Department of Pediatrics
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

2023 RESEARCH WEEK

Abstract Book

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Friday, May 19

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1:30–3 p.m. — Platform Presentations, HSLC 1345 and online viz Zoom

3–5 p.m. — Poster Presentations and Reception, HSLC Atrium

About Research Week

The Department of Pediatrics Research Week is an annual weeklong event offering daily activities that serve as an update on the latest advances in pediatric research.

For a full list of the week's events May 15–19, 2023, please visit the Research Week web page.

Platform Presentations

Friday, May 19, 1:30–3 p.m.

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2–2:15 p.m.	Victoria Adkins	Level of Peer Support Is Associated with Social Media Attitudes and Posting Behavior in Youth
2:15–2:30 p.m.	Courtney Gaberino, MD	Mepolizumab Alters Regulation of Airway Type-2 Inflammation in Urban Children with Asthma by Disrupting Eosinophil Gene Expression
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***Effects of Congenital Iron Deficiency on Hematopoietic Cell Lineages in Rats**

Mukhtarova N, Babu A, Smith Z, Siddappa A, Kling P

Background: Gestational iron deficiency (ID) is common and may limit fetal iron status, i.e., cause congenital ID that impairs red blood cell (RBC) production. Less is known about how gestational ID impacts other hematopoietic cell lineages. The objective of this study is to leverage an established model of gestational ID to study short- and long-term impact on hematopoietic lineages in neonatal rats.

Design/Methods: Gestational ID was created by ID diet to pregnant rats on pregnancy day 2 to postnatal (P)7, vs. iron sufficient (IS) control diet. We measured iron tests, complete cell count and complete cell counts in offspring at postnatal day (P)2-3 neonates, P15 suckling, and formerly ID P45 adolescence.

Results: ID P2-3 neonatal rats had 350% higher ZnPP/H ratios 70% lower plasma ferritin, 30% lower hemoglobin, and RBC than IS, all $p< 0.004$. Additionally, ID P2-3 neonatal rats had 25% lower platelets and 36% lower white cell counts (WBC), and proportionately lower lymphocyte and granulocyte numbers, all $p< 0.015$. At P2-3, microscopic cell morphology differed in RBC, WBC, and platelets, including 37% larger mean platelet volume, $p< 0.0001$. P15 suckling rats had 98% higher ZnPP/H ratios, 70%lower plasma ferritin, 40% lower hemoglobin, 4% lower RBC than IS, all $p< 0.006$. In formerly ID P45 adolescent rats, ZnPP/H, plasma ferritin, RBC, WBC, and platelet counts did not differ, although lymphocyte numbers were 19% lower and granulocytes were 50% higher, $p< 0.015$ for both. Microscopic abnormalities in WBC and platelets remained, including 2.5% higher mean platelet volume, $p< 0.024$. At birth, the linear relationships between ZnPP/H rations and hemoglobin, RBC, platelets, WBC, lymphocytes, and granulocytes were all significant, range $p< 0.01$-0.0001. The relationship between index of erythropoietic stimuli, reticulocytes, was only significant with hemoglobin and RBC, $p< 0.03$ for both.

Conclusions: At birth, gestational ID offspring exhibited marked abnormalities in RBC, WBC, and platelet lineages, but after normalization, differences in adolescents were also seen. These include microscopic cell morphological abnormalities, relative granulocytosis, and relative lymphopenia. The strong relationships of these measures with iron status suggest iron and not erythropoietic stimulus driving these changes. The long-term programming of hematopoietic and especially immune cell lineages may be clinically relevant warranting further study.

**Accepted at Midwest SPR, Platform Presentation*

***Incidence and Outcomes of Vesicoureteral Reflux after Pediatric Renal Transplant**

Alexander K, Bartosh S, Engen R

Background: Vesicoureteral reflux (VUR) is a common urologic complication following pediatric renal transplant. There is little data on the incidence of VUR or its effect on histologic graft changes or graft survival.

Design/Methods: All pediatric renal transplant recipients from 2007-2020 underwent a voiding cystourethrogram at 6 months post-transplant and protocol biopsies at 3 months and 12 months post-transplant. Lich-Gregoir anastomosis technique was used for 95% of patients. Patients were categorized into groups based on VUR grade: no/low-grade VUR (grades 0-2) and high-grade VUR (grades 3-5). Outcomes included time to graft failure, change in eGFR, and Banff score on protocol biopsy.

Results: Among 67 pediatric renal transplant recipients, 35% had no VUR, 2% had grade 1 VUR, 21% had grade 2 VUR, 30% had grade 3 VUR, 11% had grade 4 VUR, and 2% had grade 5 VUR. When controlling for age, patients with high-grade VUR had increased risk of graft failure compared to patients with low-grade VUR (aHR 4.6 (95%CI 1.3-16.5) p=0.019)). Median decline in eGFR from 3 months to 5 years post-transplant was greater among those with high-grade VUR (-15.5 (IQR -19 to 16.7) ml/min/1.73m2) compared to those with no/low-grade VUR (0.55 (IQR -31.2 to -8.2) ml/min/1.73m2) (p=0.007). There was a trend toward more acute inflammation on protocol biopsy among those with high-grade VUR, as demonstrated by change in Banff t and i score, but this did not reach statistical significance.

Conclusions: Pediatric patients with high-grade VUR at 6-months post-renal transplant appear to have worse long-term graft function and increased risk of graft failure compared to patients with no or low-grade VUR. Larger studies are needed further characterize the relationship between VUR and graft outcomes.

**Accepted at American Society of Nephrology Kidney Week 2022*

***Level of Peer Support Is Associated with Social Media Attitudes and Posting Behavior in Youth**

Adkins V, Bliss L, Calvin A, Selkie E

Background: Youth with low in-person social support often go online to find social connection, which is important for overall wellbeing. These youth may post more online and have positive attitudes towards social media, as these platforms provide social support. We examine whether youth with lower social support from peers and close friends post more and have more positive attitudes about social media, compared to youth with higher social support.

Design/Methods: In a large cohort study, youth aged 13-15 completed surveys between March 12, 2019 and February 11, 2021. Participants completed questionnaires about demographics, positive and negative social media attitudes, and perceived social support from classmates and a close friend. Participants also granted permission for us to follow their Instagram, Facebook, and Twitter accounts, where we tracked the number of times they posted within a one-month period. An average positive attitude score and negative attitudes score were created from the survey items. Social support was measured by averaging responses to questions regarding social support from classmates and a close friend. We ran t-tests using SPSS to compare differences in social media posting and attitudes among youth with low social support (below median) to youth with high social support (above median).

Results: A total of 142 participants completed surveys (M_{age} = 13.6 years), 51.4% identified as female, 47.1% White, and 92.2% non-Hispanic. Youth with low classmate support had higher positive attitudes (M = 3.39) about social media compared to youth with high classmate support (M = 3.24, p = .04). There was no significant difference in positive attitudes between youth with low close friend support compared to youth with high close friend support (p = *.10)*. Youth with low classmate support posted more (M =13.00) than youth with high support (M = 5.06, p = .004.). Youth with low close friend support also posted more (M = 12.81) compared to youth with high close friend support (M = 4.73, p = .001).

Conclusions: Youth who do not feel supported by classmates or a close friend tend to post more on social media compared to youth who feel socially supported. Teens who struggle finding supportive relationships in-person may turn to social media for social connection and have positive views of social media. Future longitudinal research can help determine the impact of such connections on adolescent wellbeing.

**Accepted at Pediatric Academic Society 2023, Poster*

***Mepolizumab Alters Regulation of Airway Type-2 Inflammation in Urban Children with Asthma by Disrupting Eosinophil Gene Expression**

Gaberino C, Segnitz M, Cox M, Bacharier L, Calatron A, Gill M, Stokes J, Liu A, Cohen R, Makhija M, Khurana Hershey G, O'Connor G, Zoratti E, Teach S, Kattan M, Becker, P, Togias A, Busse W, Jackson D, Altman M

Background: Mepolizumab (anti-IL5) reduces asthma exacerbations in urban children with exacerbation-prone asthma. We previously utilized nasal transcriptomics to identify inflammatory pathways (gene co-expression modules) associated with exacerbations despite this therapy. To understand mepolizumab's precise impact on these pathways, we assess gene co-expression and changes in inter-gene correlation using differential gene correlation and network analyses.

Design/Methods: 290 urban children (6-17 years) with exacerbation-prone asthma and blood eosinophils ≥150/microliter were randomized (1:1) to every 4-week placebo or mepolizumab injections added to guideline-based care for 52 weeks. Nasal lavage samples were collected before and during treatment for RNA-sequencing. Differential gene correlation and network analysis was developed to quantify changes in gene pair correlation to assess interactions and regulatory aspects of type-2 and eosinophilic airway inflammation.

Results: Mepolizumab uncoupled co-expression of genes in an established type-2 inflammation gene co-expression module enriched for eosinophil, mast cell and epithelial IL-13 response genes (242 genes). During mepolizumab, but not placebo treatment, there was significant loss of correlation among eosinophil-specific genes including CCR3, RNASE2 (EDN), RNASE3 (ECP), CLC, SIGLEC8, IL-4, IL-5 and IL5RA, contrasting a reciprocal increase in correlation among IL-13, and mixed inter-gene correlation changes among mast cell-specific genes (HDC).

Conclusions: These results suggest mepolizumab disrupts the regulatory interactions of gene co-expression among airway eosinophils, mast cells and epithelium by interrupting transcription regulation in eosinophils with enhancement in mast cell and epithelial inflammation. This paradoxical effect may contribute to an incomplete reduction of asthma exacerbations and demonstrates how differential gene correlation and network analysis can identify targets for more precise therapies.

**Accepted at American Academy of Allergy, Asthma & Immunology 2023, Platform Presentation*

Tumor Secreted Factors Suppress Gamma Delta T Cell Activation

Ebben J, Hess N, Mayhew Z, Turciek D, Stram A, Hossein S, Kinney M, Kratz J, Capitini C

Background: Tumor mediated immune suppression drives resistance to immunotherapies. Challenging tumor immune microenvironments that are particularly suppressive, such as those found in pancreas ductal adenocarcinoma (PDAC) are characterized by significant gamma delta T cell (gDT) infiltration. We evaluated whether secreted factors produced by PDAC can change the functional capacity of gDT from healthy donors.

Design/Methods: gDT were obtained from healthy donors, with gDT isolation from PBMCs through negative magnetic bead selection (Stem Cell Technologies). gDT were incubated in media previously conditioned through culture of PDAC patient derived organoids for 72h (Jeremy Kratz lab). After incubation, gDT were activated using a CD3/CD28 cocktail. Cytokine production was detected by intracellular cytokine staining (ICS) and ELISA. PDAC conditioned media gDT were also exposed to K562 (lymphoma) target cells loaded with calcein dye to evaluate their killing ability. After 4h of K562/gDT coculture, fluorescence readings were taking to assess K562 lysis by gDT.

Results: gDT sustained in conditioned media exhibited significantly lower production of both interferon gamma and TNF alpha in response to TCR stimulation ($p<0.005$), when measured by both ICS and ELISA. In addition, gDT exposed to tumor secreted factors exhibit impaired killing ability against immunogenic target cells (K562; $p<0.05$).

Conclusions: Tumor secreted factors may play a key role in suppressing immune responses within the tumor microenvironment that are driven by gDT, and could be associated with the acquisition of alternate gDT phenotypes. This may be relevant in both PDAC as well as other adult and pediatric cancers that are highly resistant to immunotherapies. Additional study is needed to determine whether specific signaling within gDT can be modified across different pediatric and adult malignant disease sites to effectuate better immunotherapy responses.

***Parent Experience During Pediatric Medical Visits with Scribes**

Pletta K, Kerr B, Zhao Q, Eickhoff J, Moreno M

Background: Medical scribes can assist providers with documentation for the electronic medical record. Variable patient satisfaction has been found for emergency room, internal medicine and family medicine providers working with in-person scribes. Few studies have investigated providers working with medical scribes, particularly virtual, at pediatric medical visits. The learning objective is to understand parent perceptions of experiences during pediatric medical visits with presence of medical scribes (virtual or in-person) or no scribe.

Design/Methods: A national, cross-sectional online survey was completed by parents of children 0-17 years recruited through Qualtrics panels in August 2022. The survey assessed the following experiences in the most recent pediatric visit: scribe presence (virtual, in-person or no scribe), provider type, visit satisfaction, perception of physician communication and comfort with scribe presence. A generalized linear modeling approach with stepwise selection was used to adjust covariates when comparing results for visits with virtual, in-person and no scribe. Analyses adjusted visit satisfaction and physician communication for parent education and provider type and comfort with scribe for parent birth sex.

Results: A total of 2151 participants completed the survey; mean age was 36.82 years (SD = 9.11). Most identified as female (72.7%), Caucasian (74.9%) with some college education (72.7%) and 56.8% were most recently seen by their primary care pediatric provider for a well visit. About 6.4% reported a medical visit with virtual scribe presence, 25% an in-person scribe, and 68.6% no scribe. Significantly higher visit satisfaction was reported among participants with virtual scribe presence compared to in-person scribe and no scribe ($p < .001$). Perception of physician communication was not significantly different between participants with virtual scribe, in-person scribe and no scribe ($p=.643$). Significantly higher comfort with scribe was reported for participants with virtual scribe presence compared to in-person scribe ($p < .0001$).

Conclusions: Findings support increased parent visit satisfaction at pediatric medical visits with virtual scribe presence and higher parent comfort with virtual compared to in-person scribes. Future studies are needed to further evaluate parent and pediatric patient experience during medical visits with presence of virtual, in-person or no scribe.

**Accepted at Pediatric Academic Society 2023, Oral Presentation*

Poster Presentations

Friday, May 19, 3–5 p.m.

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***Examining Virtual Research Recruitment and Participant Stressors in a Multi-center Birth Cohort, Childhood Allergy and the Neonatal Environment (Canoe)**

Afshan T, Rivera-Spoljaric K, Blackshere T, Kulkarni A, Tesson E, Hartert T, Zoratti E, Gern J, Joseph C, Singh A

Background: Recruitment for a NIH/ECHO supported multi-center birth cohort, "Childhood Allergy and the NeOnatal Environment" (CANOE) stopped due to the COVID-19 pandemic. Redesign of study procedures emphasized virtual and socially distanced activities, enabling full cohort enrollment during the pandemic. We hypothesized that higher COVID-19 pandemic-related stress and associated lifestyle changes would decrease research recruitment, but that this would be modified by the option for virtual research activities.

Design/Methods: Pregnant women (n=482) were recruited from four large academic medical centers in Detroit MI, Madison WI, Nashville TN, and St. Louis MO using a variety of methods (in person, telephone, social media, and many others). We collected demographic, social, vaccine status, and COVID-19 stressor-related data via questionnaires given to the mothers upon enrollment. COVID-19 stressors included impacts on health, finances, work, childcare, and access to a variety of basic needs.

Results: The cohort includes mothers self-identifying as Caucasian/White (52.7%), African American/Black (16.8%), Hispanic/Latino (3.5%), Asian (4.7%), and American Indian/Alaskan Native (1.4%), with the majority of enrolled mothers aged 30-39 and a slight majority of first pregnancies. Most mothers enrolled in the study indicated experiencing 0-3 COVID-19 related stressors or lifestyle changes out of the 12 questionnaire stressors. Comparison of method of recruitment across groups (0-3, 4-6, or 7+ stressors) was not statistically significant. A large majority (78%) of mothers who shared their vaccine status had received at least one COVID-19 vaccination dose and almost all of these participants (96%) enrolled in the study after vaccination.

Conclusions: Prioritizing social distancing and virtual research activities along with diverse recruitment strategies enabled full enrollment of a birth cohort during the COVID-19 pandemic. Enrolled mothers indicated a wide range of pandemic-related stressors present in their lives, but this did not affect method of recruitment in a statistically significant way. Of COVID-19 vaccinated mothers, the vast majority received at least one vaccine dose prior to participation in research activities.

**Accepted at American Academy of Allergy, Asthma and Immunology 2023, poster*

***Characterization of KCNQ Sub-types in the Mouse Retinal Neurons**

Afsheen S, Shahi P, Pattnaik B

Background: Antiepileptic drugs that target KCNQ (Kv7) channels in the brain cause visual contraindications such as blurred vision and nystagmus. Complex KCNQ channels are a multimeric assembly of five subunits and the associated single-transmembrane-spanning regulatory subunits. KCNQ channel subunits are detected in the whole retina and functional channels in the RPE and rod photoreceptors. We hypothesize that the molecular action of antiepileptic KCNQ channel modulators in the retina is due to subtypes expressed in the specific retinal neurons.

Design/Methods: Molecular expression of KCNQ subtypes in the mouse retina and RPE, freshly enucleated, was determined using conventional PCR and immunohistochemistry. We detected transcripts for all KCNQ subunits (1-5) in both retina and RPE separated by agarose gel electrophoresis. The RNeasy mini plus kit (QIAGEN) was used to isolate mRNA, which was then converted to complementary DNA using high-capacity cDNA reverse transcription (Applied bio-systems). For each of the KCNQ subunits, specific primers were obtained from Integrated DNA Technologies. Immunohistochemistry (IHC) was performed on fixed whole eye sections to determine KCNQ subunit expression in individual retinal cells. The images were acquired and analyzed on a confocal microscope (Nikon C2 instrument). Each experiment was repeated along with proper controls.

Results: All five KCNQ (1-5) subunit transcripts identified by amplicon sizes were detected in mouse RPE. The hierarchical expression of KCNQs in RPE was KCNQ4> KCNQ5>KCNQ2>KCNQ1> KCNQ3. However, the KCNQ1 transcript was not observed in the retina, while other KCNQ (2-5) transcripts were present (n=3). We detected higher expression of KCNQ2 transcript in the retina compared to KCNQ3, KCNQ4, and KCNQ5. Our IHC data showed the presence of Kv7.4 (KCNQ4) in ganglion cells and Kv7.5 (KCNQ5) in ganglion cells and RPE cells. Kv7.3 (KCNQ3) expression is also detected in the retinal tissue, although the specificity has not been conclusive.

Conclusions: Our study demonstrates cell-type specific KCNQ transcripts and proteins in the mouse retina. The KCNQ profile in mouse retinal cells differs from what has been reported in non-human primates. Our further research endeavor will determine the functional difference between mouse and non-human primates to correlate the effect of anti-epileptic drugs on KCNQ subtypes in retinal neurons.

**Accepted at ARVO 2023, poster*

Development of Lung point of Care Ultrasound Curriculum for Pediatric Critical Care Nurses and Respiratory Therapists

Asamoa-Bonsu Y, Brazelton T, Sushant S, Al-Subu A, Foster R

Background: Point of Care Ultrasound (POCUS) has been increasing and expanding across medical specialties with various clinical applications. POCUS has been integrated in various curricular – medical schools, junior doctors. This has been utilized by medical doctors during neonatal and adult critical care transport. We hypothesized that with a formal curriculum using the Kern's model of Curriculum Development we could train Pediatric Critical Care transport nurses (RN) and Respiratory Therapists (RT) to identify normal and common lung pathologies – effusion, pneumothorax, edema, and consolidation using POCUS.
Design/Methods: An online survey to determine the needs assessment of POCUS was developed and distributed to members of the Section of Transport Medicine. 25 RNs and RTs took part in a - hour lecture held on 3 different occasions and undertook 10 pre- and 10 post-test questions with before each class and assessed. Each lecture was then evaluated by participants. A knowledge retention testing was also performed and assessed. During this period participants undertook some POCUS in the Pediatric ICU and also image identifications.
Results: The mean pre-test and post-test scores were 6.6 and 8.3 respectively with a p-value 0.0002. There was an increase in individual scores on all questions. The rest of the analysis is pending.
Conclusions: We demonstrated that a formal curriculum caused an increase in the test scores in RTs and RNs. We are still analyzing the level of knowledge retention after 6 months of education, evaluation of the curriculum and the survey results.

Connecting with Families about Cardiac Neurodevelopmental Services Online

Boyett Anderson J, Cisneros D, Olson K, Zhang X, Ferrazzano P

Background: Children with congenital heart disease (CHD) have more developmental, behavioral, and mental health issues than their peers. Early detection and intervention can reduce neurodevelopmental problems. Children are screened and receive treatment when their caregivers know it exists and understand the need. Most caregivers research their child's health and development online. We assessed information about neurodevelopment on the websites of programs caring for children with CHD. We hypothesized that institutional factors would more strongly correlate with online information than would the sociodemographic makeup of the community in which the program was located.
Design/Methods: This total population sample of programs in the Congenital Cardiology Today (CCT) Directory occurred during summer of 2022. Information about neurodevelopment on each program's website was systematically assessed using key term searches on both Google and the program's web site. The first ten results for each search were reviewed. Institutional and sociodemographic factors were extracted from multiple online databases, including the 2020 US Census, the 2015-2018 Society of Thoracic Surgeons (STS) Public Reporting for Congenital Heart Surgery database; and the 2022 Fellowship and Residency Information Database.
Uni- and multi-variate regression analysis was conducted using SPSS. All P values were 2-sided and $p<0.05$ was used to indicate statistical significance.
Results: Only 29% of the 129 programs listed in the CCT directory had information about neurodevelopment that could be found by searching the program website and 36% had information that could be found using Google. Of the 91 programs that contributed to the STS database, 42 (46%) had information that could be found using Google. Surgical volume, surgical complexity, and affiliation with a pediatrics residency or pediatric cardiology fellowship program correlated with neurodevelopmental information. State-level sociodemographic factors were not associated with existence of this information.
Conclusions: Fewer than half of programs performing heart surgery in children share information about neurodevelopment online. Parents searching for information will not find it and may not know that their cardiologist can help with their child's developmental, behavioral, or mental health concerns. Improved online messaging and pointed anticipatory guidance during regular clinic visits is needed.

Wide Variation in Online Communication about Developmental Sequelae of Critical Congenital Heart Disease

Chinman G, Boyett Anderson J, Cisneros D, Olson K, Ferrazanno P

Background: Children with congenital heart disease (CHD) have increased risk for developmental, mental, and medical concerns throughout their life. Parents rely on online information about their children's health and development. To ensure children with CHD receive recommended neurodevelopmental screening and intervention, their parents need reliable, accessible, and instructive information about these issues.

Design/Methods: A total population sample of congenital cardiac programs in the United States was generated from the Congenital Cardiology Today 2020-2021 directory. Program websites were accessed during summer 2022. Researchers used qualitative content analysis to evaluate language, content, and format of each website.

Results: Fewer than half of program websites contained any information on pediatric neurodevelopment. Among programs with such information, there were notable differences in language (jargon versus no jargon), approachability (friendliness of photos versus anatomical imaging, text font, etc…), and level of detail (patients and parent visit expectations, building maps). These, and other differences, resulted in one of two primary orientations; clinically oriented or formal versus caregiver oriented or approachable. Programs with neurodevelopmental follow up programs housed within the division of pediatric cardiology were more likely to have more information available online. Programs in the Midwest tended to have more approachable websites.

Conclusions: There is little standardization of online information about neurodevelopment for patients with CHD and their caregivers. More research is needed to identify optimal strategies for communicating this information both online and in person in order to optimize patient and caregiver understanding and utilization of neurodevelopmentally appropriate care in this population.

***Inpatient Pediatric Care and Clinician Workforce in Wisconsin: The State of the State**

Busch S, Allen A, Birstler J, Martonffy I

Background: Availability of inpatient pediatric services has declined across the United States between 2008-2018, with rural areas experiencing steepest declines. Despite the movement of pediatric care to children's centers, most children are still cared for in community hospitals nationally. Assessing the availability and providers of inpatient pediatric care in Wisconsin is an important step in ensuring the health care needs of children in the state continue to be met.

Design/Methods: A cross-sectional survey was distributed to Wisconsin hospitals to determine pediatric services and physician workforce. Response rate was 130/138 (94%), including 56/58 (97%) of Critical Access Hospitals (CAHs). Results of specific inpatient pediatric subdivisions were analyzed by descriptive statistics.

Results: Hospitals that provide inpatient newborn care are mostly staffed by pediatricians (P) and family physicians (FP), while CAHs are staffed by FP. Hospitals with neonatal intensive care units are staffed by neonatologists, with telemedicine utilized in CAHs. Hospitals with general pediatric admissions are staffed by P or FP, while CAHs are staffed by FP. Hospitals with pediatric intensive care units are staffed by pediatric intensivists.

Conclusions: Despite workforce disparities and shortages, hospitals across Wisconsin, including many CAHs, continue to provide inpatient pediatric services. Family physicians play a major role in the pediatric healthcare delivery in Wisconsin hospitals. Robust inpatient pediatric training of family physicians may enable rural health authorities to continue addressing the gaps that persist in inpatient pediatric care accessibility.

**Accepted at Rural Poster & recruitment Fair, Family Medicine Midwest Conference, UWSMPH Research Forum & Society of Teachers of Family Medicine Annual Spring Conference, poster*

***Who You Know Matters: Knowing Someone Who is Trans and Agreement with Education and Athletic Legislation Impacting Trans Youth**

Calvin A, Allen B, Selkie E

Background: The U.S. has seen an increase in education and athletic legislation impacting transgender youth, such as restricting the use of gender affirming pronouns in schools and transgender youth participation in sports. The motivation for supporting such policies remains unknown. According to intergroup contact theory, exposure to a transgender individual may increase support for policy that affirms transgender youth. The purpose of this study is to examine whether knowing a transgender person relates to agreement with education and athletic legislation that protects the rights of transgender youth.

Design/Methods: A national sample of parents of children ages 0-17 were recruited from Qualtrics panels in August 2022. A survey assessed knowing a transgender person, relationship to the person, and agreement/disagreement with education and athletic policy affecting transgender youth. Policy questions asked about: disclosure of child's gender identity to parents, transgender curricula, pronoun use in schools, sports participation based on gender identity, locker room use, and verifying athletes' biological sex. We ran descriptive statistics, tested the association between relationship and policy agreement using ANOVA, and analyzed the relation between knowing a transgender person and policy agreement using logistic regression.

Results: Participants (n = 2,151) included 73% identifying as woman, 75% White, and 90% heterosexual. Among participants, 42% knew a transgender individual with 2.5% identifying as transgender themselves. About 30% of participants supported pro trans rights education policy. Participants who knew a transgender individual were 2.3 times (95% CI 1.89-2.76) more likely to support education policy that affirms transgender youth compared to participants who did not know a transgender individual. For athletic policy, about 58% of participants supported athletic policy that affirms transgender youth. Participants who knew a transgender individual were 1.5 times (95% CI 1.30-1.84) more likely to support pro trans rights athletic policy compared to participants who did not know someone who is transgender. Participants who knew a family member or a friend who is transgender were more likely to support pro trans athletic policy compared to other types of relationships, $F(8, 2142) = 10.39$, $p < .001$.

Conclusions: Individuals who knew a transgender individual were more likely to agree with education and athletic legislation that affirms transgender youth. Personal connection to a transgender person may help to explain supporting or not supporting policy that impacts transgender youth.

**Accepted at Pediatric Academic Society 2023, poster*

Assessment of Corticospinal Tract Circuitry Through Transcranial Magnetic Stimulation and Motor Evoked Potentials

Casey C, Grimaldo A, Sutter E, Mak V, Preston C, Gillick G

Background: Perinatal brain injury is a primary cause of cerebral palsy (CP). Research has shown that the first two years of life are critical for brain development and exhibit heightened neuroplasticity. However, the specific influence of perinatal injury on cortical excitability and nervous system development remains poorly understood. Previous studies have implicated altered corticospinal tract (CST) development as an important indicator of future motor function in CP. Hence, longitudinal assessment of CST circuitry during the first two years of life may provide crucial insights into the development of CP and enable future therapies targeted to an individual's brain development. Transcranial magnetic stimulation (TMS), a form of non-invasive brain stimulation, offers an assessment of CST circuitry by stimulating the motor cortex and monitoring the presence or absence of motor evoked potentials (MEPs) in the upper extremities, allowing for individualized assessment of the developing and recovering brain.

Methods: Children with a radiologically confirmed diagnosis of perinatal stroke or brain bleed were assessed for neuroexcitability and CST circuitry using single-pulse TMS. TMS pulses were targeted to the motor cortex (M1) using each participant's T1-weighted MRI on a neuronavigational system or an MRI template if needed. Resting motor thresholds and MEPs were assessed bilaterally using electrodes placed over wrist flexor musculature. Data were collected under the Perinatal Stroke: Longitudinal Assessment of Infant Brain Organization and Recovery through Neuroexcitability, Neuroimaging and Motor Development study (NIH 7R01HD098202-02 PI:Gillick).

Results: Seven children, with ages between 3 and 13 months (adjusted for prematurity), were assessed. Five showed evidence of bilateral MEPs, 1 unilateral MEPs, and 1 with indeterminate responses. A total of 461 TMS pulses were delivered across all infants. Infant safety and comfort were prioritized while maintaining accuracy in data acquisition with no adverse events.

Conclusions: TMS assessments can be used to characterize patterns of early brain connectivity and may identify neurophysiologic biomarkers of motor function that could guide future investigation and interventions. TMS assessments were well tolerated and safely administered within this pediatric population. Further analysis of MEPs may elucidate patterns of neurodevelopment related to CP occurrence and severity.

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Rural Access to Pediatric Teleneuromodulation in the Home Setting

Preston C, Gavioli M, Bach A, Nytes G, Lench D, Ikonomidou C, Villegas M, Gillick B

Background: Cerebral Palsy (CP), often diagnosed after perinatal stroke or early brain bleeds, can result in life-long motor impairment. Transcranial direct current stimulation (tDCS) is a neuromodulatory intervention with potential to improve the extent and rate of motor function recovery. Our laboratory has previously shown tDCS to be safe and effective at improving measures of motor performance of the upper limb when combined with rehabilitation in children with hemiparetic CP. Thus far, this form of neuromodulation is limited to the laboratory setting and presents access challenges for those in rural communities with limited healthcare access. Developing a remotely supervised form of tDCS neuromodulation can reduce family burden and addresses barriers to access.

Design/Methods: This pediatric teleneuromodulation study aims to assess the feasibility, safety, and tolerability of bilateral M1 tDCS at 1.5mA for 20 mins in the at-home setting under remote investigator direction and with a caregiver/child dyad. This is a 5-day serial session study consisting of 1 mock, 1 sham, and 3 active 20-minute tDCS sessions. The mock session is a fully remote training session. The following sessions include a 'headquarters' team member leading a video call with the dyad while a 'family ambassador' is present in the home for safety oversight. The evaluation of safety and feasibility involves various measures, including performance on the Box & Blocks test, conducting adverse events (AE) surveys, and monitoring vital signs. Feasibility is also assessed by measuring setup time, evaluating the quality of electrode contact, and tracking headgear movement during stimulation.

Results: To date we have successfully completed 5/10 participants (mean 14.8 years, range 13-16 years) with no major AEs across the 5 sessions for all participants. The most common minor AEs reported during active stimulation include tingling (66.67%) and itching (53.33%). Average setup time for sessions is 9 minutes 21 seconds, ranging from 3 minutes 59 seconds to 19 minutes 55 seconds. Setup time has decreased on average for active sessions. Box & Blocks scores were used as a measure of stability of motor performance, and no participants demonstrated a decrease over time. Comparing vitals (heart rate, respiration rate, and blood pressure) before and after stimulation did not indicate any noteworthy shifts.

Conclusions: Interim analysis suggests the feasibility and safety of at-home tDCS in the rural home setting.

***Reducing Red Blood Cell Transfusions (RBCTs) Following Pediatric Heart Catheterization**

Cook C, Wilhelm M, Torgeson J, Boriosi J, Lamers, L

Background: Cardiac catheterization (cath) is essential for managing congenital heart disease. Complications following cath, including the need for red blood cell transfusion (RBCT), are relatively common. The IMPACT Registry, a collaborative of > 120 cath programs, classifies RBCT within 72 hours of cath as a major adverse event. During the first three years participating, our complication rate exceeded the Registry mean, with RBCT being most common. We undertook a quality improvement project to reduce RBCT within 72 hours of cath.

Design/Methods: We used an iterative improvement strategy based on the Model for Improvement, testing multiple interventions using PDSA methodology. Our Specific Aim was to reduce the incidence of RBCT to < 3% (IMPACT Registry mean) by 12/31/22. We created a local copy of all IMPACT data to allow real-time analysis using process control charts. We used a G-chart (rare event) of cases between transfusions (CBT) as our primary outcome. Initial interventions targeted reducing procedural hemodilution, blood loss, and excessive anticoagulation. We then amended our theory of improvement using additional Pareto analysis. Subsequent interventions standardized transfusion practices. We followed post-cath length of stay (LOS) using an I-chart as a countermeasure of avoiding RBCT.

Results: Pareto analysis determined RBCT within 72 hours of catheterization as our most common major adverse event, averaging 6%. We created a local database and developed a G-chart of CBT. Pre-intervention CBT baseline was 11 cases with an upper control limit (UCL) of 64.7. Initial procedure related interventions did not increase the CBT. A second Pareto analysis revealed a majority of RBCTs were for cyanosis in single ventricle patients. Saturations were not different before and after transfusion, however. Additional PDSA cycles standardized RBCT practices and eliminated isolated cyanosis as an indication. By October 1, 2022, we exceeded the UCL of CBT, without increasing LOS; IMPACT data had not yet shown an improvement.

Conclusions: Comparative registry data can identify key improvement opportunities but has limited utility in active improvement efforts. Using an iterative improvement strategy, combined with real-time analysis of local data, we reduced RBCT following catheterization. We also hypothesize RBCT for isolated post-cath cyanosis might be safely avoided in many patients.

** Accepted at Pediatric Academic Society 2023, poster*

***Adapting the GBSS Framework for the 1-Month Infant Brain**

DiPiero M, Goncalves Rodrigues P, Cordash H, Guerrero Gonzalez J, Davidson R, Alexander A, Dean D

Background: Infancy to early life is a critical window of neurodevelopment in which differences believed to be associated with many psychiatric disorders first emerge[1-6]. Investigating the developmental patterns of the cortical gray matter (GM) microstructure is necessary to characterize differential patterns of neurodevelopment that may subserve future intellectual, behavioral, and psychiatric challenges. The Neurite Orientation Dispersion and Density (NODDI) Gray-Matter Based Spatial Statistics (GBSS)[7, 8] framework enables sensitive characterization of the gray matter microstructure. However, the underdeveloped brain creates challenges for implementing the GBSS framework in infants. We refine the NODDI-GBSS framework for the 1-month brain while keeping the dMRI data entirely in native space for processing and analysis, a method that has not been accomplished previously. We cross-sectionally investigate age-relationships in the developing GM organization of infants.

Design/Methods: Multishell dMRI data were acquired from 34 1-month old infants. Data were processed using an in-house processing pipeline and then fit to the DTI and NODDI[9] models. We adapt the GBSS framework for the underdeveloped brain and investigated voxel-wise age-relationships with GM along the infant GM skeleton generated with our adapted infant pipeline.

Results: Using our adapted GBSS method, we improved GM skeletonization in the underdeveloped brain such that the skeleton was specific to the GM and was also more contiguous with the entire cortex compared to applying the GBSS pipeline without modification. We propose an improved GM skeleton construction in the underdeveloped brain with sensitivity to age-related organization in GM. We report significant relationships of GM microstructure with age in the first month of life, with FICVF increasing with age, and MD, RD, and AD decreasing with age.

Conclusions: The GM microstructure plays a critical role in overall brain function and connectivity. Establishment of the cytoarchitecture in early life lays the groundwork in which future cognitive and behavioral skills are built upon, with differences in early cortical organization thought to subserve future behavioral and psychiatric challenges. For the first time, we adapt GBSS for the infant brain while keeping the data in its native diffusion space. We show feasibility of cortical skeletonization in the underdeveloped brain and report relationships with age across the GM microstructure in the first month of life.

**Accepted at ISMRM 2023, poster*

***Healthful Habits: Implementing a Hygiene Education Curriculum Designed from 8,250 Miles Apart**

Doucette R, Sass M, Stevens J, Introna K, O'Riordan B, Conway J

Background: In resource limited areas, improper hygiene remains a primary driver of disease, with communicable diseases especially rampant in residential institutions. In 2020, mere months into the COVID-19 pandemic, our team partnered with a rural Thailand orphanage to evaluate hygiene beliefs and practices. A needs assessment conducted at that time highlighted a need for improvement across all hygiene domains. We subsequently created a five-lesson curriculum addressing germ theory, basic hygiene behaviors, and caregiving practices.

Design/Methods: In early 2023, three lessons were piloted with 36 participants (14 house mothers; 22 adolescent children). Curriculum efficacy was assessed via two Qualtrics surveys, a seven-question hygiene survey (including 5-point Likert, true/false, and select all questions) and a six-question caregiving survey administered immediately before and after lesson administration. Three questions overlapped between the 2020 and 2023 versions and were used to evaluate temporal response changes.

Results: Pre- vs. post-lesson responses demonstrated significant improvement in 5 of 7 questions, across domains of germ understanding and proper handwashing techniques, with these findings primarily driven by the adolescents. The caregiving lesson did not significantly increase confidence in diapering practices for adolescent girls ($p=0.1039$), but did significantly increase confidence in doing so hygienically ($p=0.0119$). 1 of 3 questions significantly changed when comparing 2020 and 2023 responses. Participants felt significantly less confident in knowing what germs are and how they spread in 2023 ($p=0.0196$), which was driven primarily by house mothers ($p =0.028$), not children ($p=0.2263$).

Conclusions: Despite the geographic barriers, our results suggest a promising role of electronic survey administration and curriculum design in the promotion of proper hygiene in rural residential institutions, especially for adolescent children. The most salient barriers to our project were poor participant literacy, difficulty with critical thinking, and complex survey question types.

**Accepted at Global Health Symposium 2023, poster*

Relationship Between Disease Activity, Sleep Disturbances, and Depressive Symptoms in Children and Adolescents with Inflammatory Bowel Disease

Evaristo C, Hatab J, Villaruz J, Eickhoff J, Matthews C, Walkiewicz-Jedrzejczak D

Background: Poor sleep has been described in adult and pediatric inflammatory bowel disease (IBD) populations. Adult studies have demonstrated a correlation between IBD and depressive symptoms. Few studies in the pediatric population have examined a similar relationship. The aim of this study was to assess the relationship between sleep dysfunction and depressive symptoms in active versus inactive IBD in children and adolescents.

Design/Methods: This cross-sectional study included pediatric IBD patients seen at The American Family Children's Hospital in Madison, Wisconsin between February 2021 and May 2022. Patients completed Patient-Reported Outcomes Measurement Information System (PROMIS) Pediatric Sleep Disturbance-Short Form and Pediatric Sleep-Related Impairment-Short Form questionnaires to assess for sleep-related symptoms. Patients completed Patient Health Questionnaire-9 (PHQ-9) surveys to assess for depressive symptoms. Disease activity was scored using the Abbreviated Pediatric Crohn's Disease Index (PCDAI) for Crohn's Disease and the Pediatric Ulcerative Colitis Activity Index (PUCAI) for Ulcerative and Indeterminate Colitis. Demographics and disease-related information within 6 months of their visit were acquired from medical charts. All data was analyzed using Fisher's exact test and p-value <0.05 was used to define statistical significance.

Results: Seventy-three patients with IBD were enrolled. 70% of patients had inactive disease and 30% had active disease based on PCDAI and PUCAI scores. 11% of patients were taking sleep medication and 25% of patients were taking psychotropic medication. Patients with active disease reported increased sleep disturbances (p=0.0017) and sleep-related daytime impairments (p=0.0024) compared to those with inactive disease. Patients with active disease reported more depressive symptoms compared to those with inactive disease (p=0.0006). There was a positive correlation between severity of disease and sleep-related impairment (p=0.0035), sleep disturbance (p=0.0337), and PHQ-9 score (p=0.0035). There was no statistically significant difference in PHQ-9 score between patients taking psychotropic medications and those who were not (p=0.2339).

Conclusions: Consistent with previously reported data, our study supports a correlation between disease activity, sleep disturbance, sleep-related impairment, and depressive symptoms. Limitations of the study include the accuracy of self-reported sleep questionnaires and PHQ-9 surveys. Parental presence during questionnaire completion may also impact accuracy of responses. Generalizability of our results may be limited by the homogeneity of our patient population, with 90% identifying as White. Future research can broaden the demographics of the patient population and utilize other research protocols to further evaluate the generalizability of our findings.

***Strategies for Readthrough of Premature Termination Codons to Restore Ion Channel Function**

Fulbright S, Kabra M, Shahi PK, Ahern C, Pattnaik B

Background: The KCNJ13 gene encodes the weak inwardly rectifying potassium channel Kir7.1, which is located in the retinal pigment epithelium (RPE). Several mutations in the KCNJ13 gene cause early onset Lebers Congenital Amaurosis (LCA16) and Snowflake Vitreoretinal Degeneration (SVD). In this study, we treated a LCA16 Kir7.1 nonsense mutation (W53X) using small-molecule read-through drugs G418 and Elox03, the nonsense mediated mRNA decay (NMD) inhibitor caffeine, NMD knockdown, and suppressor tRNA.

Design/Methods: HEK 293 cells were transfected with N-terminal GFP-fused W53X mutant plasmid. Cells were co-transfected with human SMG-8 siRNA or tryptophan-carrying anticodon engineered (ACE)-tRNA for 48 hours, treated with 150 µM G418 or Elox03, or co-treated with 150 µM G418 and 500 µM of caffeine. All treated cells were incubated with drugs for 48 hours. Immunocytochemistry (ICC) and whole-cell patch clamp was performed on treated cells. Function of Kir7.1 channel was measured in the presence of K+ to determine current, Ba+ to block current, and Rb+ to enhance current. The students T-test was used and significance was determined at the $P < 0.05$ cutoff level.

Results: W53X transfection resulted in non-measurable Kir7.1 current as compared to the wild-type Kir7.1 channel. Upon treatment of cells with G418 we detected membrane expression of Kir7.1 and a 100-fold increase in the inward Rb+ current amplitude ($P < 0.01$), and a six-fold increase in the inward Rb+/K+ current amplitude ratio ($P < 0.01$). When compared to the treatment of cells with G418 alone, co-administration of G418 with caffeine led to a two-fold increase in the inward Rb+/K+ current amplitude ratio ($P < 0.01$), and interestingly, a 29 mV hyperpolarizing shift in the resting membrane potential (Vm) ($P < 0.001$). Similarly, when compared to G418 treatment alone, G418 treated SMG-8 knockdown cells led to a two-fold increase in inward Rb+ current amplitude ($P < 0.001$), more than two-fold increase in the inward Rb+/K+ current amplitude ratio ($P < 0.01$), and a 32 mV hyperpolarizing shift in Vm ($P < 0.001$). Suppressor tRNA led to membrane expression of Kir7.1 and a two-fold increase in inward K+ current amplitude ($P < 0.01$).

Conclusions: Functional assays using our disease mutant model clearly demonstrated the potential of small-molecule read-through drugs, NMD inhibition, and suppressor tRNAs for therapeutic usage of PTC-causing mutations.

**Accepted at ARVO 2023, poster*

***The Association Between Disordered Eating Behaviors and Drinking Motives and Consequences in Community College Students**

Gannon-Loew K, Kerr B, Zhao Q, Moreno M

Background: Body image concerns and disordered eating behaviors (DEBs) are common among college students. While DEBs are associated with increased alcohol consumption, the motivations and consequences associated with this alcohol use remain unclear. Further, community college students remain an underexplored population for the relationship between DEBs and alcohol use. The objective of this study was to evaluate associations between 1) perceived body image and DEBs and 2) drinking motives and consequences among community college students.

Design/Methods: This was a cross-sectional, secondary analysis of an online survey completed by community college students recruited from five campuses. To be eligible for the study, participants needed to report current alcohol use (past 28 days) and at least one episode of binge drinking. Body image perception and DEBs were evaluated using questions from the Eating Disorder Diagnostic Scale (EDDS). The Modified Drinking Motives Questionnaire Revised (DMQ-R) and the Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ) were used to assess motivation and consequences associated with drinking. Pearson correlation and t-tests were used to evaluate associations.

Results: 182 community college students participated; 82% were female and the mean age was 22.9 years (SD=3.2). Regarding body image perceptions, a fear of weight gain or becoming fat was associated with significantly higher motivation for drinking alcohol for coping-anxiety ($r=0.17$, $p=0.0280$), coping-depression ($r=0.17$, $p=0.0214$), and conformity ($r=0.17$, $p=0.0264$) reasons on the DMQ-R and with reporting a significantly higher number of alcohol-related consequences on the B-YAACQ ($r=0.19$, $p=0.0135$). Regarding DEBs, engaging in fasting was associated with significantly higher motivation for drinking for coping-anxiety (difference between means D=1.31 [SD=3.55], $p=0.0369$) and coping-depression (17.70 [10.36] vs. 13.62 [6.86], $p=0.0191$) reasons and with a significantly higher number of reported alcohol-related consequences (D=3.53[5.08], $p=0.0001$).

Conclusions: Community college students with specific body image perceptions and DEBs had higher motivation for drinking alcohol for coping reasons and experienced more alcohol-related consequences. Clinical and public health interventions could target the motivations for drinking and the higher risk of alcohol-related consequences in students with DEBs.

**Accepted at Pediatric Academic Society 2023*

Caregiver Stories: Sharing Lived Experience to Impact Care

Gerber D, Kloster H, Ehlenbach M

Background: Patients and their families are an important yet underrecognized source of expertise when teaching about delivering family-centered care. Many medical training environments utilize standardized patients to engage patients and families in teaching history-taking, physical exam, and clinical reasoning skills. However, few utilize lived experiences as an educational tool. Caregiver Stories is comprised of an interdisciplinary group of clinicians, parent leaders, and trainees. We partnered with families of children with medical complexity (CMC) to design an innovative medical education curriculum, centered around family stories with the goal of to teaching about family-centered care, culturally responsive communication, and shared decision making.

Design/Methods: The family caregivers of ten CMC were interviewed by a parent leader in one of two settings (video or live educational session) in a semi-structured interview focused on their experiences in healthcare and in caring for their child. After the interviews, an electronic survey was administered to residents, assessing acceptability of this educational format, as well as their confidence and attitudes around caring for children with medical complexity. A survey was also sent to families regarding their experience.

Results: 29 residents attended the in-person educational session: 10 PL-1, 10 PL-2, and 9 PL-3. All attendees completed the survey. Resident participants agreed that attending the session was a valuable educational tool and helped them better understand the needs of CMC and their caregivers. They also felt it would increase their comfort level in communicating with caregivers of CMC. In addition, the caregivers were surveyed regarding their experience of serving as educators. They reported that their experience was strongly positive, indicating that that they were able to share experiences that were meaningful to them and that they felt their expertise was valued by being asked to share their experiences. Thereof exposure to lived experience of caregivers in medical training. This pilot curriculum provides initial evidence that leveraging the expertise of caregivers can augment learning to deepen learner awareness of caregiver perspective and provide exposure to the experience of having a CMC. It also provides initial data to support the idea that serving as educators may provide benefit to families themselves. Next steps are to utilize the video interviews to create an educational curriculum around lived experience that can be disseminated and utilized more widely in medical education.

Conclusions: Providing the opportunity for caregivers of CMC can be an effective educational tool for medical trainees and may increase the ability of these learners to build effective partnerships. Learners and families were receptive to this educational strategy and endorsed further use and dissemination of this technique.

Successful use of Milrinone to Support a Pediatric Patient with HR-AML and Heart Failure Through HSCT

Gerhartz B, Damodharan S, Capitini C

Background: Treatment of acute myeloid leukemia (AML) is associated with high rates of cardiotoxicity. Certain types of AML with activating mutations of the FMS-related tyrosine kinase 3 (FLT3) receptor are most successfully treated with hematopoietic stem cell transplant (HSCT) as they are refractory to conventional therapy and are at higher risk of relapse. Literature describing cardiac support through HSCT for patients with high-risk (HR) AML and cardiotoxicity is limited. We describe a pediatric patient with FLT3-mutant HR AML and evidence of therapy induced heart failure who was successfully supported through conventional myeloablative conditioning and HSCT with the use of milrinone.

Case Report: Our patient was a 12-year-old female with central nervous system positive AML (CD13, CD33, CD117, and cytoplasmic MPO positive) who was initially treated per Children's Oncology Group (COG) protocol AAML1031, arm B, on study. Cytogenetics revealed an increased FLT3/ITD allelic ratio so she was switched to arm C which replaced bortezomib with sorafenib but kept the same back-bone chemotherapy (Cytarabine and Daunorubicin). During induction cycle 2, cardiac function declined with left ventricle ejection fraction (LVEF) of 32% and a left ventricular shortening fraction (LVSF) of 28%. Her pre-treatment echocardiogram was normal. Repeat bone marrow assessment after two induction cycles showed continued presence of disease and she was switched to salvage chemotherapy regimen (TVTC+sunitinib) with plan to proceed to matched unrelated donor (MUD) HSCT when in remission (CR1). Her heart failure worsened with decreased LVSF to 23.75%. Sunitinib was discontinued and she was started on lisinopril. Her cardiac function continued to decline but she achieved CR1. A multidisciplinary approach was utilized to trial milrinone for heart failure support through a fully myeloablative conditioning regimen and her MUD HSCT which she underwent successfully. Now more than 8 years after her transplant, she continues in remission with normal heart function.

Conclusions: Our case presents a pediatric patient with HR AML and therapy induced heart failure who was successfully supported through fully myeloablative HSCT with milrinone. Though unconventional, this should be considered as an option for similar patients in the future rather than opting for a reduced intensity conditioning (RIC) HSCT regimen to give the best chance for definitive cure.

***HGG-19. Co-occurrences of a High-grade Glioma with Cavernous Malformations and Pathogenic Variants in PDCD10 and SMARCA4**

Glanz H, Damodharan S, Smith-Simmer K, Bradley K, Rebsamen S, Casey K, Iskandar B, Helgager J, Puccetti D

Introduction: The co-occurrence of multiple disease processes can make for more challenging diagnoses. Here we report an unusual case of a patient found to have an IDH1-mutant high-grade glioma along with multiple cerebral cavernous malformations and pathogenic germline variants in PDCD10 and SMARCA4.

Case Description: A 17-year-old female presented with left arm paresthesia and weakness along with persistent headaches within the frontal and occipital regions that progressed in intensity to include nausea and emesis. A fast sequence magnetic resonance imaging (MRI) of her head was obtained that revealed the presence of multiple bilateral cystic lesions suspicious for cavernomas, with the most notable lesion in the right parietal lobe. Ophthalmology consultation revealed grade III papilledema bilaterally. A full brain MRI with and without contrast was obtained and demonstrated a right anterior parietal lobe lesion with associated mass effect, as well as multiple bilateral supratentorial and left cerebellar cavernous malformations. The patient underwent tumor debulking of her dominant lesion. Pathology revealed an IDH1-mutant diffuse astrocytoma, WHO grade III. Tumor genetic testing was done and identified a SMARCA4 and two TP53 variants. Germline genetic testing was then pursued which revealed a PDCD10 pathogenic variant consistent with familial cerebral cavernous malformation syndrome and a likely pathogenic variant in SMARCA4. Treatment of her high-grade-glioma included radiation therapy followed by maintenance oral temozolomide.

Discussion: This case illustrates the unusual co-occurrences of a high-grade glioma with familial cavernous malformation syndrome and germline pathogenic variants in PDCD10 and SMARCA4. Our patient continues to do well clinically, but because of her risk of developing small cell carcinoma of the ovary she has elected to undergo a prophylactic bilateral salpingo-oophorectomy. Recognition of abnormal genetic results is critical in the setting of multiple disease processes and can play a crucial role in the on-going care for a patient.

**Accepted at Society of Nuero-Oncology*

***Beyond the Exome: Setting up a Genomics-based Undiagnosed Disease Program**

Hall A, Motiff H, Hellmann J, Pavelec D, Shao X, Horner V, Webb B, Meyn M

Background: Just over half of 9,000+ rare genetic disorders have a known cause and most patients who undergo clinical genetic testing fail to obtain a diagnosis. To address these issues we created the University of Wisconsin Undiagnosed Disease Program (UW UDP).

Objectives/Methods: 1) discover new disease genes; 2) improve our understanding of genetic disorders; 3) provide patients with actionable diagnoses; and 4) evaluate novel technologies. Our "beyond the exome" workflow begins with clinical whole exome sequencing (WES) reanalysis, followed by trio short read genome sequencing. Long read sequencing, RNA-Sequencing, and epigenomic profiling are utilized ad hoc.

Results: To date, the UW UDP has enrolled 59 probands and 118 relatives. Even though >90% of probands had prior clinical WES, we have found candidate causal variants in over 40% of cases analyzed to date. Short and long read whole genome sequencing (WGS), WES reanalysis, and RNA-Seq each played a role in delineating an instance of chromoplexy involving a deletion and translocations between three chromosomes missed by clinical testing; finding two new candidate disease genes; expanding the phenotypes of two recently described disorders; discovering a novel form of inheritance for a known disease gene; and determining that a patient's novel phenotype is the likely result of synergy between two rare disorders. Additional analyses are on-going.

Conclusions: Our initial results suggest that a significant fraction of clinical WES-negative patients can be diagnosed using combinations of WGS, long-read WGS, and RNA-Seq. An undiagnosed genetic disease program can serve as an important component of a comprehensive center for rare diseases, as it offers patients access to emerging technologies and facilitate the discovery of new disease genes while advancing our understanding of rare genetic disorders.

**Accepted at CHGPM Symposium & European Society of Human Genetics, poster*

Depression Screening in PCOS Is Improved Using a Standardized Tool: Identifying Needs in a Multidisciplinary Clinic

Hassan D, Bekx T

Background: Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine diseases among adolescent girls and is associated with a high rate (40%) of depression. Left undiagnosed, this can negatively impact success of treatment and health outcomes. At the American Family Children's Hospital (AFCH), we offer a multidisciplinary clinic for those with PCOS, but currently we do not universally screen for depression. The aim of this Quality Improvement project is to implement an in-person Patient Health Questionaire (PHQ-9) depression screen in the PCOS clinic in 2023 and increase screening from 0% to 50%.

Design/Methods: To initiate this protocol, the PCOS team collaborated to coordinate care so all patients seen in person at the PCOS clinic (> age 12 years) are administered a paper version of the PHQ-9 to screen for depressive symptoms. Individuals with a positive PHQ-9 (score>9, range 0-27) or concern for mental illness regardless the score will be referred to mental health services, with additional resources included as a part of the after-visit summary. The number of patients completing the questionnaire and outcomes are tracked by manual chart review.

Results: Since implementation, 11/11 completed the PHQ-9 screening and 6 screened positive: 1 patient scored between 20-27 and 5 patients scored between 10-19. Topics most commonly positive or scoring high are 1) trouble falling, staying sleep or sleeping too much, 2) little interest or pleasure in doing things, 3) trouble with concentration, 4) feeling tired, 5) poor appetite or overeating. In this cohort of 11, 6 were already established with a mental health provider, 2 were referred and 1 was started on anti-depressant medication.

Conclusions: Rates of depression screening improved in a multidisciplinary PCOS clinic with implementation of a standard tool and collaborative team effort. Thus far, results demonstrate a high rate of depression in this population (55%) and assist in identifying individual patient's needs. Future goals include sustaining this rate over time and improving resources and mental health services for adolescents with PCOS.

A Rare Case of Neonatal Diabetes Secondary to 6Q23.3 Duplication Successfully Treated with Sulfonylurea During Adolescence

Hassan D, Chen M

Background: Transient neonatal diabetes due to 6q24 duplication usually resolves before 18 months of life and recurs in adolescence or adulthood. Insulin is the first line of treatment of neonatal diabetes related to chromosome 6 abnormalities. There is no standard treatment for patients with relapsed transient diabetes, however, the residual beta cell function after remission of neonatal diabetes could explain the potential role of insulin secretagogues. There are reports of successful transition from insulin to sulfonylureas with 6q24 duplication during adolescence. Here we describe a rare case of neonatal diabetes secondary to 6q23.3 duplication who was successfully transitioned to sulfonylurea during adolescence. To our knowledge, this is the first case with a 6q23.3 duplication to be successfully transitioned to sulfonylureas for relapsed diabetes.

Case presentation: A 15-year 3-month-old female with 6q23.3 duplication, global developmental delay and a history of neonatal hyperglycemia requiring insulin therapy till the age of 4 months, presented to the ED in mild DKA. She presented with 5-day history of fever, fatigue, polyuria, polydipsia, and history of recent weight loss. Her labs showed metabolic acidosis, glucose 395mg/dl, HbA1C of 12.3% and negative Type 1 diabetes antibodies. She was started on insulin infusion and then transitioned to subcutaneous insulin. Her HbA1c decreased down to 5.5% within 3 months after discharge. She was started on continuous glucose monitoring and transitioned successfully to low dose sulfonylurea (glyburide) 2.5 mg daily. Her blood glucose readings were maintained 100 % within target range with only occasional episodes of mild hypoglycemia, which resolved after dose splitting to 1.25 mg twice daily.

Conclusions: This case demonstrates the potential benefits of sulfonylurea in patients with relapsed diabetes due to 6q23.3 duplications. This includes good glycemic control, lower risk of severe hypoglycemia with insulin therapy and better quality of life. Known factors associated with successful transition from insulin therapy to sulfonylurea include younger age at initiation of sulfonylurea therapy and shorter duration of diabetes. Future studies of sulfonylurea treatment in large group of patients with similar mutation are needed.

***Co-design of a Mobile Application to Improve In-home Medication Safety for Children with Medical Complexity**

Kearney H, Jolliff A, Coller R, Warner G, Feinstein J, Chui M, Katz B, Bach T, Werner N

Background: Children with medical complexity (CMC) are uniquely vulnerable to medication errors and preventable adverse drug events. At least two unmet needs contribute to administration errors for CMC in the home. First, no tools are designed to support CMC caregivers' medication administration accuracy. Second, no tools exist to support families to ensure safe medication management across the network of other people involved in daily care such as extended family, in-home professionals, school personnel, and other "secondary" caregivers. Our objectives were to engage primary and secondary caregivers of CMC in a co-design process to understand medication safety challenges and design requirements for a mobile app intervention, Meds@HOME, to improve medication safety across care networks.

Design/Methods: Primary caregivers (N=6) and secondary caregivers (N=2) of CMC were recruited from a children's hospital-based pediatric complex care program. Design sessions (four with primary and two with secondary caregivers) were completed over five months. Design sessions focused on problem identification, solution generation, convergence around design requirements, and evaluating the Meds@HOME prototype. The research team of pediatricians, nurses, pharmacists, designers, software developers, and human factors engineers used team-based discussion between sessions to identify and refine design requirements across the sessions.

Results: All co-designers were female, and their CMC received M=10.5 (SD 5.8) medications/day. There were M=11.8 (SD 7.4) other caregivers involved in each child's care. Co-designers identified five key medication safety challenges: correct dosage, correct route; administering medications on time; communicating about medication administration; communicating medication changes; and timely medication refills. For each medication safety challenge, co-designers identified design requirements and corresponding app functions for the Meds@HOME intervention.

Conclusions: The medication safety challenges, design requirements, and app functions identified by caregivers in the present co-design study were used to guide the development of a mobile app that will support medication safety among care networks of CMC. The Meds@HOME application developed in this study will be tested in a clinical trial to determine if it improves medication safety for CMC at home.

*Accepted at Pediatric Academic Society 2023, poster

***Associations Between Social Media Use and Anxiety among Adolescents: A Systematic Review Study**

Kerr B, Charlly N, Garimella A, Pilarisetti L, Sullivan K, Moreno M

Background: Anxiety disorders are the most common category of mental illness among adolescents. Previous studies have shown mixed associations between social media use and anxiety. Factors associated with these mixed findings remain unexplored. The purpose of this systematic review study was to evaluate studies of social media and anxiety among adolescents. We specifically examined directions of associations, social media and anxiety measures, demographic stratification, and study quality.

Design/Methods: We searched 7 major databases; eligible articles included those published in English before 2021 that tested associations between social media use and anxiety among adolescents at middle school, high school, or college age. Title and abstract screening, full text screening, and data extraction were completed by two reviewers using the software Covidence. Data were extracted for directions of associations (positive, negative, null, mixed), social media measures (e.g., problematic use, screen time), anxiety measures (e.g., Depression and Anxiety Stress Scale), demographic group stratification, and study quality (Strengthening of Reporting of Observational Studies in Epidemiology: STROBE).

Results: Among 10,757 unique articles that underwent title and abstract screening, 70 were eligible for full text screening. A total of 28 met inclusion criteria for data extraction. The majority reported positive associations between social media use and anxiety (n = 18, 64.3%). Problematic use was the most common type of social media measure (n = 17, 43.6%), followed by screen time (n = 8, 20.5%). Majorities of positive associations with anxiety were observed for measures of problematic use (n = 13, 76.5%) and screen time (n = 7, 87.5%). Across all other social media measure types, 42.9% (n = 6) showed positive associations. A total of 16 measures of anxiety were used. The Depression and Anxiety Stress Scale was the most used anxiety measure (n = 4, 14.3%). A total of 4 studies (14.3%) stratified findings by gender identity; none stratified by race, sexual orientation, or age group. The mean STROBE score was 34.2 (SD = 4.5) out of a possible 46.

Conclusions: Previous work predominantly examined problematic social media use. Findings support pediatricians discussing anxiety in conjunction with problematic social media use with adolescents. Associations for other measure types were less consistent and are a key direction for future research.

*Accepted at Pediatric Academic Society 2023, poster

***Engagement with TikTok Content and Mental Health among Adolescents**

Kerr B, Olson C, Damani A, Moreno M

Background: Mental health conditions affect almost 50% of adolescents. Use of specific social media platforms is associated with varying mental health outcomes, potentially related to affordances, defined as design features that foster unique activities. Associations between TikTok use and mental health remain unclear. Objective: To examine adolescents' TikTok use, including frequency and engagement with specific content and affordances, and their associations with mental wellbeing and depression.

Design/Methods: This cross-sectional study recruited adolescents aged 13-18 years via Qualtrics panels in fall 2021. An online survey assessed TikTok use frequency, content participants engaged with (free text), mental wellbeing (Warwick-Edinburgh Mental Wellbeing Scale), and depression (Patient Health Questionnaire-8). Content analysis identified common areas of TikTok content from free text responses, which were classified as identity, social, cognitive, or emotional affordances. Analyses tested correlations between TikTok use frequency and mental wellbeing and depression scores. T-tests compared mental wellbeing and depression scores based on common TikTok content. Regression analyses tested associations between affordances and mental health (wellbeing and depression scores), controlling for race and gender.

Results: Among 2206 participants, 49.9% identified as female and 47.0% as white; mean age was 15.91 (SD = 1.77). About 77.3% reported any TikTok use; 52.7% reported daily use. The most common TikTok content participants reported engaging with was hobbies and entertainment (37.4%). Among affordances (Table 1), cognitive were the most common (39.7%). Mean mental wellbeing score was 3.43 (SD = 0.77); mean depression score was 1.00 (SD = 0.77). TikTok use frequency was positively associated with depression scores ($r = .131$, $p < .001$). Engagement with humor was associated with lower depression scores (M = 0.97, SD = 0.77) compared to no reported engagement (M = 1.08, SD = 0.79, $t(1190) = 2.29$, $p = .02$). Identity affordances were negatively associated with mental wellbeing scores ($\beta = -0.25$, $p < .001$) and positively associated with depression scores ($\beta = 0.25$, $p < .001$) when controlling for race and gender.

Conclusions: Findings suggest engagement with different TikTok content and affordances has varying associations with mental health. Future work should examine mechanisms behind these relationships.

**Accepted at Pediatric Academic Society 2023, poster*

***Respiratory Severity Score During the First Two Hours of Life as Predictors for Failure of Non-invasive Respiratory Support in Moderate Preterm Infants with RDS**

Koueik J, Zapata H, Lasarev M, Beckett H, Kaluarachchi D

Background: Preterm infants are at high risk of respiratory distress syndrome (RDS) due to surfactant deficiency. Current clinical management guiding exogenous surfactant replacement is based on need for higher fraction of oxygen to maintain target oxygen saturation. This approach leads to delay in timely administration of surfactant. Also, using only FiO2 as the sole criteria can be misleading. In this study, we aim to evaluate the role of respiratory severity score (RSS) as an early predictive factor for need for surfactant administration in preterm infants. The objective is to evaluate the role of RSS during the first 2 hours of life as a predictive factor for need for surfactant administration within first 72 hours of life in moderate preterm infant.

Design/Methods: We conducted a retrospective cohort study of preterm infants born at 28 0/7 to 33 6/7 weeks gestation. Hourly mean airway pressure and FiO2 were collected during the first 2 hours which were used to calculate the RSS (MAP x FiO2). Exclusion criteria included intubation, mechanical ventilation or surfactant administration prior to 2 hours of life as well as major congenital anomalies. A Log-binomial regression model was used to evaluate the association between RSS and need for surfactant administration.

Results: Of 203 neonates, median gestation age was 32.3 weeks with average weight 1.77 kg 68% of neonates were on CPAP. Median RSS was 1.26 at 1 and 2 hours of life 27 neonates (13.3%) received exogenous surfactant. 48 neonates had average RSS = 0 indicating they remained on room air and were not included in the remainder of the analysis. Risk of needing surfactant administration during the first 72 hours was associated with average RSS score ($p = 0.002$). Risk for surfactant administration within the first 72 hours increased by 2.06-fold for each 0.5-unit increase in average RSS (RR=2.06; 95% CI: 1.56–2.70, $p < 0.001$). Average RSS for the first 2 hours was divided into five non-overlapping intervals with a length of 0.25 units. The risk ratios associated with receiving surfactant within 72hours are found to increase with increasing level of the group

Conclusions: This study outlines that RSS during the first two hours can be used as a predictor for need for surfactant administration. Optimal RSS cutoffs for early rescue surfactant administration need to be determined in large cohort studies.

**Accepted at WND, Platform Presentation & at Pediatric Academic Society 2023, poster*

***Universal Outpatient Management of Pediatric Nasogastric Tubes by the Pediatric Gastroenterology Division Did Not Significantly Reduce Emergency Department Utilization for Tube Evaluation at a Tertiary Care Children's Hospital**

Lai S, Ratchford T

Background: Nasogastric (NG) tubes, are an important tool in managing multiple medical conditions in which oral feeding cannot be successfully. While these devices are lifesaving, they can develop problems, such as dislodgement or dysfunction, leading to Emergency Department (ED) visits for evaluation. In the late fall of 2019, at the Gastroenterology Team at American Family Children's Hospital (AFCH) outpatient enteral tube management, with previous management divided or shared among the PGI division, primary care providers, and other pediatric subspecialists. We hypothesized that primary outpatient management by Pediatric GI would reduce ED utilization for nasogastric tube evaluation.

Design/Methods: We performed a retrospective chart review of all patients discharged from AFCH with a nasogastric tube in place from March 1 2018 to October 31 2019 and June 1 2020 to January 31 2022. Patients were grouped and analyzed according to being pre-intervention or post-intervention, and they were followed until either their NG tube was permanently removed, or until their NG tube was replaced with a gastrostomy tube. Patients were excluded if they were primarily managed by PHO, lost to follow-up, still had NG tube in place at time of data analysis, died during the study period, or had their tube converted to a postpyloric tube. Our primary outcome was the incidence rate of ED visits for nasogastric tube evaluation per patient-weeks between the pre- and post-intervention groups.

Results: There were 130 patients identified after applying inclusion and exclusion criteria, with 56 in the pre-intervention group and 74 in the post-intervention group. The median chronological age of patients in the pre-intervention group was 5 months, and it was 6 months for the post-intervention group. The mean time from initial hospital discharge to either NG tube removal or conversion to gastrostomy tube was 6.2 weeks in the pre-intervention group and 8.8 weeks in the post-intervention group. In the pre-intervention group, the incidence rate of ED visits for NG tube evaluation was 15.6 visits per 100 patient-weeks (95% Confidence Intervals (CI): 11.7-20.3), and in the post-intervention group, the rate was 9.7 visits per 100 patient-weeks (95% CI: 7.4-12.4).

Conclusions: At our institution, there appeared to be a decrease in ED utilization for nasogastric tube evaluation after the PGI division assumed outpatient tube management, but this decrease was not quite enough to reach statistical significance. This study is limited by multiple factors including the retrospective nature of the study, modest sample size limiting statistical power, and, potentially, lingering effects of the COVID-19 pandemic affecting patient care decisions.

**Accepted by NASPGHAN 2023*

***A Quality Improvement Project to Combat Microaggressions in an Academic Outpatient Clinic**

Lai E, Ruedinger E, Mathur M

Background: Microaggressions are the "everyday slights, indignities, put downs and insults that people of color, women, LGBT populations or those who are marginalized experience in their day-to-day interactions" (Derald Wing Sue, PhD). They promote bias, discrimination and disrespect. To enhance pediatricians' confidence in identifying, responding to, and discussing microaggressions ("addressing microaggressions") by 20% using a quality improvement (QI) framework.

Design/Methods: This QI initiative was conducted in an eleven-provider group at an academic ambulatory primary care pediatric clinic. Root cause analysis indicated that providers did not address workplace microaggressions for a variety of reasons including unfamiliarity with organizational policy; and lack of confidence in recognizing, intervening, and reporting. A pre-intervention survey assessed perceived confidence addressing microaggressions on a zero to nine rating scale. An educational intervention delivered over 6 months targeted expanding provider knowledge on relevant institutional policies; methods of addressing microaggressions; and practice intervening. Educational modalities included training videos, self-guided readings, interactive role-play, and scenario-based discussions. Participants repeated the survey at five additional timepoints, following each discrete curricular component and after the full intervention.

Results: At the project's conclusion, provider confidence increased in all measured categories (Graph 1). The 20% improvement goal was reached in 6 of 7 identified subcategories (Table 1), including confidence in intervention (27%), response (26%), discussion (20%), leadership (20%), reporting (23%), and explaining policy (30%).

Conclusions: Pediatrician confidence in addressing microaggressions in the ambulatory clinic setting can increase after a 6-month educational interactive curriculum. We also found that the number of educational timepoints introduced was correlated with improved confidence. Next steps include expanding this educational program to other ambulatory clinics, and enhancing programming to strengthen confidence in identifying microaggressions, as this did not achieve 20% change.

**Accepted at Pediatric Academic Society 2023*

Cascade Screening for Familial Hypercholesterolemia in Pediatrics

Lentz M, Benoy M, Zhang X, Peterson, A

Background: Familial hypercholesterolemia (FH) is an autosomal dominant disorder characterized by lifelong high LDL cholesterol (LDL-C), which can cause atherosclerotic cardiovascular disease (ASCVD) events if untreated. When children are diagnosed with FH, they are sometimes the first family member to be diagnosed ("index case"). Subsequent screening of potentially affected family members, called "cascade screening", is recommended to identify others with FH. This allows them the opportunity to begin treatment and prevent early ASCVD events.

Design/Methods: This study determined the effectiveness of cascade screening for FH in a pediatric lipid clinic and examined outcomes of genetic counseling and testing in pediatric patients diagnosed with FH. The pediatric lipid clinic database was queried for all patients presenting for evaluation from 2/1/2011-12/31/2022. Children were diagnosed with FH once secondary causes of dyslipidemia were ruled out if LDL-C ≥ 190 mg/dL on two lipid profiles, or LDL-C ≥160 mg/dL on two lipid profiles with personal or family history of high LDL-C or premature ASCVD. Records were reviewed for family history, pharmacotherapy status, and genetic counseling outcomes. Subjects were excluded from further analysis if family history was not available or incomplete. Data were analyzed using descriptive statistics.

Results: N = 2511 unique patient records were identified, with n = 277 subjects meeting inclusion criteria. The median age was 11.9 (9.66-14.9) years with 52.7% female subjects. The median peak LDL-C was 198 (178.5-237) mg/dL. 45.1% of subjects had a family history of premature ASCVD and 75.1% of subjects were on statin therapy. N = 262 had complete family history and were included in further analysis. 68.7% of subjects were the FH index case for their family. 3.55 ± 1.89 new FH cases were identified per index case and the diagnosis of FH was made 11 times post-mortem. 38.2% of patients were offered genetic counseling with 9.9% having completed genetic testing. 5.7% of all subjects received diagnostic results (categorized as pathogenic or likely pathogenic).

Conclusions: Cascade screening effectively identifies patients with FH who may otherwise go undiagnosed and represents one effective approach to improve diagnosis rates for FH. This illustrates the need to screen, diagnose, and treat children with FH to reduce the increased risk of ASCVD and premature death in families affected by FH.

***Quality Improvement in the Placental Pathology Process: A Multidisciplinary Approach**

Machina K, Kling P, Bockoven C, Fritsch M

Background: The placenta functions to provide fetal nutrients, adapt its nutrient supply to match extraction, and mount key inflammatory responses. Placental pathology exams can offer insights and explain long- and short-term adverse events for both birther and fetus. The combination of recent indication developments (i.e. COVID-19) and varying education around pathology reports is resulting in increased pathology workload, result turnaround times, and timing of family consults. For placental pathology to guide clinical decision-making, order indications must be informative and timely reports must be returned. This objective is to identify gaps in the workflow of placental pathology processing to facilitate informative orders, improve interdepartmental communication, and educate for better clinical counseling.

Design/Methods: Quality improvement (QI) fishbone diagrams outlined problems and solutions for timely pathology report turnarounds. 3 mixed-methods surveys were sent to UW pathology and general obstetrics (Ob) residents, maternal-fetal medicine (MFM) and neonatal intensive care (NICU) fellows, and attending Ob and MFM providers to identify knowledge gaps, preferred educational tools, and free text thoughts about interdepartmental communication around placental pathology. Rates were compared by Chi^2, Likert scale data were compared by Mann-Whitney.

Results: Survey response rates from pathology trainees, combined Ob, MFM, and NICU trainees, and the Ob attendings were 23.8%, 27.2%, and 50%, respectively. Sufficiency of placental education for Ob and MFM trainees and attendings was rated 1.95/10 (n=21) and 5.5/10 (n=8), respectively. Delivery attending Ob/MFM providers rated their confidence in family counseling as 4.86/10 (n=14), with MFM providers' expressed rating higher (7/10, n=5) than Ob (3.67/10, n=9). Overall, interdepartmental communication surrounding placentas was rated an average of 1.9/10 (n=30). 4 Ob residents reported receiving no training on the topic. 3 Ob providers expressed that reports often provided no clinically relevant data.

Conclusions: Utilizing survey responses, 4 interventions were chosen to improve education and communication, including the use of a ".placentalpath" Smart Phrase, a teaching tool, updated indication guidelines, and joint perinatal case conferences on relevant topics. Future directions include implementing, following, and assessing the effectiveness of these instruments.

**Accepted at Society of Pediatric Pathology Spring Meeting, poster*

The "Passport" to Clinical Research Participant Engagement: Integrating Families and Children in a Research Journey

Mak V, Sutter E, Gissler L, Koziol H, Schiller J, Gillick B

Background: The foundation for evidence-based clinical practice is sound research, requiring successful recruitment of research participants. In pediatric research, family recruitment is a unique aspect of successfully running a research study. Study participants prefer active engagement with the research team, wherein participants and researchers acknowledge and appreciate the other's expertise and experiences. The Pediatric Neuromodulation Lab (PNL) is currently conducting a pediatric longitudinal observational study to investigate the impact of perinatal brain injury on motor development and risk for cerebral palsy (CP) (NIH 1R01HD098202). In an effort to prioritize open communication, facilitate recruitment, and provide an educational opportunity for the families of the infants during the two-year study commitment, we developed a 'Travel Passport' to guide families through each of five timepoints of the research journey.

Design/Methods: The PNL Travel Passport is an interactive, innovative approach to inform families about what to expect when joining our study and throughout the years of participation. Every family is provided with a personalized Travel Passport at the first study visit. Study components (MRI, transcranial magnetic stimulation, and movement assessments) are described in detail. Each section is amended with individualized information at the end of every participation session, allowing the study team to provide consistent updates.

Results: To date, 8 participants have enrolled in the study and received a passport. To evaluate the effectiveness of the Travel Passport, we gathered feedback from parents via a brief open-ended survey. This survey assessed perceived benefits and potential improvements. 5 of 6 parents stated the passport was "helpful" or "very helpful." Parents also described their favorite components and suggestions for improvement.

Conclusions: The travel passport serves as an accessible, approachable tool for the research team to communicate with families throughout the course of the study. Plain language and informative images are used to convey the goals and purpose of the study. Overall, parents indicated that the travel passport was beneficial in understanding their child's longitudinal study participation. The PNL will continue to assess the participants' views on the passport to best facilitate communication, involvement, and retention.

**Accepted at Combined Sections Meeting of the American Physical Therapy Association, poster*

***Higher Income Is Associated with Increased Physical Discipline During the Covid-19 Pandemic**

McGregory K, Kerr B, Zhao Q, Allen B, Moreno M

Background: Families with lower socioeconomic status are more likely to be reported for physical abuse. Physical discipline is a known risk factor for child physical abuse. Whether parental discipline practices changed during the COVID-19 pandemic remains unclear. The objective of this study was to assess the frequency and changes in self-reported parental discipline practices and association with household income and parental perception of child behavior during the COVID-19 pandemic.

Design/Methods: A national, cross-sectional survey study recruited parents through Qualtrics panels in August 2022; parents of children less than 18 years were included in analyses. Surveys included adapted questions from the validated International Child Abuse Screening Tool Parent Version and perceived changes in child behavior and parent discipline practices during the COVID-19 pandemic. Chi-square test was used to test the association between the usage of different disciplines and demographics.

Results: Among 1886 participants, mean parent age was 35.6 years (SD=8.7), and 71.9% identified as female and 75.2% as white; 51.3% self-reported using physical discipline practices. Higher household income levels (≥$150,000) were associated with increased frequency of aggressive shaking than lower income levels (≤$34,999), 40.2% vs 13.9%, respectively, p<.0001. Higher incomes were also associated with more frequent use of other physical discipline practices. There were no significant differences observed across income levels in the frequency of spanking, using time out or taking away a privilege. Participants with higher income were more likely to report an increased use of physical discipline during the COVID-19 pandemic compared with those with lower income, 16.7% vs 3.7%, respectively, p<0.0001. Participants in the highest income group were more likely to report "somewhat" or "significantly more" behavior problems during the pandemic than those in the lowest income group, 36.1% vs 21.8%, respectively, p<0.0001.

Conclusions: We found that parents in higher income households were more likely to self-report increased behavior problems and physical discipline practices that are high risk for abuse during the COVID-19 pandemic. In contrast, other studies have shown that low income parents are more likely to be reported for physical abuse. Bias toward identifying physical abuse in low income households could lead to under-diagnosis and under-reporting of physical abuse in high income households.

**Accepted at Pediatric Academic Society 2023*

***Approaching the barrier: Improved pediatric resident knowledge and confidence in osteopathic manipulative medicine after a resident-led educational intervention**

McMunn R, Tyler S, Ruedinger E

Background: Osteopathic manipulative medicine (OMM) is a safe, effective, low-cost intervention focused on optimizing bodily function through applied anatomy. Only two ACGME accredited pediatric residencies have osteopathic recognition, leaving most pediatric residents without residency-level osteopathic education. Literature suggests exposure to osteopathic training during residency increases resident utilization of OMM in patient care. Offering osteopathic education at more sites will bridge this educational gap and likely increase patient access to OMM. This study aimed to assess pediatric residents' knowledge of one osteopathic technique, confidence in performing OMM, and likelihood to perform OMM in patient care after an educational session about OMM.

Design/Methods: Two DO residents at the University of Wisconsin pediatric residency designed and taught a required half-day educational session to MD and DO residents about OMM, including basic principles and hands-on application of four techniques (soft tissue, counterstrain, muscle energy, and visceral). Participating residents were sent pre- and post-session, anonymous, voluntary surveys to determine the intervention's impact. Analysis was performed using unpaired t-tests.

Results: Data from eighteen pre-session (29% DOs, 55% response rate) and fifteen post-session (27% DOs, 45% response rate) surveys revealed a statistically significant increase in residents' knowledge about (p=0.029) and confidence in performing (p=0.029) OMM following the educational session. There was a non-significant trend toward increased likelihood to personally perform OMM in patient care.

Conclusions: A single, required, half-day, resident-led educational session about OMM effectively increased pediatric resident knowledge about and confidence in performing OMM techniques. Similar sessions can equip pediatric residents with the ability to effectively incorporate OMM into patient care. Further research should assess the optimal frequency of such activities and explore their effects on long-term knowledge and utilization of OMM.

**Accepted at the American Academy of Osteopathy 2023 Convocation, poster*

Using Improvement Processes to Mitigate Sleep Related Impairment in Pediatric Hospital Medicine

Miaskowski M, Webber S, Shadman K, Contreras J, Coller R

Background: Sleep deprivation and its sequelae impact physician burnout, well-being, and professional fulfillment. A 2020 wellness survey of University of Wisconsin Division of Pediatric Hospital Medicine (PHM) faculty showed higher sleep-related impairment scores compared to system-wide benchmarks. Our objective is to improve sleep-related impairment scores by 10%, decrease calls and pages sent and received, and increase total sleep while on call among UW Pediatric Hospitalists over the next 12 months.

Design/Methods: Using quality improvement methodology, 16 PHM faculty developed a driver diagram of factors contributing to call-related sleep deprivation. A small stakeholder group identified modifiable factors within the division's sphere of influence. Two interventions were identified, piloted, and subsequently adopted 1) transitioning emergency department direct admission calls from "ED resident-to-PHM faculty" to "ED resident-to-PHM resident" and 2) providing sleep education. Intervention 1 occurred in two phases, 1a and 1b. Intervention 1a piloted ED resident-to-PHM resident direct handoff from 6pm-2am. After this pilot, the process was fully adopted and transitioned to intervention 1b, ED resident-to-PHM resident direct handoff all night. Outcome measures included mean total sleep time on call and mean sleep-related impairment score for the division. Process measures included number of total phone calls and pages sent and received during call shifts, reported as interruptions. Faculty wore Fitbit trackers and reported sleep and call data each morning. Pages were manually pulled from records. Sleep impairment scores were collected via Sleep-Related Impairment Short Form survey administered through the UW Health Wellbeing Provider survey from October-November 2022. Run charts tracked mean weekly admits, total sleep, and night time interruptions. Weekly means were charted against blended patient days per month on run and X bar charts.

Results: After intervention 1a, median of total hours of sleep increased from 5.4 to 5.9 hours (Figure 1). Median total sleep worsened during respiratory viral season (October-November) to 4.8 hours, then improved to baseline of 5.4 after Dec 12. Mean sleep interruptions measured improved from 12.0 to 9.3 after intervention 1a, worsened to 14.5 when blended patient days rose (Sept 12 – Dec 12), and improved after Dec 12 to 8.5. Sleep impairment scores worsened slightly from 3.59 in 2020 to 3.38 in 2022.

Conclusions: Changing the overnight call workflow was associated with an improvement in total sleep and nighttime interruptions during typical census volumes. Overall sleep interruptions and total sleep worsened with higher seasonal census. Sleep impairment scores worsened over the two-year period; however, the second measurement was during a respiratory viral surge.

Aortic Catheterization, Probing the Gray Area

Miranda-Gandarilla D, Zhang X, Hokanson J, Lamers L

Background: Aortic coarctation is a potentially fatal congenital heart defect that can significantly reduce lifespan. Symptoms range from mild to severe in correlation with the severity of coarctation. For decades, surgery has been the main course of treatment. Recently, however, catheter-based treatment strategies have evolved. As available treatments expand, choosing the best treatment option and when to use it becomes more complicated.

Design/Methods: Through our research, we will be able to show what is considered the current best practice for the care of people with aortic coarctation where there is no clear course of treatment. To collect data, an electronic survey was created and sent, nationally and internationally, to pediatric cardiologists and congenital heart surgeons to assess their use of diagnostic testing and clinical decision making.

Results: While data collection is ongoing, we report preliminary results from 40 respondents. These indicate that the echocardiographic peak instantaneous gradient is felt to overestimate the catheter-measured gradient more than the echocardiographic mean gradient. At present, MRI measured gradients are not commonly used in decision making. The three clinical factors most likely to be extremely influential in decision making were aortic arch measurements on imaging (37.5%), resting hypertension (35%) and arm/leg gradients blood pressure gradients (27.5%). The arm/leg blood pressure gradient which would trigger intervention was consistent across the age spectrum, 20.3 mmHg(range 10-35) for infants, 22.1 mmHg (range 10-38) for children and 21.1 mmHg (range 15-35) for adolescents. Those factors most likely to be not at all or only slightly influential were heart murmurs (97.5%), MRI gradient (35.9%) and arm/leg pulse delay (30%). When making a decision to treat, the minimum patient weight for balloon angioplasty was 6.95 kilograms in native cases and 4.55 kilograms in recurrent cases. Furthermore, minimum patient weight for coarctation stenting intervention was 23.71 kilograms in native cases and 19.88 kilograms in recurrent cases.

Conclusions: While conclusive data is still pending, our research goal is to enhance personalized patient care for aortic coarctation cases where the best treatment option and timing of treatment may not be as obvious.

***Reticulocyte Hemoglobin for 30-day Iron Deficiency Screening in the NICU, A Quality Improvement Project**

Mukhtarova N, Norlin S, Kling P, Hulse W

Background: Iron deficiency (ID) in infancy may be associated with long-term neurobehavioral impairments indicating the need to screen for ID and initiate iron supplements before the onset of anemia. Previous quality improvement (QI) study (2016-2018), achieved 80% 30-day screening rate for risk factor-based ID screening. Reticulocyte hemoglobin (Ret-He) from new generation clinical analyzers measures iron available to produce new hemoglobin. Potential benefits include a more functional test of ID, less blood required, stable normal values past 7 days of age, and the only blood biomarker to decrease prior to ID in the brain. In this this study we examined NICU screening and ID rates with new protocol using Ret-He.

Design/Methods: Introduced new QI protocol for 30-day ID screening utilizing Ret-He in place of ferritin in 3/2022. Management protocol included delayed cord clamping for 1 minute, dosing iron at 2 weeks of life, and obtaining 30-day Ret-He level for all infants born < 33 weeks of gestation or at discharge if occurs earlier. PDSA cycles included Grand Rounds 2/2022, division meeting 3/2022, and divisional QI meeting on 5/2022. We then determined screening rates and screening failure for the first 6 months post Ret-He ID screening. Repeat screening recommended only if Ret-He level was low or borderline.

Results: Total of 88 Ret-He measurements were obtained on 67 neonates with 76 neonates qualifying for screening during their hospitalization. 49/76 neonates had screening at 30!"7 days which achieved 64.4% 30-day screening rate. The other 39 measurements were obtained either earlier due to discharge or beyond the 30-day goal screening window. Mean (95% CI) Ret-He value was 32.3 pg (31.8 – 32.8). 1/53 Ret-He (1.9%) qualified as ID (≤29 pg) at 30 days of life. 8/24 (33.3%) measurements obtained on repeat screening between 2-3 months qualified as ID.

Conclusion: Our 30-day ID screening rates decreased upon transitioning from ferritin to Ret-He and that will be addressed in subsequent PDSA cycles. ID screening rate using 30-day Ret-He threshold of 29 pg at 30 days of life was lower than previously found. Serial Ret-He may better predict ID than the sole measure based on higher ID rate at 2-3 months of life in our study. Further study is needed to determine if a different 30-day Ret-He threshold than 29 pg in our population predicts subsequent failed screening or if serial Ret-He measures and titrating iron therapy areneeded.

**Accepted at WI Neonatology Day, platform presentations*

***Transfer Letters Facilitate Timely Transition to Adult Diabetes Care**

Nicksic V, Sobiesk R, Yerges April, Van Den Langenberg B, Carrel A, Bekx T

Background: This quality improvement project evaluated the success and timeliness of transfer of young adults with type 1 diabetes (T1D) to adult care when a transfer letter (TL) was cooperatively completed by patients and providers in a Diabetes Transition Clinic (DTC + TL) or a routine pediatric diabetes clinic visit (Peds + TL).

Design/Methods: We conducted a retrospective analysis of patients ages 18-23 years with T1D who participated in a transition process from pediatric to adult diabetes clinic at the University of Wisconsin in 2021. All patients were offered a DTC appointment, where they met with pediatric and adult diabetes providers to review differences in clinic culture, self-care expectations, and together complete the TL. The TL, developed in collaboration between the adult and pediatric diabetes providers, engaged patients to share their diabetes story, identify challenges, and voice preferences for care and communication with their new adult provider. Those who were unable to attend a DTC clinic instead completed the TL together with only their pediatric diabetes provider at the time of placing a referral to adult diabetes clinic. The primary outcome was appointment completion with an adult diabetes provider, with a secondary outcome being the time elapsed to appointment completion.

Results: Twenty-five patients participated in a transition process, 15 via DTC+TL and 10 via Peds+TL. Fourteen of 15 patients who attended a DTC completed transfer to adult diabetes care compared to 8 of 10 with Peds+TL. Three patients were lost to follow up, 1 in the DTC group and 2 in the Peds+TL group. Of those who attended a DTC, 53% patients completed transfer in less than 3 months and 67% in less than 6 months. In the Peds+TL group, 50% patients completed transfer in less than 3 months and 70% in less than 6 months. There was no statistical significance in the percentage of patients who completed transferred ($p=0.99$) or the time to transfer between groups ($p=0.26$).

Conclusions: Cooperative completion of the TL by the patient with their pediatric diabetes provider was as effective as a DTC appointment in facilitating successful and timely transfer to adult diabetes care. The development of the TL is an effective tool that can aid in transition of young adults with T1D particularly when a DTC is not available or feasible.

**Accepted at Pediatric Endocrine Society, poster*

Physician Trading Cards and Feedback

Oduru O, Sklansky D

Background: In 2018, the ACGME recognized the need to improve resident wellness. Physician burnout is well recognized to have a major impact on patient care. In addition to the usual stressors of this career, the COVID pandemic created a surge of excess physician stress. Notably, a specific cause of burnout is lack of recognition from patients/families, including misidentification of residents, especially female providers. Weiss et al. 2020 showed physician trading cards can be used as a means to increase physician identification and greater association with care satisfaction. Residents in the study also expressed empowerment to deliver better care, improvement of physician-patient communication, and improvement of patient experiences (Weiss et al., 2020). Building on the study by Weiss, we hope to use the trading cards as a means to collect parent/patient feedback. Most written feedback given to inpatient pediatric providers at our institution is positive based on review of mailed survey results (Personal communication from recent P5 Medical Director). However, written feedback to residents is sparse due to low mailed survey response rates and inability to name the resident involved in the patient's care. We hypothesize that residents would receive more feedback with a direct electronic survey linked to cards distributed to families of pediatric inpatients, that the feedback would be mostly positive, and that the residents would describe increased fulfillment in work by receiving this feedback.

Design/Methods: In this pilot study, each intern on the red/white inpatient day teams will be given 25 trading cards & asked to offer them to one parent of each child they are caring for per day, preferably upon their initial meeting. The trading cards will be kept at ach intern's respective workstation, and will include a picture of the intern, a brief description of their patient care role, their hobbies/interests, and a unique QR code which will enable the parent to give the intern feedback. The study will be conducted during two 4-week rotations. We anticipate participation from 6 (and up to 8) interns. The feedback received from parents will be de-identified by Dr Sklansky and sent to each intern with an online survey via email at the end of the rotation. The number of cards left at each workstation at the end of the rotation will be tracked to determine the number given to parents.

Results/Conclusions: This study is in progress at the time of submission

Basophil Activation Testing in Baked Egg Allergy

Osman F, Singh AM, Al-Rayyan N

Background: Currently, specific IgE testing to egg white is used to evaluated for extensively-heated egg allergy among egg allergic patients, despite its poor predictive value. The basophil activation test (BAT) is an ex vivo functional assay that measures the degree of basophil degranulation after stimulation with an allergen via flow cytometry. We sought to compare the use of BAT for egg white components (egg white, ovomucoid, and ovalbumin) to standard predictors (sIgE) of oral food challenge (OFC) outcome for extensively heated egg allergy.

Design/Methods: Forty-three children with either: confirmed diagnosed of egg allergy (all forms); extensively heated egg tolerant, but egg allergic; or without egg allergy were recruited. Oral food challenge was used to confirm the diagnosis, and BAT was performed. Receiver operating characteristic curves (ROC) and ANOVA testing with pairwise comparisons when indicated were completed to compare among egg allergy diagnoses.

Results: BAT to ovalbumin differentiated extensively heated egg tolerant participants from controls (AUC=0.8425, p=0.0009). BAT to ovalbumin also best differentiated participants that were extensively heated egg tolerant from those that were extensively heated egg allergic (AUC=0.8064, p=0.0018). BAT to ovomucoid showed a trend in differentiating extensively heated egg tolerant egg allergic participants from baked egg allergic participants (AUC=0.72, p=.0881).

Conclusions: BAT to ovalbumin performed well to predict extensively heated egg allergy. It may be a useful adjunctive test in food allergy to predict oral food challenge outcome.

***Perceptions and Beliefs of Football Coaches Regarding the Merits of Youth Tackle Football**

Pfaller A, McGuine T, Brooks M, Schwarz A, Biese K, Hernandez M, Mosiman, S, Wilson, J

Background: Youth football proponents say it teaches athletes safe blocking and tackling techniques to set up for high school success. Opponents say injury risk, including concussion, is too high. The study compares the beliefs of high school and youth coaches regarding benefits of youth tackle football.

Design/Methods: Head varsity high school football coaches (HSC) in Wisconsin and youth coach (YC) members of the Wisconsin Football Coaches Association were asked to complete a survey regarding youth football. Responses for both groups were compared with Chi-square and Fisher's Exact tests.

Results: 238 of 392 (61%) HSC and 140 of 405 (34.5%) YC completed the survey. YC were more likely to agree or strongly agree that youth should play tackle football before grade 6 than HSC (YC= 61.3%, HSC= 12.1%, $p < 0.001$) while HSC were more likely to believe that players should not play tackle football before high school (HSC= 31.5%, YC= 0.0%, $p < 0.001$). YC were more likely to agree or strongly agree that tackle football in grades 3 to 5 (YC= 63.1%, HSC=10.0%, $p < 0.001$) and grades 6 to 8 (YC= 92.1%, HSC= 58.4%, $p < 0.001$) were important to teach safe football skills. YC were more likely to agree or strongly agree that tackle football in grades 3 to 5 (YC= 50.0%, HSC= 5.4%, $p < 0.001$) and in grades 6 to 8 (YC= 73.2%, HSC= 30.3%, $p < 0.001$) would reduce a players' risk of injury playing in high school. HSC were less likely to agree or strongly agree that participating in youth football would make players more likely to succeed in high school football (HSC= 13.0%, YC= 72.2%, $p < 0.001$).

Conclusions: YC, compared to HSC, were more likely to believe that youth players benefited from playing youth tackle football for learning safe football skills, reducing high school injury risk, and for greater football success in high school. The disparities were greater for grades 3 to 5 than grades 6 to 8. Most HSC (87%) did not strongly agree or agree that youth football participation was necessary for high school success. Large differences in perceptions between HSC and YC exist about the benefits of youth tackle football, especially for grades 3 to 5. Further research should look into to whether early participation increases success or decreases subsequent injury risk.

**Accepted at American Medical Society for Sports Medicine Annual Meeting, Poster & Department of Pediatrics Fellow Capstone Presentations, platform*

***Education for CHANGE: Pediatric Resident Learning Outcomes Associated with a Longitudinal Social Justice Curriculum**

Portale B, Balasubramaniam V, Bauer A, Ehlenbach M, Kloster H, Lee-Miller C, Logel S, McGregory K, Rogers D, Sklansky D, Williams Al-Kharusy S, Ruedinger E

Background: Oppressed groups in the United States experience disproportionately high rates of morbidity and mortality. Pediatric resident physicians should build knowledge, skills, and confidence to address these disparities. **The learning outcomes are** to assess whether a longitudinal social justice curriculum, Education for CHANGE, impacts pediatric residents across four domains: (1) confidence addressing social justice issues, (2) sense of personal responsibility, (3) intention to engage in social justice activities, (4) perceptions of workplace culture.

Design/Methods: Residents engaged in Education for CHANGE, an innovative, longitudinal, multi-modality 30-hour social justice curriculum focusing on racism as an archetype, over the 2021-2022 academic year. Topics included (not limited to): systems of power and oppression, bias, microaggressions, history of racism, and taking action. Residents completed a post-then-retrospective-pre-test assessing the four domains. This study design minimizes response-shift bias. Participants rate their skill and confidence after the intervention (post-test), then retrospectively rate their preintervention skill (retrospective pretest). The survey was adapted from previously utilized and validated tools. Results were analyzed using a paired t-test.

Results: Twenty-six of 46 (57%) residents completed the survey. Residents reported a statistically significant ($p<0.01$) increase in all assessed questions regarding the domains of confidence addressing social justice issues, personal responsibility, and intention to engage in social justice activities. With regard to perceptions of workplace culture, there was a significant increase in perception of colleagues' engagement in social justice activities and dialogue within the workplace ($p<0.01$). However, there was not a significant change in perception of social injustice and discrimination within the workplace ($p=0.14$).**Conclusions:** Implementation of the Education for CHANGE curriculum increased learners' confidence addressing social justice issues, personal responsibility, and intention to engage in social justice activities. Future research should examine persistence of changes, active engagement in promoting social justice, and long-term outcome measures from sustained structural interventions.

**Accepted at Pediatric Academic Society 2023 & APPD*

An Intervention to Improve UW Health-Stoughton Immunization Rates

Redemann B, Raman P, Pletta K

Background: Childhood immunizations are important to reduce risk of serious illness in children. UW Health Stoughton Pediatrics immunization rates are 88.4%, which are below the Wisconsin Collaborative for Healthcare Quality childhood immunization goal rate of 91.9% by June 2023. Focused efforts may improve Stoughton pediatric patient immunization rates and improve patient health.

Design/Methods: We identified patients ages 0–4 years seen any time at Stoughton clinic using the Workbench Wellness Registry. We included patients who were not up to date on age-appropriate vaccinations. Patients > 30 months of age and those up to date on vaccinations were excluded. The electronic medical record was reviewed to determine possible reasons for incomplete vaccination such as overdue for regular well visit or vaccine hesitancy. As an intervention, parents were contacted by letter (either MyChart or physical mail depending on MyChart activation status) regarding need for health maintenance.

Results: The initial report in October 2022 identified 19 pediatric patients, age 30 months or younger, who were not up to date on vaccinations (excluding seasonal influenza and COVID-19). Of these patients, 11 were due or overdue for routine well child visits. Patients overdue for well visits were sent letters reminding them to schedule an appointment, and of those patients, 6 had well visits scheduled and 1 caught up on immunizations as of March 2023. Further data collection is currently in process, and cumulative immunization rates for UW Health Stoughton will not be calculated until June 2023.

Conclusions: Our preliminary results demonstrate that the majority of children overdue for routine childhood immunizations are also behind on well visits, and after sending reminders to identified families, approximately half scheduled well visits. As of March 2023, 1 out of the original identified 11 children due for well visits ultimately caught up on recommended immunizations. The overall impact on clinic immunization rates is yet to be determined, with reassessment anticipated in June 2023.

Survey on Screening for Conditions Associated with Sudden Cardiac Death

Schlondrop J, Von Bergen N, Zhang X, Hokanson, J

Background: Sudden cardiac death (SCD) in young athletes is rare but receives mass attention due to its tragic nature. Although SCD is an important clinical issue, there's little data for decision-making regarding pre-participation screening in young competitive athletes.

Design/Methods: We sent out an anonymous electronic survey to the American Academy of Pediatrics Section on Cardiology and Cardiac Surgery (AAP SOCCS) and the Pediheart.net online community regarding pediatric cardiovascular providers' opinions and practices on the screening of young athletes for conditions associated with SCD.

Results: In total, 176 respondents completed the demographics questions. There were 145 (80%) pediatric cardiologists and 24 (13%) pediatric electrophysiologists, and the mean years of practice was 15.08 years. Of all the respondents, 97% read electrocardiograms (ECGs), and of those that read ECGs, 82% read screening ECGs. Additionally, 43% of respondents thought the emphasis on screening was appropriate, and 80% were at least slightly concerned about the liability associated with reading screening ECGs. Respondents (93%) didn't want to screen differently based on gender but did not appear to recognize the greater incidence of SCD in males. Respondents (89%) also didn't want to screen differently based on race or ethnicity. Overall, 57% of respondents didn't believe that pre-participation screening for conditions associated with SCD should be different for non-competitive athletes compared to competitive athletes. The majority of respondents believed that the American Heart Association 14-point history and physical and standard well-child check should be done for both high school students that identify as competitive athletes and those that don't identify as competitive athletes. However, 35 (25%) respondents believed an ECG should also be included in pre-participation screening for competitive athletes, and 12 (9%) believed that an echocardiogram should be included.

Conclusions: Data collected will help determine recommendations and shape future discussions for current best practices regarding pre-participation screening.

***Factors Associated with Successful Neonatal Lumbar Puncture Attempts at a Level III & IV NICU**

Schumacher H, Bauer A, Lasarev M, Limjoco J

Background: Lumbar puncture (LP) is frequently performed in neonates, commonly as part of the work-up for meningitis and neonatal seizures. As we create a curriculum to teach providers about using point of care ultrasound (POCUS) to perform LP, we wanted to better understand the factors associated with an increased likelihood of a successful LP attempt.

Design/Methods: A retrospective chart review was performed in all neonates who underwent a LP in a level III NICU from 2015-2022 and a level IV NICU from 2014-2022. IRB exemption was obtained. Successful LP was defined as any amount of CSF obtained during LP attempt. Categorical data were summarized using frequencies and percentages with continuous characteristics described using the median and inter-quartile range. Logistic regression was used to determine whether explanatory factors (e.g., PMA, weight at time of LP, and indication for LP) were associated with odds of a successful LP. Regression models utilized cluster-robust standard errors for hypothesis testing and confidence interval estimation to account for the same neonate undergoing multiple LP attempts. Ordinal outcomes (e.g., number of attempts/professionals to complete the LP, level of expertise of professional when final LP completed) were compared between groups using a Wilcoxon rank-sum test that was adjusted to account for clustering.

Results: 165 LP attempts on 146 neonates were reviewed. The majority of LP attempts were performed on patients with a post-menstrual age (PMA) > 35 weeks (64.2%). Predominant reason for LP was as part of an infectious evaluation (81%), followed by evaluation for seizure etiology (15%). The majority of LP attempts were successful (82%). No differences in successful LP rates were noted between the PMA (<29, 29-35, or >35 weeks) of the neonate (p=0.93), weight (<1, 1-1.5, 1.5-2.5, 2.5-4, >4kg) at the time of LP (p=0.63), or indication for LP (p=0.32). Success rates were increased if only one attempt was made (p<0.001), one provider tried (p=0.03), or if the procedure was attempted by a pediatric resident or neonatology fellow (p=0.009).

Conclusions: Neonatal factors were not associated with differences in successful LP attempts. Pediatric residents and neonatology fellows were more often successful in their LP attempts, though that is likely related to the fact that these individuals were often the 1st to make an attempt on a neonatal patient.

**Accepted at Pediatric Academic Society 2023*

The Effect of KCNJ13 Gene-disease Mutation on Pregnancy and Labor

Spillane A, Wright Z, Pattnaik B

Background: Preterm labor is a leading cause of neonate morbidity, and rates of premature labor have not improved. A recent study found that Kir7.1, an inwardly rectifying potassium channel, a product of the *KCNJ13* gene, was present in the myometrium of the uterus and was necessary for preventing contractions during pregnancy. Levels of Kir7.1 expression on the myometrium were upregulated during mid-gestation and downregulated during labor, causing a change in membrane potential and activating contraction of these cells. Since adolescent female patients with the functional mutation have recently been identified, we hypothesize that loss of function *KCNJ13* mutations provide a mechanism of a genetic cause for pregnancy complications that can benefit from promising treatment options. In mice, pups born homozygous (HOMO) for a *Kcnj13* mutation die within the first 24 hours of life, so we plan to breed heterozygous mice (HET) to study pregnancy and delivery.

Design/Methods: Our lab has created HET mice for a *Kcnj13* mutation. C57Bl6 WT mice served as a control. The uterus was collected from non-pregnant mice, and immunohistochemistry (IHC) was performed to identify the expression of Kir7.1 in the uterus. HET+HET and WT+WT breeding pairs were set up and never separated. A novel 24-hour monitoring camera system from SwiftSCIENCE was used to record labor and delivery. Breeding pairs were followed for at least 5 pregnancies and analyzed for length between pregnancies and length of labor.

Results: Kir7.1 was located on cells in the uterine myometrium and on the lumen and uterine gland epithelial cells. Additionally, HET female mice suffered more extended periods between pregnancies and shorter labor times than WT.

Conclusions: We confirmed that Kir7.1 is present in the uterine myometrium. Lumen and uterine glad epithelial cells have been found to be essential for implantation. The presence of Kir7.1 in the lumen and uterine gland epithelial cells, as well as longer periods between pregnancies in HET mice compared to WT, suggest that Kir7.1 may be playing an important role in uterine implantation. Decreased length of labor in HET female mice may be attributed to mutant Kir7.1 expression. Our results lead us to believe that Kir7.1 may affect embryo implantation and contraction during labor.

***Impact of Global Health Electives: Culture Shock, Confidence, & Career Plans**

St Clair N, Devi Howell K, Groothuis E, Lauden S, McFadden V, McHenry M, Merry S, Pitt M, Warrick S, Wilson S, Conway J

Background: Global health (GH) electives often occur within markedly different cultural, ethical, economic, and clinical paradigms. Post-return, trainees frequently recall symptoms attributable to culture shock and describe their experiences as transformative. There is limited data available to quantify the psychosocial and professional impact of GH electives on trainees. The purpose of this study is to describe the impact of global health electives on trainee culture shock, confidence in physical exam skills, and future career plans related to GH and health disparities.

Design/Methods: From 2016-2020, our study team recruited medical trainees across 9 Midwest training institutions with GH training programs into a survey study prior to their GH elective participation. Participants completed online REDCap surveys at the following intervals: 7 days pre-departure, every 5 days during the elective, and 30 days post-return. A 5-stage model of culture shock was used, and it was defined as the stress, anxiety, or discomfort a person feels when they are placed in an unfamiliar cultural environment. Surveys included participant demographics, on-site training conditions, and post-return impressions. Outcomes were summarized using descriptive statistics.

Results: 252 trainees enrolled (1/4 medical students, 3/4 GME trainees). Of those, 98% provided pre-departure demographics (Table 1), and 58% completed the post-return survey. Post-return surveys revealed that 96% and 74% of trainees endorsed experiencing culture shock (during) and reverse culture shock (after) their GH electives, respectively, with 54% impacted somewhat or very significantly during, and 32% after (Table 2). 13-16% of trainees felt that culture shock negatively impacted their professional interface (interactions with local providers, patients, and the community), and 31% felt it negatively impacted their mood. Reverse culture shock had the greatest negative impact on their perceptions of how medicine is practiced at their home institutions (35%). Post-return, 49% of trainees reported increased confidence in physical exam skills; and 68% and 80% had increased desire to incorporate GH into their careers and to address health disparities, respectively (Table 3).

Conclusions: Medical trainees from these institutions almost universally experienced symptoms attributable to culture shock during GH electives, affecting their wellness and professionalism to varying degrees. Despite this, GH electives were associated with increases in self-perceived clinical skills and commitment to addressing health disparities.

**Accepted at Pediatric Academic Society 2023*

Primary Care Perspectives of Rural HPV Vaccination Challenges and Opportunities: A Qualitative Study
Stalford S, Kliems H, Cox E
Background: Rural populations are disproportionately affected by human papillomavirus (HPV)-associated cancers. Nationally, HPV vaccine coverage is lower among rural compared to non-rural populations (56% vs 63%), well below the Healthy People goal of 80%. In Wisconsin, rural counties have rates as low as 31%. This study aimed to identify challenges and opportunities for HPV vaccine uptake in rural Wisconsin primary care clinics.
Design/Methods: We conducted 27 semi-structured interviews between March and July 2021. Interviews lasted on average 60 minutes and were recorded and transcribed. Interview participants worked in direct patient care (e.g. physicians, APPs, nurses, medical assistants), clinic/system administration, or quality improvement across 8 health systems providing primary care to rural Wisconsin populations. We used thematic content analysis to identify emergent themes.
Results: Almost half (44%, n=12) of participants were physicians or advanced practice providers; others were nurses (n=5), medical assistants (n=3), schedulers (n=3), or system-level administrators (n=4). While many had primarily clinical roles, some also had system or clinic leadership positions. Vaccine hesitancy emerged as a main barrier to HPV vaccine uptake from the interviews. Interviewees described different forms and extents of vaccine hesitancy, primarily from child patients' caregivers. Some types were specific to the HPV vaccine (e.g. link between sexual activity and the vaccine), whereas others were generalized (e.g. refusal of any childhood vaccine). Other challenges included distance to care or patient socioeconomic status. Interviewees describe a large repertoire of strategies and resources to address these challenges (e.g. rhetorical strategies during an encounter, reminder systems, vaccine-only appointments). Interviewees had different perspectives on whether they considered their clinic rural and whether rurality was linked to vaccine uptake. Participants tied rurality to barriers (e.g. spread of anti-vaccine rumors in rural communities), but also to facilitators such as patient/provider trust.
Conclusions: Healthcare professionals in primary care for rural patient populations described multiple factors affecting HPV vaccine uptake, consistent with the literature. Their perspectives varied between different health systems as well as within systems, suggesting that interventions to improve HPV vaccination rates should be responsive to local context.

***Evidence-based Infant Assessment for Cerebral Palsy: Relationship to Early Diagnosis and Intervention Access**
Sutter E, Collins K, Villegas M, Legare J, Eickhoff J, Gillick B
Background: Recent clinical guidelines (2017) highlight the importance of evidence-based assessments for early detection of cerebral palsy (CP), with the ability to accurately diagnose CP under 6 months' corrected age (CA). Magnetic Resonance Imaging (MRI) can identify injury patterns associated with risk of CP. The Hammersmith Infant Neurological Examination (HINE) and the General Movements Assessment (GMA) provide insight into early neuromotor development. This study investigated relationships between evidence-based infant assessment and diagnosis timeline in a clinical population of children with CP.
Design/Methods: Medical record review was performed with patients seen between 2010 and 2022 at the University of Wisconsin-Madison Newborn Follow Up Clinic, an interdisciplinary outpatient clinic specializing in assessment for children aged 0-3 at risk for developmental disabilities. Chart review was performed for patients who received a CP diagnosis from a developmental pediatrician to assess: 1) CA at CP diagnosis, 2) CA at first documentation of high-risk for CP ("first CP mention"), 3) assessments used in diagnosis, including GMA, HINE, and MRI, 4) selected sociodemographic and descriptive factors, and 5) interventions received.
Results: 66 patients met inclusion criteria. Data were divided into two cohorts around the 2017 guidelines publication (2010-2017, 2018-2022). MRI, GMA, and HINE were integrated more frequently in the later cohort (MRI: 75% to 92%, GMA: 4% to 68%, HINE: 0% to 13% of children). Mean ± SD CA of diagnosis was comparable (2010-2017: 15.1±6.9 months, 2018-2022: 15.7±7.8 months, independent samples t-test p=0.72). Across all years, there was a difference in CA at diagnosis among children who received none (21.5±55.8 months), one (16.1±7.8), or two or more (12.6±5.9) of the three evidence-based assessments (one-way ANOVA $p<0.001$). There was a similar difference in CA at first CP mention (none: 18.7±6.6 months, one: 8.3±7.6, two or more: 4.4±4.3, one-way ANOVA p=0.005). 91% of children had been referred to rehabilitation therapies by the time of diagnosis.
Conclusions: Integrating evidence-based clinical assessments was associated with earlier first mention of high risk for CP and CP diagnosis. This study helps identify real-world changes diagnosis timeline and intervention access based on clinical guidelines, as well as remaining gaps related to guideline implementation, feasibility, and the potential to improve outcomes.
**Accepted at American Society for Neurorehabilitation, poster*

***High-Resolution Myelin Water Imaging Using MPnRAGE**

Weaver J, Kecskemeti S, Guerrero Gonzalez J, Alexander A, Dean D

Background: Numerous magnetic resonance imaging (MRI) techniques have been introduced to quantify myelin, a key substance for brain function. These techniques, usually referred to as myelin water imaging (MWI), have been used to study demyelinating disorders such as multiple sclerosis and both typical and atypical myelination during brain development. However, most MWI techniques suffer from limited resolution, long acquisition times, and susceptibility to motion, all undesirable characteristics for pediatric neuroimaging. The novel pulse sequence MPnRAGE can obtain high-resolution (1 mm^3) motion-corrected images within clinically feasible acquisition times (< 10 minutes), and as such is well-suited for pediatric neuroimaging. We hypothesize that MPnRAGE can be used to perform MWI assuming a two-component model of myelin water and intra-/extracellular water.

Design/Methods: A multicompartment model using the MPnRAGE signal was developed to account for the myelin water signal characteristics (T1, inversion efficiency) and the volume fraction of myelin water to intra-/extracellular water (MWF). Data with a variety of parameters and signal-to-noise ratios (SNR) were simulated and fit with the multicompartment model to demonstrate that the problem is well-posed. The technique was then applied to a retrospective in vivo case. Results from this in vivo case were examined and compared to existing literature to further optimize the proposed technique.

Results: Simulation results demonstrate that the multicompartment model can be fit perfectly in the absence of noise, and still provide appropriate results in the presence of added Gaussian noise. Preliminary in vivo results demonstrate reasonable MWFs and myelin water T1 based on existing literature. However, the myelin water T1 and MWF maps are noisy, presumably due to low SNR.

Conclusions: A myelin water fraction may be derived from fitting MPnRAGE data to a two-compartment model. Preliminary in vivo results demonstrate reasonable values and structure in the myelin water T1 and MWF maps but display sensitivity to noise. Further optimization of the fitting algorithms and MPnRAGE reconstruction are necessary to improve performance.

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Parent Perceptions of Their Child's Primary Care Provider's Attire

Yanny M, Kerr B, Zhao Q, Moreno M

Background: A therapeutic alliance with a child's primary care provider (PCP) is key for best practice family-centered care. For adult PCPs, perceived knowledge, professionalism, competence, and trustworthiness is associated with type of attire. It remains unclear whether pediatricians' attire is perceived in a similar way. The objective of this study was to investigate associations between a child's PCP's attire and parents' perception of their knowledge, trustworthiness, approachability, and desire to stay within that medical home.

Design/Methods: In this national cross-sectional online survey study, we recruited parents with at least one child $\leq$ 17 years old via Qualtrics in August 2022. Participants were shown images and descriptions of various provider attire choices and were asked about their perceptions of provider knowledge, trustworthiness, approachability, and desire to continue care with them, as well as overall preferred attire. Repeated measure analyses were used for comparison of perceptions of PCPs between clothing types.

Results: Among the 2,151 parent participants, the majority (72.7%) identified as female and a majority (60.2%) were ages 30-45. The most common preference (39.7%) was "business casual with a white coat" attire for their child's PCP, and 46.2% of participants reported that how their child's provider dressed was important to them. Statistically significant differences were found among the six groups of attire in knowledge, trustworthiness, approachability, and desire to stay with the provider ($p<0.0001$) (Table 2). Pair-wise comparisons found that white coat attire was significantly higher rated overall.

Conclusions: Findings suggest that most parents have preferences regarding their child's PCPs' attire. White coats with business casual or scrubs were associated with higher trust and desire to stay with that provider. Future studies should explore whether staying within a child's medical home is influenced by the PCP's attire, and if pediatric patient perceptions correlate with parent perceptions and behavior. This study also raises ethical questions regarding who determines expectations of professionalism and dress codes in medicine.