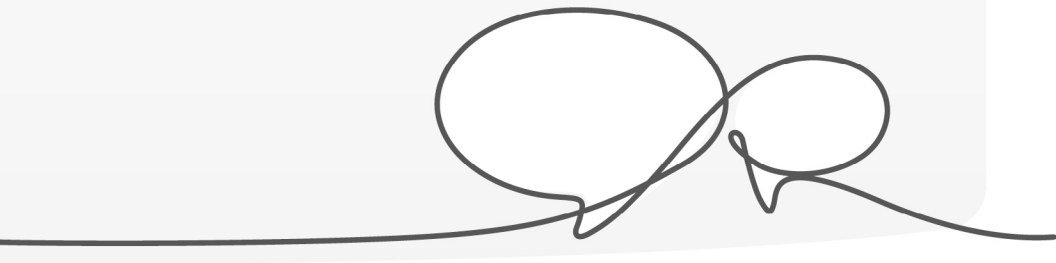
Significance: Approximately half of all infants with moderate-severe neonatal HIBI die or develop life-long neurological impairments such as cerebral palsy and cognitive abnormalities. Therapeutic hypothermia (TH) started within 6 hours of birth is the only approved treatment option available for neonates in high income countries, though effects remain poor despite optimal treatment. Moreover, a recent trial reported negative outcomes after TH in certain lower- and middle-income countries, highlighting the need to explore other cost-effective and broadly available treatment alternatives.

Hypothesis: We hypothesized that tangeretin would improve neuronal cell survival and mitochondrial membrane potential (MMP) after oxygen and glucose deprivation with reperfusion (OGD/R) to mimic HIBI via phosphorylation of Akt in Neuro2a (N2a) cells.

Experimental design: N2a cells were injured with OGD (hypoxia chamber was flushed with N2 at 20 L/minute for 8 minutes, tightly sealed and placed in the incubator at 37°C for 3 hours) followed by 21 hours of reperfusion. Tangeretin or DMSO vehicle was added immediately as the start of reperfusion. Experimental groups included control cells maintained at normoxia with glucose-rich media, OGD/R+DMSO, OGD/R+tangeretin and OGD/R+tangeretin+MK2206 (allosteric Akt inhibitor). Cell viability was quantified by Alamar blue assay. Protein expression of pAkt (ser 473) was evaluated using western blot. Cell death after OGD/R was evaluated with propidium iodide (PI) stain and apoptosis via TUNEL assay. MMP was determined by JC-1 fluorescence.

Results: Tangeretin significantly improved cell viability after OGD/R (86.5±10.5% vs 65.8±14.6%). Co-treatment with MK2206 abolished the tangeretin cell survival effects (54.7±9.0%). Consistent with this finding, western blot data showed significant increased pAkt (Ser473) protein expression following tangeretin treatment but was decreased by co-treatment with MK2206. Similarly, tangeretin significantly decreased the percentage of PI (56.1±5.1% vs 94.5±2.2%) and TUNEL positive cells (62.5±4.2 vs 86.0±2.4) compared to the OGD/R+DMSO group. Apoptotic cell death and MMP were increased in OGD/R compared with normoxia, and both were significantly attenuated by tangeretin. These effects were also inhibited by MK2206 co-administration.

Conclusion: The current study indicates that tangeretin exerts neuroprotection against OGD/R by enhancing neuronal survival in N2a cells, maintaining MMP and suppressing apoptosis. In the future, we will explore the effects of tangeretin on primary neuronal cells and in animal models.



Abstract 71

Exploring Auditory and Tactile Behavioral Phenotypes in a Mouse Model of Fetal Alcohol Spectrum Disorders

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Background: Consumption of alcohol during pregnancy can result in fetal alcohol spectrum disorders (FASD). Individuals with FASD across the spectrum often experience impaired auditory and tactile processing, leading to abnormal auditory and tactile behaviors.

Significance: Although prenatal alcohol exposure (PAE) at low to moderate levels is a dominant type of exposure, no animal studies have investigated the effects of sustained low to moderate level exposure to alcohol prenatally on offspring auditory and tactile function.

Hypothesis: We hypothesize that chronic low to moderate level of PAE impairs auditory and tactile processing.

Experimental Design: For this study, we use a voluntary drinking paradigm to model PAE in mice. To examine the impact of PAE on temporal processing of auditory processing, we performed gap-prepulse inhibition of the acoustic startle response in 6-7-week-old control and PAE mice. We developed a linear regression algorithm to be able to classify true startle and non-startle responses which is currently being validated. Analysis for gap startle ratios of the true startles will be performed to examine impairments in the central auditory pathway. For examining tactile processing, we are investigating movement and avoidance behaviors during whisker stimulation in 7–8-week-old control and PAE mice. c-Fos studies are being performed to study neural activation in brain regions in the auditory and tactile systems to examine region specific deficits in auditory and tactile processing.

Results: Our analysis of auditory and tactile behaviors and c-Fos analysis are ongoing. Training accuracy for the linear regression model is currently 0.9344. Preliminary analysis points towards impaired temporal processing in PAE mice.

Conclusion: Our auditory brainstem response (ABR) studies show that PAE mice exhibit increased hearing thresholds, reduced response amplitudes, prolonged latencies, and hyperactivity of the brainstem auditory system relative to peripheral activity. Our ongoing work on gap-prepulse inhibition studies will further shed light on whether the auditory processing deficits arise from cortical or subcortical regions or both.

Abstract 72

Maternal Plasma Carotenoid Levels During Preeclampsia and Normotension at Mid-Pregnancy and Delivery

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Background: Preeclampsia (PE), a hypertensive condition affecting 2-8% of pregnancies, increases maternal and infant morbidity and mortality. During PE, placental hypoxia induces oxidative stress, contributing to inflammation and endothelial dysfunction, resulting in maternal hypertension, premature birth, and impaired fetal growth. Carotenoids are dietary antioxidative nutrients that are postulated to regulate oxidative stress during PE. Studies demonstrate lower carotenoid concentrations in patients with PE compared to normotensive (NT) patients. Umbilical cord blood carotenoid levels are also lower for infants born to patients with PE versus NT patients. Less is known about the change in plasma carotenoid concentrations from mid-pregnancy to delivery between NT versus PE patients.

Significance of Problem: PE pregnancies have increased oxidative stress, negatively impacting both maternal and infant outcomes. The ability of carotenoids to regulate oxidative stress makes them an ideal therapeutic intervention. Characterizing differences in carotenoids between PE and NT pregnancies will elucidate their bioavailability and potential to minimize PE pathophysiology for mother and infant.

Question: How do plasma carotenoid levels change from mid-pregnancy to delivery between and within NT and PE patients?

Experimental Design: We performed an observational cohort study of pregnant patients recruited at UNMC. PE and NT designations were based on electronic medical record (EMR) diagnoses. Clinical variables, including maternal age, diabetes, pre-pregnancy BMI, and corrected gestational age, were collected from the EMR. Maternal blood samples were obtained at 24-28 weeks of gestation and at delivery. Plasma was isolated from whole blood by centrifugation, and levels of carotenoids (zeaxanthin-lutein, lycopene, β-carotene, and α-carotene) were analyzed using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Multivariate linear regression analyses were conducted in Stata 19 with a threshold of significance at $p<0.05$.

Results: 74 patients (64 NT,10 PE) were recruited. Zeaxanthin-lutein levels at 24-28 weeks were negatively associated with PE (β=-0.294, p=0.047). There were no significant associations with other carotenoids. Carotenoid levels were lower in PE versus NT at mid-pregnancy and delivery and increased over time. Although not statistically significant, fold changes in plasma carotenoid levels between mid-pregnancy and term were greater in PE versus NT patients.

Conclusions: We observed trends of lower carotenoid levels at mid-pregnancy and delivery in PE. Carotenoid levels increased from mid-pregnancy to delivery in PE and NT. In the context of stable carotenoid intake in NT and PE observed in prior studies, our findings may indicate mobilization of carotenoids for their antioxidative properties during PE pregnancy progression.