



**CLASS OF 2027**  
**SCHOLARLY PROJECTS**  
**ABSTRACT BOOKLET**

**Assistant Dean for Scholarly Activities: Margaret Samyn, MD, MBA**  
**Program Manager, Scholarly Activities: Meaghan Hayes, MEd**

**Scholarly Project Leadership Team**

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Coordinators:  
Nadine Desmarais and Patricia Schmidt

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Bioethics & Medical Humanities	Arthur Derse, MD, JD Ashley Pavlic, MD, MA
Basic to Translational Research	Joseph Carroll, PhD Priyanka Shah-Basak, PhD
Clinical to Translational Research	Jamie Jasti, MD, MS Alexandra Istl, MD
Clinician Educator	Sean Mackman, MD Kelsey Ryan, MD
Global Health	Kirsten Beyer, PhD, MPH, MS Megan Schultz, MD, MA
Health Systems Management & Policy	Mark Lodes, MD Kellie Snooks, DO
Quality Improvement & Patient Safety	Nancy Jacobson, MD Matthew Scanlon, MD
Urban & Community Health	Lauren Bauer Maher, MD, MPH, MS Rebecca Bernstein, MD, MS

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One of the graduation requirements for MCW's medical students is the Scholarly Project, a faculty-mentored longitudinal experience completed during or before Phase 3. A Scholarly Project is defined as one that meets *Glassick's Criteria for Scholarship* and is presented in both a written component (final paper) and oral component (poster or podium presentation). There are several opportunities through out their first three years as a medical student to present their project, but the Scholarship Forum is a culminating event to celebrate all Student Scholarly Projects and their time in the Scholarly Concentrations program.

## **Alifayaz Abdulzahir**

### ***Using expansion microscopy to visualize fine synaptic structures in the retina***

**Authors:** Abdulzahir A, Scalabrino S

**Project Mentor:** Miranda Scalabrino, PhD; Ophthalmology

**Background:** Retinitis Pigmentosa (RP) is a cohort of inherited neurodegenerative diseases that progressively impairs vision and ultimately leads to blindness. Current therapies are non-curative and only slow disease progression. Prior studies have shown that RP-associated neurodegeneration results in retinal neuronal rewiring, which becomes increasingly severe as degeneration advances and compensatory mechanisms fail. However, current imaging modalities lack the resolution needed to visualize these synaptic changes. We use expansion microscopy (ExM) in a mouse model of retinitis pigmentosa to examine alterations in retinal synapses at different stages of cell loss.

**Method:** We adapted the Ultrastructure Expansion Microscopy (U-ExM) protocol developed by Gambarotto et al. 2019, which physically enlarges retinal tissue while preserving morphology. Immunohistochemistry (IHC) was used to label markers of intact synaptic structures, confocal microscopy was used for image acquisition, and ImageJ was used for image analysis.

**Results and conclusion:** We successfully expanded retinal tissue up to threefold while preserving tissue morphology and staining cone photoreceptors with IHC. This enabled improved visualization of cone-mediated signaling between cone photoreceptors and bipolar cells in control mice (C57BL6J) at a much higher level of detail. Moving forward, we aim to characterize synaptic remodeling in RP, particularly changes in cone-mediated synaptic connections. We anticipate that disease-state retinas will show disrupted synaptic architecture and fewer synaptic connections, with late-stage disease demonstrating more severe degeneration than early-stage disease.

## **Akorfa Adobor**

### ***AI for health equity: Integrating generative AI and community engagement for sun safety awareness***

**Authors:** Adobor A, Jobe A, Le T, Martinez G, Milke J, Narvaez C, Obeng A, Patel R, Sorbjan N, Milejczyk K, Wanat K

**Project Mentor:** Karolyn Wanat, MD; Dermatology

**Community Partner:** Neighborhood House; UEC Riverside Park, International Institute of Wisconsin

Research has found decreased levels of sunscreen usage among African Americans and other minority groups compared to White populations. Many discrepancies in sun protection knowledge and sun safety practices exist among minority communities, and factors such as lifestyle, cultural beliefs, and individual perception may influence sun safety behaviors. Prior studies have shown that White individuals often perceive themselves as more susceptible to skin cancer and report more consistent sunscreen use. While skin cancer risks affect individuals across all racial and ethnic groups, some minority populations may have lower awareness of skin cancer risk and reduced willingness to adopt proven preventive measures, including sunscreen use. These findings highlight the need for culturally targeted educational interventions to improve sun safety awareness and behaviors among underserved populations. This study aims to assess barriers and misconceptions related to sun safety practices among African American, Hispanic, Asian, Burmese, and Rohingya communities while evaluating the development of a culturally tailored educational intervention. The intervention incorporates community engagement strategies and educational materials designed to address linguistic, cultural, and knowledge-based barriers to photoprotection. In addition, this study explores the use of generative artificial intelligence tools, including multimodal platforms such as InVideo AI, Renderforest, and Gamma AI, to develop culturally relevant health education content. This study outlines the epidemiological rationale for the intervention, the implementation of AI-driven educational tools, the community-based recruitment strategy, and the anticipated impact on sun safety knowledge, perceptions, and behavioral intentions among minority populations.

## Anika Agrawal

### *Cultural health capital among patients/families with types 1 and 2 diabetes mellitus in Port Harcourt, Rivers State, Nigeria*

**Authors:** Agrawal A, Jaja T, Akhidue K, Anyiam FE, Abibo L

**Project Mentor:** Lolia Abibo, MD; Medicine

**Community Partner:** University of Port Harcourt Teaching Hospital

**Background:** Cultural health capital (CHC) encompasses the unique cultural skills, attitudes, behaviors, and interaction styles that patients and healthcare providers bring to their encounters. CHC is divided into 12 domains: 1) Specialized cultural skills; 2) Attitudes; 3) Behaviors; 4) Interactional styles; 5) Knowledge; 6) Organizational savvy; 7) Health-related values and norms; 8) Physical appearances; 9) Health performances; 10) Social and economic resources; 11) Educational credentials; and 12) Verbal skills. This project aims to evaluate CHC domains among patients with type 1 (T1DM) and type 2 diabetes mellitus (T2DM) in Port Harcourt, Nigeria, to enhance DM care.

**Methods:** The study included T1DM and T2DM patients from the University of Port Harcourt Teaching Hospital's pediatric and adult endocrinology departments. Participants completed a 63-question survey covering seven of 12 CHC domains. For those under 18, a parent/guardian completed the survey. The survey contained 33 single-answer multiple-choice questions, categorized into 21 questions on "Knowledge," 4 on "Attitudes," 3 on "Health-related norms and values," 2 on "Behaviors," and 1 each on "Educational Credentials," "Interactional Styles," and "Verbal Skills."

**Results:** Eighty-six respondents completed the survey over four weeks in Port Harcourt. Responses from T1DM patients (N=25) and T2DM patients (N=39) were combined into a Known Type group (N=64) and compared to an Unknown Type group (N=22), comprised of individuals unsure of their DM type. T1DM and T2DM patients were also directly compared. The results showed significant differences in domains of Knowledge, Attitudes, and Behaviors, particularly between the Known Type and Unknown Type groups, suggesting key priorities for future educational interventions.

## Faizan Ahmed

### *Impact of Disease-Modifying Therapy on Mobility and Healthcare Utilization in Multiple Sclerosis: A Retrospective Matched Cohort Analysis*

**Authors:** Ahmed F, Hernandez R, Obeidat A

**Project Mentor:** Ahmed Obeidat, M.D. Ph.D; Neurology

**Background:** Multiple sclerosis (MS) is a chronic neuroinflammatory disease for which disease-modifying therapies (DMTs) are the gold standard therapy. Long-term evidence on DMT effects on disability and healthcare utilization remains limited.

**Objective:** To assess the impact of DMT exposure on ambulatory function and healthcare utilization in matched MS patients, and to quantify the contribution of infections to healthcare utilization in treated patients.

**Methods:** Single-center retrospective matched cohort study. Thirty-nine untreated MS patients (no DMT ever) were matched 1:1 to 39 treated patients by sex, race, age, years since diagnosis, and radiological disease severity. Primary outcome was walking status at most recent visit. Secondary outcomes included cumulative ER visits and hospitalizations, and infection associated visits. Logistic and Poisson regressions adjusted for years since diagnosis.

**Results:** Mean age was 61 (SD 13) years; mean disease duration 19 (SD 14) years; 82% female; 90% White. No significant difference in walking status was found (OR 0.63, 95% CI 0.08–4.05,  $p=0.6$ ). Treated patients had significantly more ER visits (IRR 1.68, 95% CI 1.39–2.03,  $p<0.001$ ) and hospitalizations (IRR 1.71, 95% CI 1.32–2.23,  $p<0.001$ ). On negative binomial regression, treatment was not a significant predictor of infection-related ER visits (IRR 0.74, 95% CI 0.26–2.12,  $p=0.575$ ) or infection-related hospitalizations (IRR 1.56, 95% CI 0.37–6.59,  $p=0.546$ ).

**Conclusions:** DMT exposure did not improve long-term ambulatory function but was associated with significantly higher healthcare utilization, which was not driven by infections. These findings emphasize the need for individualized approach to DMT use.

## Margaret Allen

### ***Prevalence of Non-Accidental Trauma Screening in Pediatric Out of Hospital Cardiac Arrest Patients***

**Authors:** Allen ME, Balakrishnan B, Yan K, Narang SK, Scanlon MC.

**Project Mentor:** Binod Balakrishnan MD, Matthew C Scanlon MD MS; Pediatrics

#### Introduction

Non-accidental trauma (NAT) is a serious yet potentially preventable cause of morbidity and mortality in pediatric trauma patients. Although reported in 1–12% of cases, its true incidence is underrecognized due to variable presentations and the young age of affected children. Some patients present as out-of-hospital cardiac arrest (OHCA), where identifying NAT is critical for clinical management and medicolegal purposes. As NAT evaluation lacks standardization, we hypothesized that screening is often incomplete in this population.

#### Methods

We conducted a retrospective review of 313 children aged 0–5 years admitted to the PICU at a Level I trauma center for OHCA between 2015 and 2024. NAT screening was assessed using six criteria defined by the child advocacy team: drug screening within 24 hours, skeletal survey, comprehensive metabolic panel (CMP), neuroimaging, detailed skin examination, and social work consultation. Partial and complete screening completeness and OHCA etiology were analyzed.

#### Results

The median age was 0.75 years [0.25, 1.67]. Only 13.1% (41/313) underwent complete NAT screening, with a mean of  $3.38 \pm 1.62$  components completed. CMP (85.3%), social work consultation (69.7%), and neuroimaging (67.1%) were most frequently performed, while skeletal survey was least common (17.3%). Leading OHCA etiologies included non-NAT trauma (17.9%), respiratory causes (16.3%), NAT (15.7%), and infection (15.0%). Among patients with unknown etiology (2.6%), only one had complete screening. NAT prevalence was 75.6% in fully screened patients versus 6.6% in those incompletely screened.

#### Conclusions

NAT evaluation is frequently incomplete in young children presenting with OHCA, potentially leading to missed diagnoses. Standardized screening protocols may improve detection and outcomes.

## Alyssa Alvarado, BS

### ***Feeding Goals Achieved: Strong Alignment Between Intention and Outcome in Newborns During Birth Hospitalization***

**Authors:** Alvarado A, Ryan K, Cabacungan E, Dasgupta M, Yan K, Bolin A.

**Project Mentor:** Ashley Bolin, MD; Pediatrics

**Background:** Human milk is the ideal form of infant nutrition. Breastfeeding intention strongly predicts behavior, yet rates differ significantly by maternal race and ethnicity despite similar intentions. We hypothesize that there is a relationship between maternal and infant characteristics, exclusive breastfeeding and feeding alignment, at our level IV perinatal center, where families may access Mom's Own Milk (MOM), Donor Human Milk (DHM), or formula.

**Objective:** To determine the rate of exclusive breastfeeding, the rate of alignment between feeding intention and outcome, and factors associated with alignment during the birth hospitalization (BH).

**Methods:** This is a retrospective review of randomly selected electronic health records (EHR) of 300 term infants born vaginally at the Froedtert Milwaukee Birth Center from 7/2021 to 3/2024. EHR data were mined using I2B2/Honest Broker and supplemented with manual chart review. The outcome variable was feeding alignment, defined as identical feeding intention and feeds received during the BH. Maternal demographics, antepartum, and newborn variables were compared using T-test/Mann-Whitney/Chi-square/Fisher's exact test as appropriate. Feeding type alignment was evaluated by pairwise comparisons.

**Results:** 288 subjects were analyzed, with 191 (66.3%) exclusively breastfed during the BH. Feeding intention and outcome were aligned in 82% of subjects. There was no significant difference between alignment based on race/ethnicity, pregnancy number, maternal age, marital status, infant gestational age, infant sex, infant birth weight, type of delivery or length of stay. Infants who received MOM + formula had significantly lower alignment.

**Conclusions:** Among single term infants born vaginally, DHM contributed to higher alignment during the BH. Lower alignment for dyads receiving MOM + formula suggests potential for further DHM use.

## Tasmia Amjad

### *Exploring cultural humility in the care of Muslim patients: a case study-based approach for medical students*

**Authors:** Mohammad I, Khursheed S, Abufares N, Yusuf H, Azam L, Young S, Agarwal H

**Project Mentor:** Himanshu Agrawal, MD; Psychiatry

**Introduction:** For some Muslim Americans, the lack of provider awareness of Islamic social norms and cultural practices can strain the physician-patient relationship and create distrust. Our curriculum addresses this gap in medical education through a multimodal, two-hour workshop that introduces the concepts of cultural humility and structural competency and demonstrates how they can be applied to clinical care of Muslim patients.

**Methods:** Pre-clinical medical students participated in a didactic on cultural humility, structural competency, and Islamic healthcare practices, followed by two small-group case discussions and a large-group debrief. Cases addressed same-gender provider preference in the emergency department and diabetes management during Ramadan. Pre- and post-session surveys assessed confidence using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) across multiple iterations between 2023 and 2026.

**Results:** Across two iterations with matched pre-post data (N = 37), participants scored significantly higher on all post-test questions compared to pretest questions (overall M = 4.36 post vs. M = 3.28 pre, all  $p < 0.001$ ). Qualitative feedback was overwhelmingly positive, with participants emphasizing the value of cultural humility education and requesting integration into the core curriculum.

**Discussion:** This workshop provides medical students with foundational awareness of Muslim practices that influence healthcare and introduces cultural humility and structural competency as frameworks for caring for patients from diverse cultural and religious backgrounds. We recommend this curriculum for medical students preparing to care for Muslim and other minority communities in the US.

## Emi Ampo

### *Semi-automated transfer of tumor annotations from H&E to fluorescence images of breast and lung tissues for intraoperative margin detection*

**Authors:** Niu T, Ampo E, Jorns JM, Patton M, Lu T, Yee DH, Yen TWF, Yu B

**Project Mentor:** Tina WF Yen, MD, MS; Surgery

**Purpose:** We aimed to develop a semi-automated method for transferring tumor annotations from pathologist annotated hematoxylin and eosin-stained (H&E) images to corresponding fluorescence images captured by microscopy with ultraviolet surface excitation (MUSE) for intraoperative assessment of tumor margins.

**Approach:** A semi-automated annotation method, comprising registration, outline extraction and refinement, and final annotation transfer, was implemented to facilitate the transfer process. Registration was performed using a site pairing and second-order polynomial transformation to align a MUSE image with the corresponding H&E image. Annotations from the H&E image were extracted using a subtraction arithmetic algorithm and subsequently refined by eliminating background areas using a Canny edge detection method. The refined annotations were then accurately transferred to the registered MUSE image, completing the pipeline. MUSE images from 35 breast and lung surgical 24 tissues were annotated using this method and compared to those manually annotated. Similarities between the two annotation sets were estimated using three metrics: Dice Similarity Coefficient (DSC), cosine similarity, and Convolutional Neural Network (CNN)-based feature similarity.

**Results:** The DSC, which assesses overlap of the annotation contours, achieved a mean score of  $0.88 \pm 0.08$  across the 35 samples. The cosine similarity, which quantifies pixel-level similarity, yielded a mean score of  $0.88 \pm 0.11$ . The CNN-based feature similarity, which leverages AlexNet to extract high-level features and compute the cosine similarity, achieved the highest performance with a mean score of  $0.94 \pm 0.04$ .

**Conclusions:** The proposed method can be used as an accurate, efficient, and reliable tool to create a large dataset of annotated MUSE images that are essential for the development of deep learning classification models for intraoperative detection of tumor margins.

## **Laken Anderson**

### ***Effectiveness of Estimated Blood Volume (EBV)-Guided Prophylactic Enoxaparin Dosing in Patients Following Minimally Invasive Surgery***

**Authors:** Anderson L, Kindel T, Peppard WJ, Chang CK, Rein L

**Project Mentor:** Tammy Kindel, MD, PhD; Surgery

Enoxaparin is the most common drug given prophylactically to patients undergoing surgery to prevent venous thromboembolism (VTE). There is debate as to whether body mass index (BMI) or estimated blood volume (EBV)- based enoxaparin dosing is the best method to achieve desired anti-factor Xa (aXa) levels.

This study prospectively reviewed minimally invasive surgery patients treated at MCW from February 2023 to June 2024. Patients must have had an aXa drawn 2.5-6 hours following 3 consecutive doses of enoxaparin for inclusion. The target range for aXa draw was 0.2-0.5 IU/mL. Enoxaparin was dosed based on EBV using the following guidelines: EBV 3-4.9 received 30 BID, EBV 5-6.9 received 40 BID, and EBV >7 received 60 BID.

This study included a total of 150 patients. The mean BMI was  $46.80 \pm 10.99$  kg/m<sup>2</sup> with an average age of  $46.79 \pm 13.80$  years. Prophylactic in-range aXa levels were attained in 115 patients (76.67%), with 4 patients (2.67%) above target and 31 patients (20.67%) below target. The mean aXa level was  $0.27 \pm 0.10$  IU/mL. 2 patients (1.32%) had bleeding events, and 1 patient (0.66%) developed a deep vein thrombosis. When comparing the historical BMI guided dose to current recommended EBV dosing, 95 patients (63.33%) received the same dose, and 55 patients (36.67%) received different dosing. 27 patients (18.00%) received higher dosing using EBV guidelines compared to BMI (n=8 for 60mg BID instead of 40mg BID; n=19 for 40mg BID instead of 40mg QD) and 28 patients (18.42%) received lower dosing using EBV guidelines compared to BMI (n=26 for 40mg BID instead of 60mg BID; n=2 for 30mg BID instead of 40mg BID). In range aXa levels were achieved in approximately 77% of patients using EBV-based dosing. The 23% that had measured out of range are important given the potential risk of preventable thromboembolic events or bleeding and requires further study and validation of EBV-based dosing in specific sub-populations of surgical patients.

## **Madelyn Anderson, BA**

### ***Association between shoe brand and lower extremity injury among WNBA players: a retrospective cohort study of the 2023 season***

**Authors:** Anderson MR, Choudhury A, Mickelson EJ, Kim MH, Cross JA.

**Project Mentor:** Janelle A Cross, PhD; Orthopaedic Surgery

This study investigates the relationship between lower extremity (LE) injury and shoe brand worn by Women's National Basketball Association (WNBA) players in the 2023 season. Injury and footwear data from The Next and KixStats were cross-referenced and analyzed. Seventy-nine LE injuries occurred during the 2023 season. The most represented shoe brand was Nike, which was associated with 46 lower extremity injuries. Global chi-square analysis yielded a significant association between LE injury events and shoe brand through both games and minutes ( $p=0.0434$ ,  $p<0.0001$ ). Individual Fisher's exact test analysis displayed a significant relationship between players wearing Puma with LE injury occurrence through games ( $p=0.0100$ ), and between players wearing Puma and Adidas with LE injury occurrence through minutes ( $p<0.0001$  and  $p<0.0001$ ). Subsequent post hoc analysis of shoe models within the Puma brand demonstrated that TRC Blaze ( $p=0.0008$ ) and Stewie ( $p=0.0039$ ) were significantly associated with LE injury occurrence. Despite accounting for 0 injuries in the 2023 season, the significant relationship found between Stewie and LE injury suggests a possible protective effect for players wearing that model. These findings demonstrate how footwear selection influences the risk of suffering a LE injury during WNBA gameplay and how sports medicine physicians can guide footwear selection for athletes to promote player safety. Future work should aim to investigate the consistency of our observed relationship between shoe brand and LE injury during 2024 WNBA gameplay.

## **Quinn Anderson, BS**

### ***Resident burden in trauma care: a qualitative analysis of discharges against medical advice***

**Authors:** Anderson Q, Cronn S, Peschman J

**Project Mentor:** Jacob Peschman, MD FACS; Surgery

**Introduction:** Discharges against medical advice (DAMAs) are ethically complex clinical events studied primarily from the patient perspective. Little is known about how these encounters affect clinician wellbeing, particularly among resident physicians navigating early professional development in high-acuity settings. This study examines surgical resident experiences with DAMAs on a Trauma and Acute Care Surgery service, focusing on psychosocial impact, implications for professional identity formation, and clinical contexts shaping these encounters.

**Methods:** Semi-structured interviews were conducted with surgical resident physicians assigned to the Trauma and Acute Care Surgery service at a single academic medical center. Transcripts were analyzed using inductive thematic analysis.

**Results:** Five surgical residents were interviewed. Three interrelated themes were identified: 1) emotional burden of the AMA encounter, characterized by frustration and sustained concern for patient outcomes; 2) erosion of professional confidence and identity, in which the absence of clinical closure disrupted learning cycles central to professional identity formation; and 3) system-level constraints on resident decision-making, including high workload demands and absence of standardized protocols, which reduced clinical agency. Across themes, the acuity and complexity of trauma and surgical care intensified the impact of these encounters.

**Conclusion:** DAMAs represent a recurrent and structurally mediated challenge in surgical training that contributes to moral distress, threatens professional identity formation, and occurs within institutional conditions that amplify their impact. Targeted educational interventions, standardized discharge protocols, and strengthened supervisory support may mitigate these effects and improve resident wellbeing and discharge safety.

## **Adam Andrade**

### ***MY VOICE: Youth Perspectives on Firearm Violence in Milwaukee***

**Authors:** Snooks K, Andrade A

**Project Mentor:** Kellie Snooks, DO, MPH; Pediatrics

**Community Partner:** Running Rebels, Safe & Sound, and Wisconsin Anti-Violence Effort

The prevalence of firearm violence in Milwaukee, Wisconsin remains a major health concern among adolescents. In this study, we focus on how firearm violence directly affects adolescents by hearing their lived experiences and gaining insight into what they believe could make a difference.

Using a qualitative approach, four focus groups involving 19 adolescents aged 14-18 years were recruited through community-based organizations, WAVE, Running Rebels, and Safe & Sound. The focus groups were held at these organizations where discussions were audio-recorded, transcribed verbatim, and analyzed using thematic analysis. Four major themes emerged from thematic analysis of the transcripts. First, was the normalized youth's access to firearms. Second, were the genuine appreciation and the protective role of community-based programs, along with their gaps in awareness and accessibility. The third theme noted was the structural and institutional gaps in school safety and emergency communication. Lastly, the participants in our group described geographic inequality in exposure to violence. The voices of these participants are powerful, and their lived experiences are irreplaceable. By including youth in the conversation and incorporating their ideas, we can help guide future efforts to reduce adolescent exposure to gun violence in Milwaukee and inform policies aimed at creating broader community impact.

## **Kristen Andrea Apolinario**

### ***Economic impacts of a rural residency program in Wisconsin: an interrupted time Series and difference-in-differences analysis***

**Authors:** Apolinario KC, Ruffalo L

**Project Mentor:** Leslie Ruffalo, PhD; Family & Community Medicine

**BACKGROUND** Rural residency programs are increasingly promoted to address physician workforce shortages in rural areas. However, the broader economic impact of rural residencies on their host communities is understudied, with prior studies largely relying on simulation models rather than empirical longitudinal analyses.

**OBJECTIVE** To evaluate the association between implementing a rural residency program and changes in county-level economic outcomes using real-world longitudinal data.

**METHODS** This study used a multiple-method quasi-experimental design to assess economic trends in Green County, Wisconsin after the 2015 introduction of the SSM Health Monroe Family Medicine Residency. Interrupted time series (ITS) analysis evaluated county-level trends in healthcare employment, median household income, and unemployment. Difference-in-differences (DiD) analysis compared these trends with those in Richland County, a demographically similar rural county without a residency program.

**RESULTS** In Green County, ITS analysis found sustained decreases in healthcare employment ( $p < 0.001$ ) and median household income ( $p < 0.001$ ), and an immediate decrease in unemployment ( $p = 0.008$ ) following program implementation. DiD analyses showed no significant differences compared to Richland County in healthcare employment ( $p = 0.11$ ), median income ( $p = 0.78$ ), or unemployment trends ( $p = 0.72$ ).

**CONCLUSION** Although economic trends in Green County changed significantly after introducing a rural residency program, these changes were not significantly different from those in a similar rural county. This suggests that the observed economic changes may reflect broader regional trends rather than isolated effects of the residency program. Further research examining narrower geographic regions and multi-site analyses may better characterize the economic impacts of rural residency programs.

## **Cole Aschenbrener**

### ***Comparing Postoperative Outcomes Between Synthetic and Hybrid Meshes after Minimally Invasive Hernia Repair in Low-Risk and Comorbid Patients***

**Authors:** Aschenbrener CP, Goldblatt MI

**Project Mentor:** Matthew Goldblatt, MD; Surgery

**Background:** Options for mesh reinforcement in ventral hernia repair (VHR) include synthetic, biologic/absorbable, and hybrid mesh. Synthetic mesh provides permanent strength and is the most cost-effective, but it has a higher potential to induce a foreign body response and mesh fracture. Absorbable mesh promotes tissue ingrowth, decreases foreign body response, and is more resistant to infection, but it is more expensive. Hybrid mesh combines the attributes of long-term durability and tissue ingrowth. We investigated the difference in early postoperative outcomes between synthetic and hybrid mesh in low-risk and comorbid patient populations, respectively. We tested the hypothesis that there would be no difference in outcomes between the low-risk synthetic and comorbid hybrid groups.

**Methods:** A retrospective review was conducted of comorbid and low-risk patients who underwent minimally invasive VHR (MIVHR) with intraperitoneal onlay placement of hybrid (GORE<sup>®</sup> Synecor) ( $n=49$ ) and synthetic ( $n=52$ ) meshes, respectively. Short-term complications included 30-day surgical site infection or occurrence (SSI/O), any other complication, readmission, recurrence, and 1-year hernia recurrence.

**Results:** Chi-square tests between the low-risk synthetic and comorbid hybrid groups showed no statistically significant difference in 30-day SSI/O (21.2% vs. 34.7%;  $p = .129$ ), any complication (5.8% vs. 8.2%;  $p = .710$ ), readmission (1.9% vs. 0%;  $p = 1$ ), hernia recurrence (5.8% vs. 2%;  $p = .618$ ), or 5-year hernia recurrence (11.4% vs. 8.6%;  $p = 1$ ).

**Discussion:** There was no difference in undesirable postoperative outcomes, suggesting that the cost of hybrid mesh may be countered by a measurable benefit in comorbid patients undergoing clean, MIVHR.

## O Aung

### ***Biofabrication of small-diameter vascular graft with acellular human amniotic membrane: a proof-of-concept study in pig***

**Authors:** Aung O, Rossi PJ, Zhai Y, Allen KP, Dyer MR, Chang J, Wang X, Caswell C, Stellpflug A, Chen Y, Tefft BJ, Gu L, Wu R, Wang B

**Project Mentor:** Bo Wang, PhD; Biomedical Engineering

Expanded polytetrafluoroethylene (ePTFE) grafts are FDA-approved and effective for large vessel surgeries but face challenges in smaller vessels ( $ID \leq 6$  mm) due to reduced blood flow and higher risks of thrombosis, stenosis, and infection. This study developed a DAM graft with an ID of 6 mm from decellularized human amniotic membrane and compared its performance to ePTFE grafts in a porcine carotid artery model. DAM grafts retained key ECM structures and mechanical properties post-decellularization, with customizable layers and stiffness to meet specific clinical needs. DAM grafts demonstrated successful carotid artery replacement, showing good surgical feasibility, patency, and post-operative recovery. In contrast to ePTFE grafts, which exhibited significant neointimal hyperplasia (NIH), poor endothelialization, and inflammation, DAM grafts displayed organized endothelial coverage, smooth muscle alignment, and reduced inflammation, minimizing NIH, thrombosis, and graft failure. These findings position DAM grafts as a promising alternative to synthetic grafts, especially for small-diameter applications. Future research should focus on improving endothelialization, exploring molecular mechanisms, and assessing long-term outcomes to further optimize DAM grafts for clinical use.

## Rohit Balaji

### ***Implementation of an Educational Video for Pre-Operative Strabismus Counseling***

**Authors:** Balaji R, Stiff HA

**Project Mentor:** Heather A Stiff, MD; Ophthalmology

#### INTRODUCTION

Written educational supplements for pre-operative strabismus counseling have been studied, but no studies have assessed the benefit of an educational video (1). Videos have shown benefit in pre-operative counseling for cataract surgery (2). This study developed a video for pre-operative strabismus counseling and evaluated its impact on comprehension, perceived quality of care, and appointment duration.

#### METHODS

This IRB-approved single-center randomized controlled trial enrolled patients presenting for strabismus surgery consults. Patients were assigned to a control group (standard counseling) or video group (video plus counseling). An optional parent survey assessed perceived quality of care and comprehension. Appointment duration was recorded using eSynchrony.

Video: <https://www.youtube.com/watch?v=kCTbZLDFfP0>

#### RESULTS

Ninety-three patients were enrolled (50 video, 43 control). Thirty-seven surveys were completed, including 28 in the video group. Quality-of-care ratings were 4.81/5 in the video group versus 4.78/5 in controls ( $p=0.83$ ). Comprehension scores were 89.3% versus 84.1%, respectively ( $p=0.14$ ). Average appointment time was 72.9 minutes in the video group versus 69.1 minutes in controls ( $p=0.40$ ).

#### CONCLUSIONS

Use of a pre-operative strabismus counseling video maintained high quality of care without changing appointment duration. Comprehension scores were higher in the video group. Higher survey response rates in the video group (56% vs 21%) suggested greater engagement and support incorporating video into pre-operative counseling.

## **Antonina Balistreri**

### ***Firearm Injuries Among Women: The Role of Injury Location, Known Assailants, and Intimate Partner Violence***

**Authors:** Balistreri A, Timmer-Murillo S, Kallies KJ, Brandolino A, Tomas CW.

**Project Mentor:** Carissa Tomas, PhD; Institute for Health & Humanity

**Background:** Firearm violence among women in the United States continues to rise, yet female firearm injury survivors remain understudied, particularly regarding injury setting, assailant relationships, and intimate partner violence (IPV). This study evaluated firearm injuries among women presenting to a Level I Trauma Center in Milwaukee County, Wisconsin.

**Methods:** A retrospective chart review was conducted of adult women presenting with firearm injuries between 2015 and 2023. Patients with self-inflicted injuries or injuries occurring outside Milwaukee County were excluded. Injuries occurring within 0.1-miles of a patient's residence were categorized as occurring "at home." Variables collected included age, race, injury location, relationship to assailant, IPV history, mortality, and mental health screening outcomes. Chi-square analyses were performed, with statistical significance defined as  $p < .05$ .

**Results:** A total of 289 women met inclusion criteria. Women injured at home were significantly more likely to know their assailant compared to women injured outside the home ( $\chi^2 = 37.84, p < .001$ ). Women injured by known assailants were more likely to sustain injuries in private settings ( $\chi^2 = 67.78, p < .001$ ). A documented history of IPV was more common among women injured at home than outside the home ( $\chi^2 = 10.58, p < .001$ ). Among women completing mental health screening, 84% screened positive for PTSD, depression, or both. No significant mortality differences were identified.

**Conclusions:** Female firearm injuries occurring at home were strongly associated with known assailants and IPV history. These findings highlight the importance of trauma-informed IPV screening, mental health support, and violence intervention efforts within care settings.

## **Ololade Balogun**

### ***Assessing the social integration of phase 1 medical students with learning community groups in undergraduate medical education***

**Authors:** Balogun OA, Pavlic AM, Peltier WL, Hooyer KC, Pfeifer KJ

**Project Mentor:** Ashley Pavlic, MD, MA; Emergency Medicine

This qualitative study explored factors influencing social bonding within the MCWFusion Learning Communities (LC) program at the Medical College of Wisconsin. Learning communities are increasingly used in undergraduate medical education to promote mentorship, wellness, professional identity, and support. However, limited research has examined why some learning communities develop strong social cohesion while others remain fragmented. The purpose of this study was to identify interpersonal, structural, and environmental characteristics associated with bonded and unbonded learning communities for Phase 1 medical students. A mixed qualitative methodology was utilized, consisting of recruitment surveys and 30 semi-structured Zoom interviews with participating students. Interviews explored perceptions of community bonding, leadership, communication, engagement, inclusivity, and barriers to participation. Transcripts were analyzed using iterative deductive thematic coding process, resulting in four major parent categories: LC Navigator Dynamics, Engagement with TGD Sessions, Complex Social Learning Environments, and LC Dynamics. Over 100 individual codes were condensed into higher-yield concepts. Findings demonstrated that bonded learning communities were associated with engaged faculty leadership, psychological safety, inclusivity, open communication, shared experiences, and active participation. In contrast, unbonded communities were characterized by inconsistent facilitation, superficial interactions, scheduling barriers, social isolation, and limited personal connection. Bonding existed along a spectrum rather than as a binary outcome. Overall, the study suggests that intentional facilitation and interpersonal dynamics play an important role in social integration within medical school learning communities and may influence student wellness and professional development.

## **Daulton Baran**

### ***From Gaps to Gains: Identifying Barriers and Strengthening Pediatric Resuscitation Workflow at FMLH ED Through Iterative Simulation and Education***

**Authors:** Baran D, Yang T, Bailey L.

**Project Mentor:** Thomas Yang, MD; Emergency Medicine

**BACKGROUND:** Froedtert, a Level 1 trauma center, largely manages adult patients. In turn, this leaves staff with limited pediatric experience. However, critically ill pediatric patients do present to the ED, raising concerns about potential knowledge and system gaps during resuscitations. In-situ simulation provides a practical approach to identify and address these gaps before actual patient encounters.

**METHODS:** A three-phase study (2024–2025) developed a checklist and survey using a modified Delphi process with a multidisciplinary expert panel. Tools were pilot-tested and then applied in in-situ pediatric resuscitation simulations. Participants included EM residents, nurses, respiratory therapists, pharmacists, and other support staff. Data collected included checklist adherence and participant perceptions.

**RESULTS:** The finalized survey consisted of 12 items, and the checklist was 22 items. Recurrent latent safety threats (LSTs) were found using the standardized checklist. Despite these gaps, >90% of critical actions were completed per simulation. Post-simulation survey scores showed confidence and knowledge both increased by >1.5 points on a 1-5 Likert scale. Participants also rated awareness of LSTs, teamwork, and interprofessional communication highly.

**CONCLUSION:** In-situ simulation paired with a consensus-driven checklist effectively identifies safety and system gaps, enhances team performance, and reinforces pediatric resuscitation skills in an adult ED setting.

## **Simran Bedi**

### ***A Transformative Approach to Addressing Intimate Partner Violence in the South Asian Community: Designing and Evaluating Health-Centric Education***

**Authors:** Bedi S, Agrawal H

**Project Mentor:** Himanshu Agrawal, MD; Psychiatry

**Introduction:**

Intimate partner violence (IPV) affects approximately 35% of women globally, with South Asian populations facing unique vulnerabilities. Cultural norms that prioritize family reputation and community over individuality can create barriers to disclosure. Healthcare providers play an important role in recognizing IPV, supporting survivors, and connecting patients with resources. The Health Advancement for Asian Pacific Islanders through Education (HAAPIE) provides educational modules that increase awareness of health issues affecting Asian communities. This project developed an IPV-focused module to expand provider education on culturally informed care for South Asian patients.

**Methods:**

We developed a concise educational module designed to teach medical students about IPV, including identification of affected patients, available resources, and culturally relevant considerations. The module includes a case-based scenario and reflective questions to encourage application to clinical practice. Pre- and post-surveys were administered to medical students at the Medical College of Wisconsin–Milwaukee to assess changes in knowledge, confidence in intervention strategies, ability to identify IPV, and cultural competence.

**Results:**

Survey results demonstrated improvements across all domains following completion of the module. Participants reported increased knowledge of IPV in the South Asian community, greater confidence in applying intervention strategies, improved ability to identify and respond to IPV, and increased cultural competence. Although the sample size was small (N = 7) and findings were not statistically significant, scores increased across all measures.

**Next Steps:**

Future work will focus on developing additional culturally informed IPV modules and incorporating simulation-based learning with standardized patients.

## Justin Behlke

### ***Developing an outlook on other realities (DOORs): A curriculum model targeting the importance of patient realities in the emergency department***

**Authors:** Behlke J, Pavlic A, Kahn S, Sonnenberg T

**Project Mentor:** Taylor Sonnenberg, MD MSGH; Emergency Medicine

**Background:** The DOORs curriculum is designed to equip emergency medicine (EM) residents with skills to address social determinants of health (SDH) and deliver compassionate, patient-centered care. Vulnerable populations often face disparities in access and outcomes, underscoring the need for a curriculum that fosters empathy, ethical awareness, and resource navigation.

**Methods:** DOORs was integrated into weekly departmental conferences, with eight or more 30–60-minute sessions annually. Initial sessions assessed residents' familiarity with vulnerable populations and resources. Topics included incarcerated individuals, refugees, homeless patients, and sex workers. Sessions featured expert lectures, interactive discussions, and ethics case reviews. Resident demographics and baseline knowledge were analyzed through surveys.

**Results:** Over four years, resident awareness of ED resources improved significantly. In 2020, 52% reported that the curriculum influenced their practice, increasing to 62.5% in 2022. Pre- and post-curriculum surveys showed significant gains in awareness for refugee resources (1.76 to 2.76) and hemodialysis patients (2.36 to 3.35). Residents especially valued sessions led by those with lived experience and emphasized community engagement.

**Conclusion:** DOORs enhances EM residents' capacity to address SDH, navigate resources, and engage with communities. Future plans include expansion to other specialties and strengthened collaboration with local and national programs to improve SDH education in medical training.

**Discussion:** Our curriculum highlights the value of integrating social determinants of health (SDH) into resident education to deepen awareness and community connection. We found that tailoring content based on resident feedback, particularly emphasizing lived experience and community partnership, was essential for engagement. Notably, strong local support made implementation more feasible and cost-effective than expected.

## Johnny Belcher

### ***Food instability and otitis media in children: impact of social determinants of health and "food deserts" on disease incidence.***

**Authors:** Belcher J, Adams J, Friedland D, Chun R, Hilbrands J, Kaenkumchorn T, Bock J

**Project Mentor:** Jonathan Bock, MD; Otolaryngology

**Introduction:** Acute Otitis Media (AOM) is the leading diagnosis in pediatric acute care, affecting over 50% of children by age three. While social determinants of health (SDOH) such as socioeconomic status and geographic location often influence health outcomes, the specific impact of "food deserts" and nutritional markers on AOM prevalence remains under-researched. This study explores whether pediatric patients in underserved nutritional environments experience higher rates of AOM.

**Methods:** Utilizing the Clinical Research Data Warehouse (CRDW), we analyzed electronic medical records from Children's Hospital of Wisconsin (2009–2019). We identified 10,359 patients diagnosed with AOM using specific ICD codes. Nutritional status was quantified using CDC-standardized Z-scores (BMI-for-age or weight-for-length). Geographic data were cross-referenced with USDA-defined food desert zip codes in Southeast Wisconsin to correlate disease incidence with food instability.

**Results:** Of the total cohort, 3,292 patients underwent tympanostomy tube placement. Analysis of BMI Z-scores revealed no statistically significant differences in AOM incidence or surgical intervention rates between underweight, normal weight, or overweight populations. Furthermore, residence within a food desert did not correlate significantly with increased rates of AOM or subsequent tube placement.

**Conclusion:** This study found no significant association between BMI-based nutritional status or geographic food instability and the prevalence of AOM in Southeast Wisconsin. The results suggest that while SDOH are critical in many pathologies, AOM incidence in this population may be driven by other factors. Future research should investigate alternative comorbidities, such as Gastroesophageal Reflux Disease (GERD), and their potential relationship with BMI and middle ear inflammation.

## Sonu Bhandari

### ***Examining the Relationship Between Skin Tone and Peripheral Intravenous Catheter Placement Outcomes in Pediatric Patients: A Prospective Cohort Study***

**Authors:** Bhandari S, Bramillari S, Porada P, Drendel A, Burek A.

**Project Mentor:** Alina Burek, MD; Pediatrics

**Introduction:** Peripheral intravenous catheter (PIVC) placement is a common source of pain and distress in children, particularly when multiple attempts are required, a phenomenon known as difficult intravenous access (DIVA). Factors associated with DIVA include younger age, prematurity, obesity, and chronic medical conditions. Previous studies have reported racial differences in DIVA rates, but it remains unclear whether skin tone contributes to this discrepancy.

**Objective:** We aim to examine the relationship between skin tone and DIVA in pediatric emergency department (ED) patients. **Hypothesis:** Children with darker skin tones (Fitzpatrick IV-VI) have higher rates of DIVA than those with lighter skin tones (Fitzpatrick I-III).

**Methods:** This prospective study was conducted at Children's Wisconsin ED. **Inclusion criteria:** children <18 years of age with an order for PIVC placement. **Exclusion criteria:** critically ill and non-English/non-Spanish speaking patients. Data was collected through direct observation, electronic medical record review, and patient/guardian and inserter surveys.

**Results:** Of the 91 patients enrolled, the median age was 10 years, and 57% (N=52) were female. The distribution of Fitzpatrick skin types was 30% (N=27) Type I, 28% (N=25) Type II, 18% (N=16) Type III, 10% (N=9) Type IV, 10% (N=9) Type V, and 6% (N=5) Type VI. First-attempt success rate was 77% (N=70). DIVA occurred in 18% (12/68) with Fitzpatrick type I-III and 39% (9/23) with Fitzpatrick types IV-VI.

**Conclusion:** Preliminary findings suggest that darker skin tone may be associated with higher rates of DIVA compared to those with lighter skin tones. Continued enrollment and adjusted analyses are needed before definitive conclusions can be made.

## Brody Bien, MS

### ***Microelectrode array analysis of mavacamten response in iPSC-CMs with a rare, predicted damaging variant in MYH6***

**Authors:** Brody Bien, MS; Liang, Huan-Ling, MD., Multerer, Abigail, MS., Tomita-Mitchell, Aoy, PhD

**Project Mentor:** Aoy Tomita-Mitchell, PhD; Surgery

**Background:** Variants in MYH6, which encodes  $\alpha$ -myosin heavy chain, have been implicated in left-sided congenital cardiovascular disease phenotypes including hypoplastic left heart syndrome. Patient-specific induced pluripotent stem cell-derived cardiomyocytes (iPSC-CMs), compared with iPSC-CMs from an unaffected familial control, provide a platform to study variant-associated cardiomyocyte behavior; however, the response of MYH6-associated cardiomyocytes to cardiac myosin inhibition remains poorly defined.

**Methods:** Day 28 iPSC-CMs representing wild-type (WT), MYH6 carrier, and MYH6-E1584K variant lines were studied using multielectrode array analysis after treatment with 250 nM mavacamten. Cells were differentiated using a published protocol and replated onto fibronectin-coated CytoView MEA plates from frozen cardiomyocyte stocks. Serial recordings were obtained before treatment and at 1, 3, and 36 hours after exposure. Beat period mean, beat period irregularity, spike slope mean, spike amplitude mean, and field potential duration mean were analyzed and pooled across plates.

**Results:** Mavacamten exposure was associated with time-dependent changes in pacing and depolarization-related metrics that differed across WT, carrier, and MYH6-E1584K lines. WT cells exhibited shorter beat periods than carrier and variant lines at pretreatment and 1 hour, while the variant line retained longer beat periods through 3 hours. Pretreatment beat period irregularity was highest in the carrier line, whereas post-treatment differences were attenuated. Spike slope was lower in variant than WT cells at multiple early time points, and spike amplitude decreased over time within the variant line. Field potential duration was comparatively variable.

**Conclusions:** MEA-based longitudinal phenotyping identifies genotype-specific electrophysiologic responses to mavacamten in MYH6-associated iPSC-CMs.

## Wentrell Bing

### *Evaluating the Assessment of Pediatric Sepsis in Belize City*

**Authors:** Bing W, Ogonnaya C, Bryant A, Cruz Y, Snooks K

**Project Mentor:** Kellie Snooks DO, MPH; Pediatrics

**Background:**

Sepsis remains a leading cause of mortality among children under five years, accounting for nearly three million deaths globally. Early recognition is critical; however, clinical identification in pediatric populations remains inconsistent. This study aimed to characterize clinical assessment patterns in pediatric patients presenting with sepsis-like features to inform development of a standardized screening tool.

**Methods:**

A prospective observational study was conducted in the Accident & Emergency department, enrolling patients aged 30 days to 16 years presenting with suspected infectious etiologies. Demographic data, vital signs, and clinical findings were systematically recorded in a deidentified database. Descriptive statistics, including means, medians, and standard deviations, were calculated.

**Findings:**

Sixty-seven patients were enrolled (median age 47.0 months). Critical components of sepsis assessment were frequently omitted: blood pressure was unrecorded in 92.9% of cases, capillary refill time in 56.7%, extremity temperature in 52.2%, and accessory muscle use in 49.3%. Key historical features, including decreased urine output (57.6%) and gastrointestinal symptoms (44.8%), were inconsistently documented. Although 47% of patients met systemic inflammatory response syndrome criteria, none were formally diagnosed with sepsis. The most common discharge diagnoses were pneumonia (55.6%) and acute gastroenteritis (38.9%).

**Interpretation:**

Substantial gaps in clinical assessment and documentation may contribute to under recognition of pediatric sepsis. These findings highlight the need for standardized screening protocols to improve early identification and clinical outcomes.

## Katie Rose Blachowicz

### *Exploring determinants of breastfeeding duration and exclusivity for black mothers*

**Authors:** Blachowicz KR, Hernandez AM, Peebles J, Blackwell D, Griffin N.

**Project Mentor:** Sunu Eapen, MD; Medicine

**Community Partner:** African American Breastfeeding Network

Froedtert Hospital data show lower exclusive breastfeeding during the delivery admission among Black versus White patients (48% vs 75%), mirroring national disparities that persist through 12 months postpartum. Breastfeeding practices and determinants were assessed among Black mothers to guide local interventions.

A 28-item survey incorporating the Iowa Infant Feeding Attitude Scale (IIFAS; 17–85) assessed feeding practices, attitudes, and postpartum resources. The survey was sent to patients identifying as Black or African American who delivered a live birth at Froedtert Hospital between 3/1/23 and 8/31/23. Demographic and biomedical data were abstracted via chart review. Descriptive statistics summarized responses, and Pearson correlations examined factors associated with longer breastfeeding duration.

In total, 33 of 374 eligible patients responded (mean 15±2 months postpartum). Breastfeeding initiation was 75.8%. Median exclusive breastfeeding duration was 6.2 weeks, and total breastfeeding duration was 26.1 weeks. Respondents believed the recommended exclusive breastfeeding duration was 8±4 months. The median IIFAS score was 61, consistent with neutral attitudes. Common reasons for stopping included perceived low milk supply (66.7%), inability or unwillingness to pump/breastfeed at work (66.7%), fatigue (40.0%), and concern that breast milk alone did not satisfy the infant (40.0%). Longer duration correlated with higher IIFAS scores ( $R=0.59$ ,  $p=0.002$ ) and stronger prenatal feeding intentions ( $R=0.55$ ,  $p=0.02$ ).

Modifiable barriers, especially perceived milk supply and workplace constraints, were prominent. A breastfeeding peer counselor program was created to address some of the barriers identified in this study and support Black patients who intend to breastfeed, with next steps including evaluating acceptability and effectiveness.

## Faith Bobholz

### *Development, implementation, and assessment of a cervical cancer risk and referral tool in two drop-in centers serving female sex-workers in Kampala, Uganda*

**Authors:** Bobholz F, Beroza A, Rine S, Okoth C, Kyomya M, Katende D, Nassazi W, Touray C, Bobholz M, Dickson-Gomez J, Beyer K

**Project Mentor:** Kirsten Beyer, PhD, MPH, MS; Institute for Health & Humanity

**Community Partner:** Alliance of Women Advocating for Change, Uganda Harm Reduction Network

Cervical cancer (CxCa) is the leading cause of cancer in Uganda, yet preventable with regular screening for and vaccination against HPV. Female sex workers (FSW) are an especially vulnerable population when it comes to HPV risk yet face increased barriers to screening and care. We aimed to develop, implement, and assess a simple CxCa risk and referral tool (RRT) for use at two drop-in-centers (DICs) serving FSW in Kampala, Uganda, with a goal to increase engagement in CxCa screening. A total of 402 RRTs were completed. Three hundred and ninety-five (395) were eligible for CxCa screening with visual inspection with acetic acid (VIA), out of which 303 indicated interest to be screened using VIA. A total of 287 FSW were referred for VIA and 86 completed the screening referral. The overall average risk score was 46.29 (SD = 12.75); all participants were identified as high-risk for CxCa. Key population group was not found to significantly impact CxCa risk score. Age and CxCa risk scores were found to be statistically significant in multivariable modeling. The RRT proved to be useful in categorizing FSW risk for CxCa and guiding DIC staff in medical decision-making regarding screening referrals. Low-resource settings should consider implementing similar tools to identify at-risk populations, such as FSW, and streamlining referrals for CxCa screening services to identify pre-cancerous and cancerous lesions of the cervix earlier when resource constraints prevent recommended approaches, such as comprehensive HPV testing.

## Harsha Bollepalli

### *Effects of twister cables on the malalignment of the lower extremity in children with gait disorder*

**Authors:** Stacy Stibb, DO; Rachel Lenhart, MD, PhD; and Xue-Cheng Liu, MD, PhD

**Project Mentor:** Xue-Cheng Liu, MD, Ph.D; Orthopaedic Surgery

**Background:** In-toeing and out-toeing gait are clinical symptoms of anatomic dysfunction in neuromuscular disorders (NMD). Twister Cables (TC) and ankle-foot orthotics (AFO) have been used in conservative management for gait correction; however, few studies have examined the efficacy of TC in addressing in-toeing or out-toeing gait and its correction of 3D motions of the lower extremity (LE) joints. The goal of the study was to evaluate lower extremity kinematics and gait parameters to compare the efficacy of TC.

**Methods:** A retrospective review was approved by IRB and conducted on children with NMD who underwent motion analysis from 1/1/2013 to 06/3/2024. Gait analysis data were collected for three groups involving patients ambulating with barefoot, TC +AFO, or AFO per patient. The 3D joint motions of the LE, GDI, and SPT data were captured by using the Plug-in-Gait Model with Vicon MX and were divided into stance phase (ST) and swing phase (SW) of the GC.

**Results:** Ten patients with mean age of 5.2 years met inclusion criteria involving children with CP (5), SB (3), neurofibromatosis type 1(1) and moyamoya disease (1). No significant differences were seen in SPT and GDI between TC + AFO and barefoot ( $P>0.05$ ). Significant differences are seen in LE transversal rotations between TC +AFO vs. barefoot and between TC +AFO vs. AFO ( $P<0.05$ ).

**Conclusion:** TC demonstrates effective correction in the in-toeing or out-toeing gait in children with NMD. TC can help guide clinicians and may be considered as a provisional rehabilitative tool to treat gait disorders.

## **Molly Brennan**

### ***Vaccines are Like Seatbelts: Vaccine Ethics During a Measles Outbreak & the Question of Compulsory Immunizations for Minors***

**Authors:** Brennan MM, Friedrich A

**Project Mentor:** Annie Friedrich, PhD; Pediatrics; Institute for Health & Humanity

In 2025, the United States recorded the highest number of measles cases since 1992, as well as two pediatric deaths. The increase in measles cases has largely been driven by falling vaccination rates, mostly due to parental vaccine refusal. There are four principal pediatric decision-making models: the Harm principle, the Best Interest Standard, Constrained Parental Autonomy, and Shared Family Centered Decision Making. This paper explores the application of these frameworks to the ethical dilemmas raised by parental vaccine refusal, including evaluating whether vaccine refusal constitutes legally actionable medical neglect. This paper then considers these frameworks within the context of rising measles prevalence, and argues that this represents an ethically relevant change in the epidemiological landscape. Increased disease prevalence may ethically permit more restrictive vaccine policies, including compulsory vaccination. This paper concludes by presenting a new framework for considering the medical and ethical qualities of vaccines, arguing that they are more akin to other public health interventions which have benefitted from robust policy support and legal mandates, such as seatbelts.

## **Grace Eleanor Sessler Bruess, B.S.**

### ***Evaluating outcomes of live-attenuated vaccine administration in pediatric patients on dupilumab for atopic dermatitis***

**Authors:** Bruess GES, Barry KK, Olsen GM, Foschi CM, Cook E, Liegl M, Pan AY and Lalor L

**Project Mentor:** Leah Lalor, MD; Dermatology

**Introduction:** Dupilumab is an IL-4R $\alpha$  and IL-13 inhibitor FDA-approved for the treatment of atopic dermatitis (AD) in patients aged 6 months and older. Guidelines recommend avoiding live-attenuated vaccines during dupilumab therapy due to limited safety data, though inadvertent administration may occur due to lack of provider awareness.

**Methods:** We conducted a retrospective chart review of 233 pediatric patients (ages 6 months to 10 years) with AD receiving dupilumab at Children's Wisconsin. Data collected included demographics, dupilumab dosage, documentation of vaccine counseling, live vaccine administration, and adverse events. Fisher's exact test was used for categorical variables ( $p < 0.05$  considered significant).

**Results:** Nineteen (8%) patients received live vaccines while on dupilumab: 15 MMRV, 2 varicella, and 2 MMR + varicella. Four (21%) experienced adverse events, including fever, respiratory symptoms, and one hospitalization for dehydration. The serious adverse event occurred in a patient with prior similar episodes, making causality unclear. Of those vaccinated, 8 (42%) had no documented counseling, including 2 of the 3 with adverse events and the one hospitalization. Patients who altered their dupilumab schedule around vaccination had fewer adverse events.

**Conclusion:** Live vaccines were administered to children on dupilumab despite recommendations to avoid them. Most tolerated vaccination without serious complications. This study supports existing literature suggesting potential safety and highlights the need for improved counseling and larger-scale studies to inform practice.

## **Calista Bulacan**

### ***Impact of Social Determinants of Health on Diagnostic Stage in Esophageal Cancer Patients Undergoing Chemoradiation***

**Authors:** Bulacan CM, Matoska T, Jasti S, Banerjee A, Puckett L

**Project Mentor:** Lindsay Puckett, MD and Thomas Matoska, MD; Radiation Oncology

Esophageal cancer (EC) can carry poor prognosis, and insidious onset of symptoms can lead to advanced stages at diagnosis. Social determinants of health (SDOH) literature in EC is limited and rarely focuses on diagnostic staging. This single-institution retrospective study identified 181 adenocarcinoma and squamous cell carcinoma EC patients who received definitive chemoradiation between 2010 and 2022. Patients were divided into advanced stage at diagnosis (Stage IVA or IVB oligometastatic) versus locally advanced stage (Stage I-III) per AJCC 8th staging. SDOH within the study groups that were evaluated using a chi-square test included marriage and parental status, distance from treatment facility, and substance use (alcohol and smoking). Of the patients who were furthest from their healthcare facility (49.9+ miles) 52.9% were advanced stage at diagnosis compared to <12.5 miles (26.0%) and 12.5-49.9 miles (14.7%,  $p=0.004$ ). Those who were not married with children had the highest rate of advanced stage at diagnosis (66.7%,  $p=0.03$ ) compared to married with no children (26.7%), not married with no children (0%), and married with children (25.9%). There were no significant differences in staging among patients across alcohol use categorizations ( $p=0.739$ ) or smoking status subgroups ( $p=0.573$ ). This study concludes that being not married with children and living further from the treatment facility were associated with advanced stage EC at time of diagnosis. These results should be interpreted with caution due to potential confounding variables. With more multi-institutional, controlled studies it is possible that EC screening recommendations can broaden in the future.

## **Adrienné Burton, BS**

### ***Evidence-Based Revision of Benign Gynecological Surgery Peri-Operative Protocols***

**Authors:** Burton A., Gecki K., Beran B.

**Project Mentor:** Benjamin D. Beran, MD; Obstetrics & Gynecology

Inspired by Enhanced Recovery After Surgery guidelines by the ERAS Society, we sought to revise our peri-operative protocols and education to increase favorable health and surgical outcomes by providing evidence-based recommendations and removal of unsupported guidelines.

Current pre- and post-operative protocols for benign gynecologic surgery were put through an evidence-based literature review using Elsevier, Cochrane Reviews, PubMed, and web-search engines. Preference was given to evidence published after 2015 and assigned a research grading by the Oxford Research scale (2009). Guidance with insufficient evidence was considered by a group of three surgeons to keep or remove based on expert opinion.

Twenty-six of 39 (66.7%) of existing guidelines were supported by A/B Oxford scale level evidence. The remaining 13 guidelines showed that 2/13 had sufficient evidence (A/B level) to be removed, while the other 11/13 had insufficient evidence to reject, defined as grades at or below C level. Of these, physicians voted to keep 5/11 guidelines, remove 2/11, and modify 4/11. In total, 4 guidelines were removed based on sufficient evidence to reject or total lack of evidence, and the remaining guidelines were modified to account for patient safety risk, or perceived patient satisfaction.

A/B graded research now supports 78.8% of the revised guidelines, representing a 12.0% increase. The remaining guidelines were agreed upon as necessary contributions or modified based on expert opinion. Overall, the new guidelines represent a higher percentage of evidence-based practices and a less restrictive pre-/post-operative recovery protocols to align with current data regarding enhanced recovery protocols.

## **William Butak, BS**

### ***Effects of Increased Plasma Ceramide on Human Microvascular Function***

**Authors:** Simovic T, Jaramillo-Torres M, Butak WJ, O'Connell E, SenthilKumar G, Teng H, Yang K, Durand MJ, Freed JK

**Project Mentor:** Julie Freed, MD, PhD; Anesthesiology

**Introduction:** Peripheral microvascular health reflects coronary microvascular function and offers a less invasive model to study coronary microvascular health. Elevated plasma ceramides are associated with major adverse cardiovascular events (MACE) and coronary microvascular dysfunction, but the in vivo impact of ceramides on human peripheral microvascular function remains unclear. We assessed endothelial response to a high-fat meal and hypothesized that acute increases in plasma ceramides would impair peripheral microvascular function.

**Methods:** In this double-blinded, randomized controlled crossover trial, in vivo microvascular function and perfusion were assessed using laser Doppler flowmetry with local heating and incident dark field microscopy (CytoCam), respectively. Baseline microvascular measurements and plasma ceramides were obtained before subjects were given a high-fat shake containing either medium-chain (MCT) or long-chain (LCT) fatty acids. Blood draws and microvascular measurements were repeated at 2 and 4 hours after consumption.

**Results:** Postprandial serum concentration changes in C18:1, C24, C24:1, and total ceramides differed between MCT and LCT meals ( $p \leq 0.020$ ). Serum concentrations of C18:1, C20, C24, and C24:1 also varied between sexes ( $p \leq 0.022$ ), with greater increases occurring in females. Nitric oxide-dependent microvascular responses decreased at 2 and 4 hours after both MCT ( $\beta \geq -0.307$ ;  $p \leq 0.001$ ) and LCT meals ( $\beta \geq -0.301$ ;  $p \leq 0.001$ ). No differences were observed in incident dark field microscopy measures after consumption of either meal.

**Conclusion:** Acute long-chain fatty acid intake increased circulating ceramides primarily in females, but both MCT and LCT meals similarly impaired microvascular endothelial function regardless of sex, suggesting that sex-specific ceramide responses do not explain postprandial microvascular dysfunction.

## **Kayleigh Butler, BS**

### ***Effects of Medical Learning Communities on Faculty Members: A Narrative Review***

**Authors:** Butler KK, Pavlic A.

**Project Mentor:** Ashley Pavlic, MA, MD; Emergency Medicine

**Background:** Learning Communities (LCs) are increasingly adopted in undergraduate medical education to foster mentorship, student wellbeing, and professional identity formation. While prior work has demonstrated benefits for students, the impact of LC participation on faculty serving as Learning Community Navigators (LCNs) remains less well defined.

**Objective:** To synthesize existing literature on faculty experiences as instructors (Navigators) of Learning Communities.

**Methods:** A narrative review was conducted using Google Scholar to identify articles that included the search terms "learning communities," "medical education," "faculty," and "navigator." Studies describing faculty roles, experiences, or outcomes related to LCs or similar longitudinal mentorship models were included. Data were extracted and synthesized thematically.

**Results:** The literature suggests that LC participation is associated with increased faculty meaning, connection, and professional engagement. Faculty report enhanced sense of purpose, stronger relationships with learners and colleagues, and improved alignment with institutional educational missions. Participation in LCs is also linked to increased job satisfaction and perceived professional development. However, challenges include increased workload, competing responsibilities, and role conflict. Institutional support, program structure, and faculty development appear to influence these outcomes.

**Conclusions:** Learning Communities represent a potentially valuable model for enhancing faculty job satisfaction and engagement in academic medicine, though their impact is context-dependent and institutional support is necessary to reduce harm. Further research is needed to directly compare LCNs to Non-LCN faculty and to assess any potential effects on faculty wellbeing.

## **Isabel Butz**

### ***Food Delivery Program for Gun Violence Survivors: Development and Implementation***

**Authors:** Butz, IM, Tran, M, Nelson, D.

**Project Mentor:** David Nelson, PhD; Family & Community Medicine

**Community Partner:** Feeding America Eastern Wisconsin

**Background:** Gun violence continues to be a major public health crisis throughout the United States, leaving lasting physical, psychological, and socioeconomic impacts on survivors. One facet of interest includes food insecurity, with existing research positing it as both a risk factor for and consequence of gun violence exposure. Through the development and implementation of food provisions in a hospital-based violence intervention program in Milwaukee, we aim to reduce the burden of unmet needs and evaluate overall healing in patients.

**Methods:** A multidisciplinary partnership was developed between the Trauma Quality of Life (TQoL) Clinic, Feeding America, and the Medical College of Wisconsin (ThriveOn King) was developed to provide food to survivors of gun violence. Participants were screened during clinic visits at TQoL via food insecurity (FI) inventory and enrolled in Feeding America's OrderAhead platform. Participants then placed their first order of self-selected food for pickup at ThriveOn King.

**Results:** Previous clinic screening found an average FI score of  $1.80 \pm 0.48$  (95% CI). One patient has met criteria for enrollment thus far.

**Conclusion;** Early findings demonstrate that, despite limited enrollment, program implementation is feasible. Implementation challenges include integration to clinic workflow and commercial food distribution logistics. Barriers to recruitment include high no-show rates and negative FI screens. As recruitment continues, this program served to establish key partnerships for the long-term implementation of food provisions to vulnerable patients. Future efforts will delve further into barriers to recruitment, evaluation of the program, and the impact of food on healing from traumatic injury.

## **Alexandra Campbell**

### ***Management of pediatric esophageal coins and associated costs: a tertiary care retrospective review***

**Authors:** Aasen M, Campbell A, Ng R, Thomas R.

**Project Mentor:** Thomas Robey, MD; Otolaryngology

**Objective:** To evaluate the outcomes, hospitalization times, and costs associated with endoscopic retrieval, esophageal bougienage, and observation for pediatric esophageal coin ingestion.

**Methods:** A retrospective review was performed of pediatric patients (0–18 years) treated for single esophageal coin ingestion at a tertiary children's hospital from January 2012 and December 2022. Patients were stratified by treatment modality: endoscopic retrieval, esophageal bougienage, or observation. The primary outcome was treatment success, and secondary outcomes included complications, hospitalization time, and cost.

**Results:** Of 491 patients, endoscopic retrieval was most common (45.2%, n=222), followed by observation (35.8%, n=176) and bougienage (18.9%, n=93). Endoscopy demonstrated the highest success rate (95.0%), followed by bougienage (83.9%), and observation (26.7%). Complications were rare (0.8%, n=4) and occurred only in the endoscopic group. Bougienage had the shortest hospitalization time (4.51 hours) compared to endoscopy (12.57 hours) and observation (15.11 hours). The average cost for bougienage (\$3,289.43) was substantially lower than endoscopic retrieval (\$12,277.96). Coin location influenced success rates: distally located coins demonstrated the highest rates of spontaneous passage (73.7%) and bougienage success (87.8%), whereas proximally located coins had lower success rates for both observation (12.6%) and bougienage (71.4%). Children aged 24 months and younger had lower success rates across all modalities.

**Conclusion:** Esophageal bougienage is a safe, effective, and cost-efficient alternative to endoscopic retrieval for the management of pediatric esophageal coin ingestion. Coin location and patient age are important factors in guiding treatment selection, with distally located coins and older children demonstrating the most favorable outcomes.

## **Tiana Carlson, BS**

### ***JMAC HOSA: Engaging high school students in healthcare careers***

**Authors:** Carlson, TL, Meurer, L, Calawerts, W, Davies, S, Letellier, S, Isah, M.

**Project Mentor:** Linda Meurer, MD, MPH and William Calawerts, MD, MPH; Family & Community Medicine

**Community Partner:** Milwaukee Area Health Education Center and Milwaukee Public Schools

Students from racial and ethnic groups underrepresented in medicine continue to face barriers to entering healthcare professions, contributing to disparities within the healthcare workforce. To address this issue, Milwaukee Area Health Education Center (AHEC), Milwaukee Public Schools (MPS), and the Medical College of Wisconsin (MCW) collaborated to develop a Health Occupations Students of America (HOSA) chapter at James Madison Academic Campus (JMAC), a predominantly minority and economically disadvantaged high school. The program aimed to increase student exposure to healthcare careers through mentorship, leadership opportunities, guest speakers, field trips, competitions, and college and career preparation activities. During the 2024–2025 academic year, MCW medical students, AHEC staff, school faculty, and student officers coordinated monthly and later weekly programming tailored to student interests and community needs. Program effectiveness was evaluated using attendance data, student participation, retrospective end-of-year surveys, and the Kirkpatrick Model of evaluation. Thirty-three students enrolled in the chapter, with five students advancing from regional to state and international HOSA competitions. Survey responses demonstrated high overall program satisfaction, increased confidence in understanding healthcare career pathways, greater interest in healthcare professions, improved college preparedness, and stronger feelings of mentorship support and school connectedness. These findings suggest that community-based healthcare pipeline programs such as the JMAC HOSA program may positively influence student engagement, leadership development, and interest in healthcare careers among populations historically underrepresented in medicine.

## **Korinne Carr, MA**

### ***Malnutrition and clinical outcomes in critically ill children with diabetes mellitus***

**Authors:** Carr K, Zhang L, Pan AY, Mikhailov TA

**Project Mentor:** Theresa A Mikhailov, MD, PhD; Pediatrics

#### **Background:**

Malnutrition is a significant contributor to morbidity in critically ill pediatric patients and is associated with prolonged hospitalization and increased healthcare utilization. Children are particularly vulnerable due to higher metabolic demands and lower energy reserves. In pediatric intensive care unit (PICU) populations, malnutrition remains common, with prevalence ranging from 24% to 53% on admission. In children with diabetes mellitus (DM), adequate nutrition is essential for glycemic stability and recovery, yet limited data exist evaluating its impact on outcomes in this population.

#### **Objective:**

To evaluate the association between malnutrition and clinical outcomes in critically ill pediatric patients with diabetes mellitus.

#### **Methods:**

We conducted a retrospective cohort study using the Virtual Pediatric Systems (VPS) database. Critically ill pediatric patients with DM and available nutrition screening data at PICU admission were included. Patients were categorized as malnourished or at risk for malnutrition based on admission screening metrics. Outcomes included in-hospital mortality, PICU length of stay (LOS), and hospital LOS.

#### **Results:**

Among 2,653 patients, 841 (31.7%) were malnourished or 'at risk' for malnutrition. Mortality did not differ significantly (0.5% vs 0.2%,  $p=0.27$ ). Adjusting for age, race/ethnicity, and PRISM3, patients 'at risk' for malnutrition had longer PICU LOS (geometric means and 95% CIs: 1.03 (0.97, 1.13) vs 0.91 (0.86, 0.96),  $p<0.001$ ) and hospital LOS (geometric means and 95% CIs: 5.31 (4.84, 5.83) vs 2.67 (2.53, 2.82) days,  $p<0.001$ ).

#### **Conclusions:**

Malnutrition is common in critically ill pediatric patients with DM and is associated with prolonged length of stay. Early nutritional screening may improve outcomes in this high-risk population.

## Chase Caswell

### *Provider Perception of Treating Complex Patients*

**Authors:** Caswell CM, Schnell JL

**Project Mentor:** Jessica Schnell, MD; Pediatrics

**Introduction:** Patients with disabilities make up a significant portion of medically complex patients in the United States. Further research is needed to quantify and identify areas of curriculum weakness in order to effectively create learning materials to address the disparities present in our healthcare system

**Methods:** Surveys were distributed to medical students, residents, and physicians in the departments of Family Medicine and Internal Medicine to assess providers' perception and self-reflection of their medical knowledge, educational experience, and community resource competencies for patients in various disability groups (physical disabilities, developmental disabilities, psychological disabilities, and acquired disabilities). Surveys were scored on a 1-10 scale. Results were then stratified and analyzed by time in practice to assess for disparities in provider confidence pertaining to various disability classes.

**Results:** A total of 31 attending physicians, 4 residents, and 1 medical student responded to our survey. Providers scored their confidence in their medical education as  $5 \pm 2.07$ . Providers' confidence in treating psychological disabilities was significantly greater than in all other disability groups. There was a high degree of variability in physical exam practice opportunities between the various groups (developmental = 57.1%, physical = 61.1%, acquired = 77.8%, psychological = 91.7%)

**Conclusions:** Provider confidence in their medical education related to patients with disabilities was relatively low. The highest confidence scores were related to treating patients with psychological disabilities, which may be due at least partly to the integration of primary psychiatry rotations into most medical curricula. Incorporating more disability-specific curriculum items may improve future provider confidence in treating patients with disabilities.

## Frank Chavez

### *Characterizing chronic liver disease patterns in adult Hispanic patients within Milwaukee: An exploratory study*

**Authors:** Chavez F, Saeian K, Trivella JP

**Project Mentor:** Kia Saeian, MD; Medicine

**Background:** Chronic liver diseases (CLD) are associated with improved prognosis when identified early. Studies suggest that Hispanic patients have disproportionately higher incidence, present at a younger age, and display more aggressive CLD patterns.

**Objective:** Milwaukee County has the largest number of Hispanic residents in Wisconsin, yet no previous studies have explored their CLD presenting clinical characteristics. We aim to characterize the adult Hispanic patient population with CLD at Froedtert Hospital to develop a multivariable registry that can serve as a clinically useful tool.

**Methods:** Retrospective chart review on 1750 charts identified using TriNetX. Data was included if: ICD-10 confirmed CLD diagnosis from (5/23/14 - 5/23/24), between age of 18 and 65 and had proper clinical follow-up.

**Results:** Of original 1750 charts, 29.25% (n=512) met our inclusionary criteria. Metabolic Dysfunction Associated Steatoic Liver Disease (MASLD) encompassed (n=392) or 76.56% of our cohort. This MASLD cohort displayed an average BMI of 35, LDL of 118, and age at presentation of 40.5 years. 40.3% had type 2 diabetes, 41.8% had hypertension, 47.4% had hyperlipidemia, and 22% of this MASLD cohort displayed all 3 of these comorbidities.

**Discussion/Conclusion:** The high prevalence of MASLD in this cohort combined with class 2 obesity, dyslipidemia and multiple metabolic comorbidities highlights the importance of earlier screening in addition to further incorporation of protocols that emphasize metabolic management/risk. Over 70% of our CLD cohort was lost to longitudinal follow up. Prioritizing bridging this gap is crucial to identify root causes to prevent potential unmonitored decompensation in this population.

## Hsuan-Yu (Taylor) Chen

***Age-associated increases in PAI-1 silenced with siRNA-lipid nanoparticles reduces thrombosis and prolongs lifespan***

**Authors:** Ferrareso F, Skaer CW, Wei Z, Hur WS, Seadler M, Dai W, Paul M, Ketelboeter LM, Lund L, Rodriguez G, Juan LJ, Strilchuk AW, Zhang Y, Cullis P, Dyer M, Gerras A, Shi Q, Luyendyk J, Flick M, Zheng Z, Kastrup CJ

**Project Mentor:** Christian Kastrup, PhD; Biochemistry; Surgery

**Community Partner:** Versiti Blood Research Institute and UBC

Plasminogen activator inhibitor 1 (PAI-1) is an inhibitor of fibrinolysis, thereby promoting blood clot stabilization. PAI-1 contributes to thrombosis, diet-induced obesity, and age-associated diseases such as diabetes, cancer, and Alzheimer's disease. Circulating PAI-1 increases with age, contributing to the increased thrombotic risk in age-related diseases. In contrast, partial PAI-1 deficiency protects patients from cardiovascular morbidity and extends lifespan. Decreasing circulating PAI-1 levels has both experimental and therapeutic value. RNA gene therapy can regulate the levels of target proteins, including those not amenable to traditional small-molecule or antibody-based therapies. Here, we developed a therapeutic approach to induce long-lasting PAI-1 knockdown in vivo with siRNA-lipid nanoparticles (siPAI-1). One dose of siPAI-1 resulted in 90% knockdown of plasma PAI-1 and lasted 10 days post-administration with no overt toxicity. siPAI-1 decreased thrombus weight following complete ligation of the inferior vena cava (IVC) in young and aged mice, and increased survival in aged mice four days post-IVC ligation. Hepatic PAI-1 mRNA expression in diet-induced obese mice was >10-times higher than in healthy mice and was exponentially correlated with body weight. One dose of siPAI-1 in obese mice resulted in 70% knockdown of circulating PAI-1. Furthermore, siPAI-1 normalized the supraphysiologic concentration of PAI-1 in aged mice, and prolonged lifespan in a fast-aging mouse model. Thus, siRNA-mediated PAI-1 knockdown represents a long-term anti-thrombotic approach and effective strategy to limit pathologic impact of PAI-1 in aging and in age-related diseases.

## Laurel Chen, MBE

***A single center pilot study: Serial characterization of pediatric heart transplant myocardium by cardiac magnetic resonance imaging (CMR) at 3T***

**Authors:** Chen LX, Zhang J, Yauck JS, Heimerl A, Kindel SJ, Stendhal G, Yan K, Samyn MM.

**Project Mentor:** Margaret Samyn, MD, MBA; Pediatrics

A knowledge gap exists regarding serial myocardial characteristics as pediatric heart transplant recipients (PHTx) age. While acute rejection (AR) is traditionally assessed by endomyocardial biopsy (EMB), cardiac magnetic resonance imaging (CMR) with parametric (T1, T2) mapping non-invasively assesses myocardium. This study assessed serial myocardial changes for PHTx by CMR at 3 Tesla (3T), hypothesizing first that CMR mapping changes with aging and second that CMR mapping changes dramatically [SK1.1][MS1.2] with treatable AR. This was a single-center study of PHTx having  $\geq 2$  consecutive CMR (September 2016 - June 2024) at Children's Wisconsin (Milwaukee, WI). Paired Student's t-tests compared first and most recent follow-up CMR, with further comparison of CMR for healthy PHTx (without treatable AR) and PHTx with treatable AR. The 20 PHTx were predominantly male (60%) and White (80%), with median transplant age 2.4y {IQR: 0.2, 6.8}. Eight PHTx had 2 CMR; four had 3 CMR, and eight had 4 CMR. Median transplant duration was 12y {IQR: 9, 14} and median follow-up was 49mo {IQR: 29.5, 62.5}. 6/20 (30%) had at least one instance of treatable AR, with only 3/6 (50%) being within 90 days of CMR. Among all PHTx, left ventricular end-diastolic volume and cardiac output increased over time ( $p=0.022$  and  $p=0.01$ ); no other differences were seen on serial scanning. In this small cohort, neither native T1 nor strain were different for healthy PHTx vs PHTx with treatable AR. Interestingly, PHTx with treatable AR returned to baseline T1 after recovery. Larger, multi-center serial CMR studies with longer follow-up are warranted.

## **Ankit Choudhury, BA**

### ***The impact of GLP-1 receptor agonists on postoperative outcomes following total shoulder arthroplasty***

**Authors:** Choudhury A, Van Boxtel M, Hanley J

**Project Mentor:** Jessica Hanley, MD; Orthopaedic Surgery

**Background:** Total Shoulder Arthroplasty (TSA) is a common treatment for shoulder arthritis. Type II Diabetes Mellitus (T2DM) is linked to negative postoperative outcomes, but the impact of glucagon-like peptide-1 receptor (GLP-1) agonists on TSA complications remains unknown.

**Methods:** A retrospective cohort study using the TriNetX Database analyzed T2DM patients who underwent TSA (January 2018-December 2023). Patients were stratified by GLP-1 agonist use. Medical complications within 90 days and surgical complications within 2 years were recorded. Univariate logistic regression assessed initial associations, followed by inverse propensity score-weighted binary logistic regression to adjust for confounders.

**Results:** Among 8254 patients, 505 used GLP-1 agonists. GLP-1 agonist use was not associated with increased risk of medical or surgical complications. Unadjusted analysis showed significantly lower odds of 90-day mortality in GLP-1 users (OR 0.17, 95% CI 0.0043-0.99, P=.0435). This association remained significant after inverse propensity score weighting (OR 0.077, 95% CI 0.011-0.554, P=.011). No other complications were significantly affected, though the reduced risk of wound dehiscence approached significance (OR 0.256, 95% CI 0.061-1.074, P=.063).

**Conclusion:** GLP-1 agonist use is associated with reduced 90-day mortality in T2DM patients undergoing TSA without increasing postoperative complications. These findings support the continued perioperative use of GLP-1 agonists to optimize surgical outcomes.

## **Tory Clearwater, BS**

### ***From screening to safety planning: Improving suicide prevention efforts at Froedtert Hospital***

**Authors:** Clearwater TA, Lindeke SS

**Project Mentor:** Sara Lindeke, MD, MA; Psychiatry

**Background:** Suicide is a growing public health crisis and leading cause of death in the United States. This project aimed to implement a standardized suicide prevention protocol at Froedtert Hospital in compliance with The Joint Commission's National Patient Safety Goal (NPSG) for Suicide Prevention.

**Methods:** Froedtert Hospital established a Suicide Prevention Team, which developed a comprehensive workflow for suicide screening, risk assessment, and safety planning, including standardized tools such as the Columbia-Suicide Severity Rating Scale (C-SSRS) and the Stanley-Brown Safety Planning Intervention. Additional staffing and targeted education were implemented to support consistent use of these tools. Compliance measures were extracted from the hospital's electronic medical record to monitor progress over time.

**Results:** During this project, suicide screening rates rose from 49.5% to 82.3%. While screening rates were similar for patients admitted to the hospital and discharged from the emergency department (ED), risk assessment and safety plan completion rates remained lower for patients discharged from the ED, with safety plan completion remaining below 20%.

**Conclusions:** The implementation of a standardized screening protocol combined with expanded staffing and targeted education led to significant improvement in suicide screening rates. Despite these gains, completion of risk assessments and safety plans remained lower, particularly for patients discharged from the ED. Contributing factors include limited availability of psychiatry staff, competing clinical demands on ED providers, and variability in documentation. These findings highlight the ongoing need for targeted education, staffing support, and workflow optimization to ensure consistent risk assessment and safety planning.

## **Benjamin Close**

### ***Urban caregiver experiences with pediatric surgical care: a qualitative study***

**Authors:** Close BC, Feltracco HA, Lara ST, Van Arendonk KJ, Flynn-O'Brien KT, Nataliansyah MM.

**Project Mentor:** Katherine Flynn-O'Brien, MD, MPH; Surgery; Pediatrics

#### Introduction:

Urban families, particularly those experiencing socioeconomic disadvantage, face persistent disparities in pediatric surgical care. While prior research has focused on clinical outcomes, less is known about how provider- and system-level processes shape family experiences across the surgical journey. This study aimed to characterize challenges in care navigation, communication, and institutional factors influencing the pediatric surgical experience for urban families.

#### Methods:

We conducted semi-structured interviews with 21 caregivers whose children underwent surgery at a high-volume children's hospital between 2020 and 2023. Eligibility was limited to Milwaukee County residents. Interviews explored experiences across pre-, intra-, and post-operative phases. Transcripts were independently coded and reviewed by a multidisciplinary team. Inductive thematic analysis identified key themes shaping caregiver experiences.

#### Results:

All participants were female caregivers; most identified as African American and were insured through state-sponsored programs, with nearly half reporting household incomes below \$15,000. Surgical complexity ranged from routine to urgent. Three domains emerged: (1) navigating the surgical pathway, including delayed recognition of symptom severity and prognostic uncertainty; (2) communication and technology use, marked by delays, unclear explanations, and mixed experiences with digital tools; and (3) perceptions of the healthcare system shaped by trust, perceived bias, and documentation accuracy.

#### Conclusions:

Care navigation challenges, communication gaps, and variability in trust significantly shape the pediatric surgical experience for socioeconomically disadvantaged urban families. Addressing provider- and system-level factors is essential to advancing equity and improving care quality.

## **Lauren Cohen, BS**

### ***National Trends in Neoadjuvant Systemic Therapy Utilization in Patients with Early-Stage HER2-Positive Breast Cancer from 2016–2021: The Impact of the KATHERINE Trial***

**Authors:** Cohen LN, Rogers CC, Lloren JIC, Kamaraju S, Chaudhary LN, Huang C, Cob AN, Singh P, Kong AL, Teshome M, Cortina CS.

**Project Mentor:** Chandler S Cortina, MD, MS; Surgery

Neoadjuvant systemic therapy (NST) for HER2+ breast cancer (HER2+ BC) has historically been used to down-stage disease to facilitate surgical de-escalation; however, in 2019, the KATHERINE trial identified a survival benefit to adjuvant T-DM1 for those with residual disease after NST. We aimed to determine national rates of NST for patients with cT1–2 N0 M0 HER2+ BC and identify factors associated with receipt of NST vs upfront surgery with adjuvant systemic therapy (US-AST). A retrospective cohort study of women with cT1–2 N0 M0 HER2+ BC was performed using the National Cancer Database from 2016–2021. ANOVA, Kruskal–Wallis, Chi-square, Fisher's Exact tests, and a multivariable logistic regression analysis were used. 54,449 patients met inclusion: 30,546 (56.1%) received US-AST and 19,562 (35.9%) received NST. NST utilization increased from 31.1% in 2016–17 to 43.3% in 2020–21. On regression analysis, women diagnosed in 2020–21 were more likely to receive NST (OR 1.9, 95% CI 1.8–2.0). Populations less likely to receive NST included NH-Black women (OR 0.87, 95% CI 0.8–0.95), age  $\geq 70$  (OR 0.7, 95% CI 0.6–0.8), increasing comorbidities (OR 0.7, 95% CI 0.5–0.9), and Medicare insurance (OR 0.8, 95% CI 0.7–0.8). Patients with cT2 disease were more likely to receive NST vs those with cT1 disease ( $p < 0.001$ ). From 2016–2021, national rates of NST for patients with cT1–2 N0 HER2+ BC significantly increased. Race/ethnicity and insurance type were associated with receipt of NST underscoring ongoing disparities in care. Future studies are needed to determine the impact of the disparate rates of NST utilization.

## Alexis Cole

### ***Unhiding the Hidden Curriculum in Medical Education: A Near-Peer Educational Intervention to Improve Clerkship Preparedness***

**Authors:** Cole AR, Ruffalo L

**Project Mentor:** Leslie Ruffalo, PhD; Family & Community Medicine

Medical students entering clinical clerkships must navigate a “hidden curriculum” of unspoken expectations that are often not formally taught, contributing to uncertainty amongst students. We developed a 45-minute near-peer workshop for Phase 2 medical students starting clerkships at the Medical College of Wisconsin, delivered in both in-person and virtual formats, to address these implicit norms. The session incorporated real evaluation examples, case-based discussion, and facilitated reflection to provide practical strategies for navigating team dynamics, feedback, and performance expectations. Pre- and post-session surveys demonstrated significant improvements in learners’ understanding, confidence, and ability to navigate clinical environments, with large effect sizes across multiple domains. Additionally, learner anxiety related to hidden expectations decreased. Participants engaged in candid discussions about real clinical scenarios, highlighting a need for safe, near-peer spaces. This work supports the integration of structured hidden curriculum education into clerkship preparation.

## Emily Cooper

### ***Evaluating Eligibility Criteria for the Crime Victims Compensation Program in the State of Wisconsin***

**Authors:** Cooper EA, Labott AT, Tatakis A, Biesboer EA, Berry AF, Hamadeh Y, Anderson Q, Brandolino A, deRoos-Cassini TA, Schroeder ME

**Project Mentor:** Mary Elizabeth Schroeder, MD; Surgery

**Objectives:**

The study aims to evaluate the ability of level 1 trauma patients to utilize and receive financial retribution through the Crime Victim Compensation at an urban Level 1 trauma center and subsequently evaluate applicant demographics and the approximate financial impact of injury.

**Methods:**

A prospective survey-based study was conducted. Trauma patients meeting the following inclusion criteria were enrolled: individuals admitted to the trauma service who were potential victims of crime, such as motor vehicle collisions involving an intoxicated driver, assault or battery, pedestrian-vehicle collisions, intentional non-self-inflicted firearm discharge, or stabbing. Eligible patients were screened, consented, and surveyed to evaluate knowledge of the CVC program, eligibility, and the perceived financial repercussions of their injuries.

**Results:**

Between February 2024 and August 2024, 1,236 patients were screened for eligibility with 82 patients enrolled in the study. The cohort was predominantly male (72%) and identified as Black/African American (72%). The survey results indicated that 91.5% of participants were unaware of the CVC program. Additionally, 62.2% reported having dependents who required financial support, and 76.5% were employed prior to their injury. Notably, 11% of participants had child support obligations, and 66.7% of these individuals faced potential disqualification from the program due to delinquent payments.

**Conclusions:**

While many patients experience both physical and psychological impacts following a violent crime, the financial impact is often overlooked. This study highlights a significant lack of awareness of the Crime Victim Compensation program among trauma patients, particularly within an urban setting. The demographic data suggest that Black/African American males are disproportionately represented in this population.

## **Hunter D'Acquisto**

### ***Development of a Quality Improvement Video Review Program for Cardiac Arrest Resuscitations in the Emergency Department***

**Authors:** D'Acquisto H, Jasti J

**Project Mentor:** Jamie Jasti, MD; Emergency Medicine

**INTRODUCTION** Cardiopulmonary resuscitation (CPR) is one intervention consistently associated with improved survival from cardiac arrest. However, maintaining high-quality CPR during emergency department (ED) resuscitations is challenging. Video review has emerged as a quality improvement strategy for evaluating resuscitation performance and identifying workflow inefficiencies associated with CPR interruptions.

**HYPOTHESIS** Implementation of a video review program for cardiac arrest resuscitations in the ED will identify opportunities for improving high-quality CPR.

**METHODS** We conducted a single-center pilot quality improvement study using retrospective video review of ED cardiac arrest resuscitations recorded between May and August 2024. Videos were reviewed using a standardized abstraction process to identify chest compression interruptions and associated procedural events. CPR quality metrics were assessed according to American Heart Association (AHA) recommendations. Data was abstracted into a Microsoft Excel database and analyzed using descriptive statistics.

**RESULTS** Ten cardiac arrests were reviewed. Mean patient age was 67 years, 60% were female, and 90% experienced out-of-hospital cardiac arrest. Investigators identified 68 chest compression pauses greater than 1 second. Mean pause duration was  $17 \pm 11$  seconds, and 56% exceeded the AHA-recommended maximum interruption duration of 10 seconds. Mean chest compression fraction was  $89 \pm 5\%$ ; however, chest compression fraction during LUCAS application was  $54 \pm 15\%$ . The longest interruptions were associated with intubation, LUCAS application, and ultrasound.

**CONCLUSION** This pilot study identified prolonged chest compression pauses associated with intubation, LUCAS application, and ultrasound that exceeded AHA benchmarks. Video review appears promising for improving implementation of high-quality cardiac arrest care.

## **George Delis**

### ***Delays and Barriers in Biologic Therapy Initiation for Patients With Hidradenitis Suppurativa***

**Authors:** Delis GJ, Roth G

**Project Mentor:** Gretchen Roth, MD; Dermatology

**Background:** Hidradenitis suppurativa (HS) is a chronic inflammatory disease for which biologic therapy is often necessary to improve disease severity and morbidity. However, timely initiation is frequently hindered by systemic barriers.

**Objective:** Analyze delays and barriers to biologic therapy initiation among HS patients

**Methods:** We retrospectively reviewed dermatology patient encounters at Froedtert Hospital (Milwaukee, WI) between 6/1/2020-6/5/2024. Collected data on medication initiation and discontinuation, insurance type, prior authorization (PA) approval times, and documented reasons for delays.

**Results:** Mean time between PA submission and approval varied by insurance type, with drug company patient assistance programs associated with significantly longer approval times than Medicaid, Medicare, or commercial insurance at 106 days (n=3) ( $p < 0.05$  across groups). Approval times also varied by medication with Humira being approved significantly faster compared to Cosentyx and Inflectra ( $p < 0.05$ ). Additionally, 4.69% of patients never started therapy, and 5.63% required switching biologics prior to next encounter. Insurance-related barriers, particularly PA denials, were the most common contributors to delays.

**Limitations:** Single-center design, reliance on chart documentation

**Conclusion:** Significant delays in biologic access occur for HS patients, particularly among those reliant on assistance programs. Initiation delays frequently exceeded approval delays, suggesting further non-insurance barriers to care, highlighting the need for interventions to improve access.

## Deniz Demircioglu

### ***Stereotactic Body Radiation Therapy (SBRT) versus Irreversible Electroporation (IRE) In the Treatment of Locally Advanced Pancreatic Cancer (LAPC), A Systematic Review and Meta-Analysis Comparing Median Overall Survival and Severe Adverse Events***

**Authors:** Demircioglu DC, Banerjee A, Okwudi E, Matharu SS, Choudhury A, Nguyen CL, Seo D, Kamgar M, Christians K, Tolat P, George B, White S, Erickson B, Hall WA

**Project Mentor:** William A Hall, MD; Radiation Oncology

Pancreatic cancer is frequently diagnosed at a stage when surgical resection is not feasible. After systemic chemotherapy, locoregional therapies such as stereotactic body radiation therapy (SBRT) and irreversible electroporation (IRE) are often considered. This meta-analysis compared median overall survival (OS) and grade  $\geq 3$  toxicities among patients treated with SBRT, IRE, or a combination of IRE and radiation.

A systematic review was conducted using PubMed, Cochrane, Web of Science, and ClinicalTrials.gov to identify studies evaluating SBRT or IRE in non-metastatic locally advanced pancreatic cancer. Review articles, conference abstracts, case reports, retrospective studies, and studies lacking both median OS and toxicity data were excluded. Abstracts were screened by at least three of five independent reviewers. Because of the large number of eligible studies, the analysis was restricted to prospective trials. Meta-analytic comparisons of median OS and toxicity proportions were performed using random-effects models.

From 1,419 identified articles, 176 passed initial screening. Ultimately, 28 prospective SBRT trials and 20 prospective IRE trials were included. Among IRE studies, 9 combined IRE with radiation and 11 used IRE alone.

Median OS was similar between SBRT (16.82 months) and IRE without radiation (19.17 months) ( $p = 0.309$ ), with no significant difference in grade  $\geq 3$  toxicities (12% vs 11%,  $p = 0.61$ ). However, IRE combined with radiation demonstrated significantly longer median OS compared with SBRT alone (22.46 vs 16.82 months,  $p = 0.025$ ) but was associated with higher grade  $\geq 3$  toxicity (22% vs 12%,  $p = 0.04$ ).

SBRT and IRE alone showed comparable outcomes, while combined radiation and IRE may improve survival at the cost of increased toxicity, warranting evaluation in prospective randomized trials.

## Isa DeMorat

### ***Low acuity visits to an academic emergency department: A quality assessment of patient presentations***

**Authors:** DeMorat I, Jacobson N, MD, Nickel L, PhD, Rubin J, MD

**Project Mentor:** Nancy Jacobson, MD; Emergency Medicine

Hospital and emergency department (ED) crowding increasingly threatens safety, timeliness, efficiency, and patient-centered care. As a result, ED wait times and the number of patients leaving without being seen are rising. Upon arrival, patients are triaged by an Emergency Severity Index (ESI), a validated tool introduced in 2002. ESI categorizes patients from level 1 (highest acuity) to levels 4 and 5 (low acuity). No clinical or patient-centered data has been collected for lower acuity presentations at Froedtert ED. This project aims to evaluate low-acuity patient encounters for Froedtert ED for themes in clinical presentations and patient-centered variables. The electronic health record was queried to obtain data on patients presenting to the Froedtert Hospital ED for the 2023 calendar year who were assigned an ESI 4&5 or 1-3 at triage. Patient variables, encounter-specific variables, and clinical variables were recorded and analyzed. Some results were expected: the ESI 4&5 group was younger, and a higher percentage of ESI 1-3 patients arrived via EMS. Other findings require further investigation: ESI 1-3 had more Asian and White patients, while ESI 4&5 had more Black or Other patients. ESI 4&5 also had higher percentages of self-pay or workers' compensation patients, and more lacked a Primary Care Provider. We aim to further explore why patients choose the ED over lower-acuity settings like clinics or urgent care. While quantitative data shows who is presenting with low acuity, the next step is to understand why through qualitative data collection and analysis.

## Allison Dentice, BA

***By the students, for the students: Operation Conversation enhances preclinical students' confidence in challenging communication skills***

**Authors:** Agrawal A, Dentice AD, Zehm A

**Project Mentor:** April Zehm, MD; Medicine

### Background

Effective communication improves outcomes, yet communication skills training (CST) is underrepresented in preclinical medical education.

### Methods

Medical students integrated a student-designed, mentored CST program around difficult conversations into the core medical school curriculum. The program involves intimate experiential small group learning with facilitator feedback on personally chosen scenarios. Anonymous qualitative and quantitative feedback was obtained.

### Results

Eighty-one percent of participants were “extremely satisfied” with the program, and 81% would recommend the program. Post-session confidence increased in all program objectives. Participants said the exercises were realistic and timely.

### Discussion

This student-championed program builds students' communication confidence through experiential learning and feedback. Learners valued the program and appreciated its relevance. Future plans include assessing participants' longitudinal communication performance during standardized assessments.

## Will Derenne

***Hemolysis in Venopulmonary Arterial Extracorporeal Membrane Oxygenation: A Comparative Analysis of Venovenous Versus Venopulmonary Arterial Approaches***

**Authors:** Derenne W, Ramamurthi A, Donato B, Rein L, Butak W, Caswell C, Seadler BD, Alimi M, Ubert AH, Durham LA.

**Project Mentor:** Lucian A Durham, MD, PhD; Surgery

Patients with acute respiratory failure (ARF) that require greater intervention than max ventilator settings are often treated with veno-venous extracorporeal membranous oxygenation (VV ECMO). Veno-pulmonary arterial (VPA) ECMO is a novel treatment for ARF as it also offloads the right heart. Initiating an ECMO type that is already offloading the right heart as it offloads the lungs prevents the need to convert to veno-arterial (VA) ECMO in ARF. This study aims to further characterize the possible complications of VPA ECMO and compare it to the traditional VV ECMO. Additionally, it looks at patient demographics of 142 patients that underwent VV or VPA ECMO at this institution. Specific complications analyzed were hemolysis (plasma free hemoglobin used as marker) and acute kidney injury (AKI). All information was collected via retrospective chart review of a single center. Significant findings included no difference between mean pfHb levels across VV and VPA mode ( $13.13 \pm 9.55$  and  $11.50 \pm 7.23$  for VPA and VV respectively). Brand of pump as well as pump speed were both associated with increased levels of pfHb. Age and increase in pump flow were both associated with increased incidence of AKI. The fact that VPA and VV hemolysis rates did not differ despite VPA using smaller cannulas suggests that VPA ECMO may be considered in cases of ARF when VV ECMO would be used. This paper does not seek to inform decision making on choosing VPA over VV, but rather aims to characterize a novel ECMO method with little literature about it.

## **Nikhil Desai**

### ***Resilience, the Endocannabinoid System, and Inflammatory Cytokines in Hematopoietic Cell Transplant Patients: An Exploratory Pilot Study***

**Authors:** Desai NN, Lazic S, Lind KT, Hillard CJ, Szabo A, Henley E, Liphardt HA, Morris KE, Awoyinka I, Stolley M, D'Souza A, Irwin MR, Costanzo ES, Knight JM

**Project Mentor:** Jennifer Knight, MD, MS, FACLP; Psychiatry

Background: Hematopoietic cell transplantation (HCT) is characterized by profound physiological stress, immune dysregulation, and psychological distress. The endocannabinoid (eCB) system sits at the intersection of stress regulation and immune signaling, yet its relationship with resilience during HCT is unknown.

Methods: Seven adults with multiple myeloma undergoing first autologous HCT provided blood samples and patient-reported outcomes at five peri-transplant timepoints (T1–T5). Plasma 2-arachidonoylglycerol (2-AG), anandamide (AEA), and inflammatory markers (IL-6, TNF- $\alpha$ , CRP, VEGF-A) were collected. Resilience capacity was operationalized using the Five Facet Mindfulness Questionnaire (FFMQ) as a mindfulness-based proxy. Timepoints were pooled and associations estimated using correlation analyses evaluated with generalized estimating equations.

Results: AEA demonstrated a significant positive association with overall FFMQ resilience ( $r = 0.36$ ,  $p = 0.040$ ) but no significant association with depression or anxiety, suggesting that the relationship between AEA and resilience may be partially independent of mood symptoms. 2-AG appeared descriptively elevated at the pre-transplant timepoint (T2), the period of peak anticipatory distress. TNF- $\alpha$  demonstrated strong positive associations with depressive and anxiety symptoms and a significant negative association with overall FFMQ resilience ( $r = -0.50$ ,  $p < 0.05$ ), implicating it as a stress-sensitive pathway linking psychological and immune processes during HCT.

Conclusions: These exploratory findings raise the possibility that circulating AEA may be a biological correlate of resilience capacity partially independent of mood symptoms, and that TNF- $\alpha$  may be a particularly relevant inflammatory correlate of distress and resilience during HCT. Replication in larger, adequately powered cohorts is required.

## **Jacob Dickman**

### ***Spatial analysis of osteoarthritis synovial tissue***

**Authors:** Dickman JA, Holub M, Rybova J, Duris C, Kumar S, Jutras B, Edelstein A, Lochhead RB.

**Project Mentor:** Robert Lochhead, PhD; Microbiology & Immunology

Severe knee osteoarthritis (OA) impacts one-third of people over age 60. Approximately 20% of OA patients who undergo total knee arthroplasty (TKA) experience debilitating joint pain and dysfunction for months or years following surgery. However, predictors of post-surgical patient reported outcomes (PRO) are lacking. We hypothesize that synovial tissue (ST) inflammatory mediators are correlated with poor post-surgical recovery. Multiplexed immunofluorescence microscopy (mIF) was used to characterize the ST cellular microenvironment in 20 OA patients undergoing TKA. Immune, endothelial, and stromal cells were identified. Intercell distances were measured for all cell types. Spatial and synovial fluid laboratory findings were correlated with PRO at 6-months post-surgery. In a subset of samples, the perivascular space of ST contained abundant antigen presenting cells (APC), HLA-DR+ fibroblast-like synoviocytes (FLS), CD4+ T helper (Th) cells, and CD8+ cytotoxic lymphocytes (CTL). Perivascular HLA-DR+ FLS correlated with poor post-surgical recovery. Perivascular CTL positively correlated with bacterial peptidoglycan in ST) and CXCL10 in synovial fluid. Abundance of perivascular APC, particularly CD11c+ dendritic cells, correlated with synovitis and IL-6 in SF. Change in KOOS-JR at 6 mo. post-TKA correlated with mean distance between Th cells and Thy1+HLADR+ FLS. Correlation was also seen with KOOS-JR and distance CTL—endothelial cell intercell distance. perivascular T cells and APC may promote synovial inflammation in advanced knee OA. Importantly, excessive perivascular HLA-DR+ FLS in ST likely drive inflammation-associated post-operative complications and poor recovery following TKA.

## Andrew Doan

### *Tending to the Religious and Spiritual Needs of Muslim Patients in U.S. Hospitals: A Data-Driven Policy Report*

**Authors:** Doan A, Rizky I, Afreen M, Abdulbaseer U, Padela AI

**Project Mentor:** Aasim Padela, MD, MSc; Emergency Medicine

**Community Partner:** Initiative On Islam and Medicine

Muslim Americans number approximately 5 million and represent one of the fastest-growing religious populations in the United States. For many, religion directly shapes healthcare behaviors, dietary practices, medication preferences, and medical decision-making. Despite this, their religious and spiritual needs remain systematically unmet within hospital settings.

This report brings forward findings from the Muslim American Health and Spiritual Needs (MAHSN) study; a nationally fielded survey of 1,281 self-identified Muslim adults conducted by the Initiative on Islam and Medicine (II&M); the report documents substantial and measurable gaps between what Muslim patients require and what hospital systems provide. Study findings reveal that 94% of respondents considered having religious and spiritual needs met during hospitalization important, yet 40% reported those needs went unaddressed. Approximately 70% identified key Islamic resources as important to their care; fewer than 30% reported actual access to any of them. Only 27% were ever asked about their religious identity by a provider.

This report calls on healthcare administrators, clinical leaders, and policymakers to implement concrete reforms across three dimensions:

- Observances: providing neutral prayer spaces, prayer mats, and the Qur'an
- Practices: ensuring access to halal food and medications free of porcine derivatives and alcohol
- Values: expanding Muslim chaplaincy services and embedding culturally and spiritually competent care into provider training and institutional policy

These reforms are feasible and consistent with existing accreditation and regulatory obligations. What is needed now is institutional will. This is a matter of healthcare equity, patient safety, and accountability.

## James Dowd

### *Short-term comparison of traditional open surgical approaches to minimally invasive techniques for the treatment of metastatic periacetabular bone disease*

**Authors:** Dowd JR, Neilson JC, Wooldridge AN, Hackbarth DA, Tutton SM, Scheidt MJ, Key BM, King DM.

**Project Mentor:** David King, MD; Orthopaedic Surgery

**BACKGROUND** Periacetabular metastatic disease can cause pain and disability, prompting potential surgical intervention. Traditionally, a Harrington type reconstructive with a total hip replacement has been the standard approach, however these are invasive. Minimally invasive techniques, including screw fixation with cementation and potential ablation, aim to reduce morbidity. This study compared surgical and short-term postoperative outcomes between the two treatment options for patients with periacetabular metastatic disease.

**METHODS** Prospectively maintained institutional medical records were used to retrospectively identify patients that had undergone the traditional approach, who would be minimally invasive candidates, and patients that have undergone the minimally invasive procedure. Patient demographic, surgical data, and postoperative outcomes of patients with minimum three-month follow-up were collected. Paired t-test and Chi-squared tests were used to determine any statistically significant differences between the two groups.

**RESULTS** 17 traditional patients and 48 minimally invasive patients were identified. Minimally invasive patients had statistically significant lower rate of operative blood loss, transfusion rates, operation time and length of stay ( $p < .05$ ). 14 traditional and 32 minimally invasive patients had minimum three month follow up. The two cohorts did not demonstrate a significant difference in the need for secondary procedures, complications, death within 90 days, or Pain and Ambulatory Function Scores ( $p > .05$ ). Minimally invasive patients had statistically significant quicker return to augmented therapies ( $p < .05$ ).

**DISCUSSION** Patients undergoing minimally invasive techniques for metastatic periacetabular disease had reduced surgical morbidity while achieving similar short-term postoperative outcomes and faster return to augmented therapies when compared to patients treated with the traditional approach.

## Emma DuMez, BA

### *Trajectories of parent and patient quality of life following pediatric CAR T cell therapy*

**Authors:** DuMez E, Steineck A, Pan A, Zhang L.

**Project Mentor:** Angela Steineck, MD,MS; Pediatrics

**Background:** Health-related quality of life (HRQOL) is an important determinant of outcomes amongst pediatric oncology patients and their families. Children undergoing chimeric antigen receptor (CAR) T cell therapy experience significant physical and psychosocial burden. Caregiver distress is known to influence patient wellbeing, yet the relationship between parent and patient HRQOL in this population remains poorly characterized.

**Methods:** This post-hoc analysis utilized data from a longitudinal, multicenter prospective study of pediatric patients undergoing CAR T cell therapy. Parent HRQOL was assessed using the Caregiver Quality of Life Scale (CQOLC) and patient HRQOL was measured using the Pediatric Quality of Life Inventory (PedsQL) Generic and Cancer modules. Analyses were completed for baseline, +4 weeks, and +3 months post-infusion. Summary statistics and Pearson correlation coefficients were used to evaluate associations between parent and patient HRQOL ( $P < 0.05$ ).

**Results:** Patient HRQOL was lowest at baseline and improved at 4 weeks and 3 months post-infusion. In contrast, parent HRQOL was highest at baseline and declined following treatment initiation; remaining decreased at 3 months. Patient and parent HRQOL were not significantly correlated at any timepoint. Subdomain analysis demonstrated persistent impairment in patient-reported worry despite overall HRQOL improvement.

**Conclusions:** Pediatric patients undergoing CAR T cell therapy reported diminished HRQOL at treatment initiation with improvement over time, while caregiver HRQOL declined and remained impaired. The absence of a significant association between parent and patient HRQOL suggests a complex, multifactorial relationship and highlights the need to further identify HRQOL predictors in both patients and caregivers.

## Eric Elftmann

### *Evaluation of AI-based Medical Education Platform at Scale*

**Authors:** Elftmann E, Wolfrath N, Verhagen N, Ramamurthi A, Kothari AN

**Project Mentor:** Anai N Kothari, MD, MS; Surgery

**Introduction:**

Evaluating the quality of AI-based educational tools is necessary for safe and ethical deployment. ChatClinic is a medical education platform that generates AI-Simulated Clinical Interactions (ASCIs) using large language models (LLMs). The objective of this study was to measure task-alignment of ASCIs created using ChatClinic.

**Methods:**

ChatClinic ([www.chatclinic.ai](http://www.chatclinic.ai)) was used to generate 5 clinical scenarios: small bowel obstruction (SBO) both not requiring and necessitating surgical intervention, diverticulitis, cholecystitis, and reducible inguinal hernia. For each scenario, 7 step, multi-turn conversations were generated with a benchmark dataset of 200 human-evaluated reference ASCIs and 800 test ASCIs. Each test conversation was evaluated against the benchmark set using the heuristic BLEU evaluation metric for LLMs (above 0.6-0.7 indicates a significant match). Additionally, all ASCIs from the 5 scenarios (5,000 total) were evaluated for answer relevance, hallucination, and moderation using LLM-as-a-judge.

**Results:**

The average BLEU scores ranged from 0.732 for SBO non-operative to 0.885 for SBO operative. Across 4,000 test conversations, 65 scored below 0.6 (1.625%). LLM-as-a-judge mean answer relevance ranged from 0.934 (SD: 0.033; SBO non-operative) to 0.946 (SD: 0.016, reducible inguinal hernia), hallucination ranged from 0.017 (SD: 0.043; reducible inguinal hernia) to 0.089 (SD 0.097; SBO non-operative), and moderation was 0.000 (SD: 0.000 – 0.007) for all scenarios.

**Discussion:**

ChatClinic demonstrated reproducibility at scale to consistently provide high-quality ASCIs. All scenarios averaged BLEU scores above 0.7. Additionally, LLM-as-a-judge evaluation demonstrated high levels of answer relevance and very low levels of hallucination. Evaluating task-alignment for AI-based tools at scale is critical for deployment.

## Jordan Eng

### ***Healthcare Access and Outcomes for Pediatric Rohingya-Speaking Patients in the Emergency Room: A Retrospective Review***

**Authors:** Eng J, Liegl M, Pan A, Olen AT, Shah B, Burgunder L.

**Project Mentor:** Lauren Burgunder, MD, MPH; Pediatrics

**Background:** Refugees often face significant barriers to healthcare access. This study describes emergency department (ED) utilization among pediatric Rohingya-speaking refugees at Children's of Wisconsin (CW).

**Methods:** A retrospective chart review at the CW emergency room was performed between 2014 and 2024. Inclusion criteria included Rohingya speaking patients under 18 years of age at the time of presentation. Demographics and encounter details were collected, including triage acuity, length of stay (LOS), chief complaint, and ED disposition. Descriptive analysis was performed for all encounters. A univariate analysis assessed associations between triage level, interpreter type, LOS, and disposition using the first encounter for each unique patient.

**Results:** A total of 884 encounters among 420 unique patients met inclusion criteria. 22% of patients were seen 3 or more times over the 10-year period. The most common chief complaints were respiratory or infectious (50%) and gastrointestinal related (25%). Over half of visits were triaged as low acuity (54%), with most discharged home (82%). Interpreters were predominantly hospital video/telephone interpreters (91%). The mean LOS was 215±108 minutes compared to 157 minutes for all ED encounters during that time. Most encounters occurred between 8am and 4pm (50%). LOS differed significantly by triage acuity ( $p < 0.001$ ), while LOS was not significantly associated with interpreter type and ED disposition.

**Conclusion:** Rohingya-speaking pediatric ED encounters were characterized by high interpreter documentation, frequent low-acuity presentations, and repeat utilizations. We hope these findings inform efforts to improve comprehensive care for refugee and limited-English-proficient populations in pediatric emergency settings.

## Jesse Fang

### ***Comparative Pressure Mapping of Recumbent Bicycle Seat Cushions on Uneven Terrain***

**Authors:** Fang JR, Lee K,

**Project Mentor:** Kenneth Lee, MD; Physical Medicine & Rehabilitation

**Background:**

Many Veterans have sustained permanent injuries that prevent them from participating in able-bodied sports. The Milwaukee VA adaptive cycling rehabilitation program introduces veterans with physical disabilities recumbent bicycle (trike) riding. This reduces pressure on the hands, back, and perineum compared to upright bicycles. However, uneven terrain may increase saddle forces because trike riders cannot stand on the pedals to absorb shock. No studies have directly compared saddle cushion materials during trike riding.

**Methods:**

Subjects completed 16 riding trials on the Catrike Dumont trike using four different saddle cushions. These consist of factory mesh, foam, air, and gel. Subject rode over simulated bumps of increasing height (0.5, 0.75, and 1.0 inches) and saddle pressures were recorded using the ForeSite SS XSensor pressure mapping system. Outcome measures included peak saddle pressure and pressure dispersion index.

**Results:** A two-way ANOVA demonstrated a significant main effect of cushion type on peak pressure ( $F(3,15)=5.03$ ,  $p=0.013$ ), while bump height did not significantly affect peak pressure ( $p=0.091$ ). No significant interaction was observed between cushion type and bump height ( $p=0.95$ ). Gel cushions demonstrated the highest mean peak pressures, while foam cushions demonstrated the lowest. There were also significant differences in dispersion index between cushion types ( $F(3,20)=19.40$ ,  $p<0.001$ ), with the factory mesh cushion demonstrating the lowest dispersion index.

**Conclusions:** Cushion material significantly influences saddle pressure characteristics during trike cycling. Mesh and foam cushions demonstrated lower peak pressures and improved pressure redistribution compared to gel and air cushions. These cushion types may reduce soft tissue loading and improve rider comfort.

## Paola Farah

### *Improving rapport and trust between attending and residents in general surgery: a qualitative analysis*

**Authors:** Farah PT, Peschman, JR

**Project Mentor:** Jacob Peschman, MD; Surgery

#### Context

Rapport and trust between surgical attending physicians and resident learners are critical to effective training, yet residency structures lack formal mechanisms to establish rapport at rotation onset. Without structured communication, attending physicians begin each rotation with little insight into a resident's learning preferences, professional goals, or personal circumstances, delaying trust calibration and hindering negotiation of expectations. This study evaluated the feasibility of a structured pre-rotation communication tool designed to foster mutual understanding and improve rapport and trust between surgical residents and their supervising team.

#### Methods

This mixed-methods study was conducted across Trauma, Acute Care Surgery (ACS), and Surgical Intensive Care Unit (SICU) services at a single academic medical center. A voluntary email-based survey was distributed to 29 residents — 12 senior (PGY3–5) and 17 junior (PGY1–2) — one month before rotation start, addressing rotation goals, concerns, and relevant personal or professional context. Individualized resident profiles were compiled and distributed to the supervising team before each rotation.

#### Results

Of 29 residents surveyed, 8 responded (27.6%), evenly split between senior and junior residents. All 8 completed the first two questions. Responses to the personal disclosure question were limited, with only the 4 junior residents and 1 senior resident responding, suggesting disclosure willingness varies with training level.

#### Discussion

This study demonstrates the feasibility of a pre-rotation communication tool in surgical training while highlighting barriers including survey fatigue and stigma surrounding vulnerability among senior trainees. Future work should expand the sample, administer the planned post-intervention survey, and explore tailored approaches across training levels.

## Michael Farris, MSc

### *The effect of tranexamic acid on the prevalence of heterotopic ossification in elbow trauma surgery*

**Authors:** Farris M, Bollepalli H, Szakiel P, Sullivan C.

**Project Mentor:** Connor Sullivan, MD; Orthopaedic Surgery

#### BACKGROUND

Heterotopic ossification (HO) is a complication often seen following trauma or surgery that can lead to pain and reduced mobility of joints. Tranexamic acid (TXA) is an anti-fibrinolytic drug widely used across many medical applications for the treatment and prevention of hemorrhage. Recent studies have begun to investigate TXA as a potential prophylactic therapy to prevent postoperative development of HO following orthopedic surgery.

#### METHODS

This is a retrospective cohort study evaluating a total of 480 patients who underwent surgical treatment for traumatic injury to the elbow at Froedtert Memorial Lutheran Hospital in Milwaukee, Wisconsin, USA. Rates of HO were compared between patients who received intravenous TXA during their surgery and those who did not.

#### RESULTS

Out of 480 total patients, 53 received TXA during surgery and were assigned to the treatment group while the remaining 427 were assigned to the control group. Rates of HO were 30.19% in the treatment group and 21.31% in the control group. Rates of clinically significant HO were 15.09% in the treatment group and 8.43% in the control group. These differences were not found to be statistically significant for HO ( $p = 0.14$ , 95% CI = -0.22-0.04) or for clinically significant HO ( $p = 0.11$ , 95% CI = -0.17-0.03).

#### DISCUSSION

No significant relationship between TXA and HO was observed. This adds to the currently limited and heterogeneous literature regarding TXA as prophylaxis for HO in the trauma setting. Future work is needed to accurately determine the efficacy of TXA for this potential new use.

## **Emilia Ferreira, BA**

### ***Investigating the Association of CMV Serostatus, Concussion History, and Clinical and Biomarker Outcomes in Collegiate Athletes***

**Authors:** Ferreira EB, Savitz J, Teague TK, Meier TB

**Project Mentor:** Timothy B. Meier, PhD; Neurosurgery

**Background:** There is great interest in determining why adverse outcomes are observed in subsets of athletes with repeated concussions. Cytomegalovirus (CMV) is a common herpesvirus virus that has shown to be reactivated due to stress or inflammation. We test the hypothesis that CMV serostatus moderates the relationship of concussion history with clinical measures and blood-based biomarkers of inflammation and brain injury.

**Methods:** Collegiate athletes (N=208; 62.5% male, mean age 20.99±1.68 years) with varying concussion histories were enrolled. Blood samples were analyzed for IgG CMV antibodies using ELISA. Clinical outcomes included concussion-related symptoms, psychological symptoms, and depression and anxiety symptoms. Concentrations of IL-1RA, IL-6, IL-10, CRP, TNF, GFAP, tau, and NFL were measured in serum. General linear models examined the interaction of CMV serostatus with prior concussion history on clinical outcomes and blood-based biomarkers.

**Results:** 27.4% athletes tested positive for CMV antibodies. CMV+ athletes were older and more likely to be non-white ( $p < 0.05$ ). There was a significant interaction of CMV serostatus and number of prior concussions for levels of IL-6, with a positive association between IL-6 and prior concussions observed in CMV+ athletes ( $B(SE) = .259(.08)$ ,  $p = 0.001$ ) but not CMV- athletes ( $B(SE) = .022(.05)$ ,  $p = .665$ ). Concussion history was associated with increased symptoms across all clinical measures, irrespective of CMV status ( $p < 0.05$ ).

**Conclusion:** CMV serostatus moderates the relationship between prior concussions and IL-6 levels, highlighting its role in exacerbating immune responses to repeated head injuries. Concussion history remains associated with increased symptoms regardless of CMV status.

## **Paige Fuller, BS**

### ***Revamping surgery bootcamp for fourth-year medical students***

**Authors:** Fuller PC, Elegbede AF, Peschman JR

**Project Mentor:** Jacob Peschman MD, MSPE, Anuoluwapo Elegbede MD,; Surgery

#### **Introduction**

Transitioning from medical student to resident is a difficult and pivotal point in a medical trainee's education, yet many medical students feel unprepared. Most medical schools have implemented short preparatory courses focused on residency transition called surgery "bootcamps" for fourth-year students. Bootcamps' curricula vary and have mixed results. Most focus on clinical and technical skills, yet what interns need to know are communication skills. We aimed to revamp our local bootcamp curriculum to focus on both clinical and communication skills.

#### **Methods**

After review of current literature and previous local curriculum, we created a revamped 2-day, 16-hour local bootcamp with a mix of didactics, skills sessions, patient cases, mock pages, and faculty question-and-answer. Fourth-year medical students who matched into surgical subspecialties were invited to attend and asked to fill out optional pre-curriculum and post-curriculum surveys.

#### **Results**

12 students attended, 9 completed the pre-curriculum survey and 7 filled out the post-curriculum survey. Students agreed communication and time management was the most important skill to know for intern year. In the clinical skills domain students on average reported being somewhat comfortable before and very comfortable after bootcamp. In the communication domain, most students reported feeling somewhat comfortable before and very comfortable after. Students reported being somewhat comfortable before and after in the medical management domain, with a decrease in students not at all comfortable after. Comments included "taught us new information" and "it was a good use of time".

#### **Conclusion**

Overall, the new surgery bootcamp was well received by students and increased their overall comfort in. This curriculum should be used as a foundation for future bootcamps with incorporation of student feedback.

## Zachary Gestrich

### *Developing a Community Advisory Board for the Moving Forward with Myeloma Lifestyle Intervention*

**Authors:** Gestrich Z, D'Souza A, Sheean P, O'Connell K, Alonso E, Stolley M

**Project Mentor:** Melinda Stolley, PhD; Medicine

**Background:** Multiple myeloma (MM) survivors experience persistent symptoms, functional limitations, and psychosocial distress that impact their quality of life. Lifestyle interventions may mitigate these factors; however, MM-specific programs are limited and often lack the racial/ethnic diversity representative of MM survivors. Community Advisory Boards (CABs) function to support culturally relevant and feasible intervention development. This study describes the creation of a CAB to guide the Moving Forward with Myeloma (MFM) lifestyle intervention.

**Methods:** Using established CAB frameworks, MM survivors were recruited through pilot data and clinician recommendations. Members were screened and reviewed program materials and exercise modules. Meeting structure was established and feedback was incorporated to refine the sequencing, readability, and the feasibility of the curriculum. Sustainability plans were created that included scheduling long-term meetings, compensation, and evaluation processes.

**Results:** Five MM survivors with diverse age, racial, and ethnic backgrounds participated in three structured meetings and individual follow-up sessions. CAB members recommended reorganizing weekly topics, introducing stress-management content earlier, simplifying language, adapting exercises for mobility limitations, and including optional sexual-health materials. Members also contributed to logo selection and proposed community-building strategies.

**Conclusion:** The CAB strengthened the MFM lifestyle intervention by ensuring alignment with the experiences and priorities of MM survivors. Despite challenges with recruitment, technology, and study delays, the CAB enhanced the intervention's relevance, accessibility, and patient-centeredness. The model demonstrates the value of community-engaged research in designing equitable survivorship interventions for individuals with MM.

## Joshua Gonzales

### *Military Medical Academic Enrichment Experience (MMAE): A Pilot Pre-Post Study Demonstrating Improved Medical Student Knowledge of Military and Veteran Healthcare*

**Authors:** Gonzales J, Strong M, Nguyen V, Lee K, Burek G

**Project Mentor:** Kenneth Lee, MD; Physical Medicine & Rehabilitation

**Background:** Military-connected patients represent a clinically important population, yet medical trainees may receive limited formal instruction in military culture, Veterans Affairs (VA) systems, Department of Defense (DoD) structure, and service-related health concerns.

The Military Medical Academic Enrichment Experience (MMAE) was developed at the Medical College of Wisconsin to provide future physicians with practical tools to improve care for current and former military members. The curriculum addressed DoD/VA structure, military service timelines, healthcare eligibility, military culture, PTSD, and basic military history-taking.

**Methods:** A 20-question pretest/posttest design was used to evaluate learner knowledge before and after the MMAE curriculum. Questions 1–10 were multiple choice and graded using an answer key. Questions 11–20 included free-response items and were scored using flexible criteria that accepted synonymous wording and clinically equivalent responses. Nine matched participants had complete pretest and posttest data and were included in the final paired analysis. Matched participant scores were analyzed using descriptive statistics, a paired-samples t-test, effect size calculation, and Wilcoxon signed-rank testing.

**Results:** Mean total scores increased from 10.78/20 on the pretest to 17.78/20 on the posttest, reflecting a mean gain of 7.00 points. This improvement was statistically significant,  $t(8) = 8.08$ ,  $p = 0.000041$ , with a very large effect size, Cohen's  $d_z = 2.69$ . The Wilcoxon signed-rank test also supported significant improvement ( $p = 0.0039$ ).

**Conclusion:** Participation in MMAE was associated with improvement in learner knowledge of military and veteran healthcare topics. These findings support continued development of military-focused educational programming in medical training.

## **Chloe Guillaume**

### ***Reproductive preventive medicine in patients with spinal cord injury: a review of current literature with guidelines for patients and physicians***

**Authors:** Guillaume CF, Ball C.

**Project Mentor:** Charlotte Ball, MD; Physical Medicine & Rehabilitation

Spinal cord injury (SCI) affects many individuals during reproductive years, yet reproductive and preventative healthcare needs in this population are often overlooked. Although fertility is often preserved following SCI, women with SCI experience lower rates of routine gynecologic screening, including cervical cancer screening and mammography, compared to the general population. Additionally, sexual wellbeing and fertility are often overlooked for women with SCI, particularly during the acute period following injury. Women often experience wrongful assumptions regarding their desires for fertility or sexual activity, resulting in potentially harmful gaps in their preventative gynecologic healthcare. Emerging strategies, including self-collected HPV testing, may improve accessibility and screening adherence for select patients. Barriers that contribute to these disparities include inaccessible facilities and equipment, provider discomfort with disability-specific care, and misconceptions regarding sexuality and fertility after injury.

This scholarly project summarizes current literature regarding reproductive preventative healthcare in patients with SCI, with focus on screening disparities, contraception and family planning, pregnancy considerations, and sexual health counseling. Additionally, this work proposes practical clinical recommendations for both healthcare providers and patients aimed at improving adherence to reproductive preventative healthcare services.

## **Daniela Guzman-Garza, B.S.**

### ***Use and Perceptions of Artificial Intelligence (AI) Among Medical Students***

**Authors:** Guzman-Garza D, Ashworth R.

**Project Mentor:** Rachel Ashworth, MD; Pediatrics

The use of artificial intelligence, such as large language models and generative AI, is rapidly increasing. Use is widespread and is now being seen more and more often in medical spaces, including medical education. Students, especially those who have been in school long enough to see the access and usefulness of artificial intelligence change rapidly, are fast adopting this technology. Previous studies that ask a similar question – how do medical students use and perceive AI? - have shown that perceptions are overall positive, though most are unsure of the ethical implications of implementing AI in medical education and medical practice. A survey was conducted at all levels of the Milwaukee College of Medicine to assess the types and frequency of use of AI by current students. The survey also asked questions surrounding beliefs about AI's effect on the environment. Whether or not education on AI use should be integrated into the curriculum, and whether AI in medical education and practice is ethical. Comparisons were made between student responses at this institution vs student responses found in the literature, which comes from within and outside of the United States. Data collection for this review is ongoing, but anecdotal evidence shows that most students are open to the use and education surrounding artificial intelligence. The use of artificial intelligence has particularly been seen on the wards when responding to attending questions, creating differential diagnoses, or in place of using a traditional search engine such as Google.

## May Madi Han, MS

### *Improving dermatology capacity through one-page clinical guidelines: an educational intervention for frontline providers in Bagamoyo, Tanzania*

**Authors:** Han MM, Norton NB, Seibert D, Estill M, Juma O, Mmbaga G, Lukwaro M, Mcharo JJ, Humphrey SR, Wanat KA

**Project Mentor:** Karolyn Wanat, MD; Dermatology

**Community Partner:** Ifakara Health Institute, Bagamoyo District Hospital

Dermatologic diseases are the fourth leading cause of nonfatal disease burden globally, with higher impact in sub-Saharan Africa due to climate, poverty, and limited access to care. Dermatologic care is often provided by general practitioners with limited dermatology training, leading to challenges in accurate diagnosis and management. In collaboration with the Burma Skincare Initiative, concise, visually focused guidelines for impetigo, tinea, and scabies were developed for frontline providers. Providers at Bagamoyo District Hospital completed a pre-intervention survey before receiving the guidelines. After eight weeks, a post-intervention survey assessed changes in knowledge and confidence in diagnosis and management using a Likert-scale.

Thirty-eight providers participated: 6 general practitioners, 17 clinical officers, 13 nurses, and 2 dentists. Average clinical experience was 11.7 years, with 8.8 years in Bagamoyo. Statistical analysis demonstrated significant improvements ( $p < 0.01$ , Fisher's exact test) in knowledge and confidence in diagnosis and treatment of impetigo, tinea, and scabies, particularly among clinical officers and nurses. No significant changes were observed among general practitioners or dentists. Participants expressed high satisfaction and interest in additional topics.

One-page dermatology clinical guidelines can improve providers' knowledge and confidence, especially among clinical officers, who completed a two-year medical course. Greater improvements in these groups likely reflect their shorter prior training relative to general practitioners, who underwent a five-year undergraduate curriculum and one-year internship. With adaptation to local resources, this model is scalable across similar low-resource contexts in sub-Saharan Africa and beyond, contributing to addressing global burden of skin disease.

## Kathryn Harris

### *Association of Traumatic Brain Injury with Major Depressive Disorder and Depression-Related Symptoms in Community-Dwelling Older Persons*

**Authors:** Harris KS, Brett BL

**Project Mentor:** Benjamin Brett, PhD; Neurology; Neurosurgery

Traumatic brain injury (TBI) is a common cause of disability and death in the United States<sup>1-2</sup>. A growing body of research reveals that TBI is associated with a higher risk for major depressive disorder (MDD)<sup>3-4</sup>. More research is needed regarding the longitudinal and long-term psychiatric effects of TBI in older adults. This project aims to determine the baseline relationship between history of TBI and history of MDD cross-sectionally, assess the incidence of new onset of MDD among older adults with a history of TBI longitudinally, and determine the baseline correlates between TBI and other health metrics. This project consisted of secondary analysis of 3 longitudinal community-based cohort studies. The association between history of TBI and baseline diagnosis and new onset of MDD were assessed using Chi-squared ( $\chi^2$ ) tests. At baseline, there was a significant difference in the number of depressive symptoms reported by each group ( $p = 0.002$ ). There was no significant difference in the rates of baseline diagnosis of MDD between groups ( $p = 0.293$ ) nor was there a difference in the rates of MDD onset over the course of the study ( $p = 0.564$ ). Interestingly, TBI exposure groups reported significantly higher levels of physical activity at baseline. Overall, these findings may suggest a vulnerability for future development of MDD in those exposed to TBI but do not elucidate a direct relationship. Further research could be conducted to investigate the types of depressive symptoms associated with TBI exposure and the trajectory of TBI symptoms over time.

## **Julia Hasik, BS**

### ***Contrasting the performance of US Medicaid expansion programs: evaluating variability in state-level uninsured rates***

**Authors:** Hasik J, McGinley E, Pezzin L

**Project Mentor:** Liliana Pezzin, PhD, JD; Institute for Health & Humanity

Despite the documented benefits of Medicaid expansion under the Affordable Care Act (ACA), ten U.S. states had yet to implement this policy as of 2024. This study evaluates state-level variation in uninsured rates, Medicaid enrollment, and low-income population shares to identify factors that account for differential outcomes between states in different coverage policy regimes (2013-2022 expansion and non-expansion states). Using state-level data from the Kaiser Family Foundation and multivariable linear regression, we estimate the contribution of key demographic and policy variables to reductions in uninsured rates from 2013 to 2022. Medicaid expansion was significantly associated with lower uninsured rates (coefficient = -1.48,  $p=0.005$ ) after adjusting for state-level characteristics. Three variables—pre-expansion uninsured rates, proportion of low-income individuals, and Medicaid enrollment levels—accounted for 79% of the variation in change in uninsured rates and 87% of the variation in 2022 uninsured rates across states. These findings identify expansion states that would serve as appropriate policy analogs for non-expansion states, with implications for reducing the coverage gap in high-need regions such as Texas, Florida, and Georgia.

## **Sameeha Hassan**

### ***Evaluation of Cognitive-Linguistic Treatment Approaches in Improving Language Health of Stroke Survivors with Aphasia***

**Authors:** Hassan SE, Shah-Basak P.

**Project Mentor:** Priyanka Shah-Basak, PhD; Neurology

Stroke is a leading cause of long-term disability, and aphasia affects approximately 21–38% of stroke survivors, resulting in substantial impairments in communication, social participation, and quality of life. Conventional speech-language therapies demonstrate variable efficacy, particularly in the chronic phase, and often do not directly target underlying cognitive mechanisms that support language. The planned study evaluates the feasibility and preliminary efficacy of two novel cognitive-linguistic interventions: subvocal rehearsal and attention refreshing, both designed to improve verbal short-term memory (STM) in stroke survivors with aphasia (SWA); this report includes results only from the subvocal rehearsal treatment

Using a within-subject design, three participants with chronic left hemisphere stroke and documented STM impairments completed two treatment cycles (10 sessions over 2 weeks each), separated by an eight-week break. Tasks involved practicing rehearsal with computerized manipulation of STM load (set size) and maintenance duration (delay) and required nonverbal response to minimize speech production confounds. Feasibility outcomes included acceptability, implementation, and practicality; efficacy was assessed via changes in performance trends across sessions and tolerance to increased task difficulty.

Preliminary results demonstrate heterogeneous responses. One participant maintained consistently high performance, another showed gradual improvement followed by stabilization at higher difficulty, and the third showed promising early gains. The intervention was well tolerated and implementable within a structured protocol. These findings support feasibility and suggest potential for mechanism-based therapies targeting STM. Larger studies are needed to determine efficacy, optimize protocols, and evaluate generalization to functional language outcomes.

## **William Hayssen, BS**

### ***Impact of thoracic irrigation and thoracostomy tube size on retained hemothorax volume: a swine study***

**Authors:** Hayssen W, Turner H, Wilson D, Seadler M, Mantz-Wichman M, Yang K, Conrardy R, Allen K, Carver T

**Project Mentor:** Thomas Carver, MD; Surgery

#### Introduction:

Retained hemothorax (rHTX) remains a frequent complication following traumatic chest injury. Intrapleural irrigation at the time of tube thoracostomy (TT) has been shown to reduce rHTX; however, its efficacy across different tube sizes remains unknown. We investigated the impact of TT diameter and thoracic irrigation on rHTX burden in a controlled swine model. We hypothesized that irrigation paired with a larger-diameter (28 Fr) TT would result in superior clearance of intrapleural blood compared to irrigation with a smaller (14 Fr) TT. Additionally, we hypothesized that irrigation through a 14 Fr TTs would decrease rHTX vs non-irrigated 14 Fr TTs.

#### Methods:

Thirty adult swine underwent bilateral hemothorax creation with 500 cc autologous blood per side. In cohort one (n=20), each animal received a 28 Fr TT in one hemithorax and the other a 14 Fr TT. Both sides were irrigated with 1 L warmed saline. In cohort two (n=10), bilateral 14 Fr TTs were placed, with one side randomized to irrigation and the other as control. After a fixed drainage period, euthanasia was performed and rHTX volume was measured via thoracotomy.

#### Results:

In cohort one, median rHTX was lower with 28 Fr vs 14 Fr TTs (93 cc vs 156 cc;  $p < 0.001$ ). In cohort two, no significant difference was observed between irrigated and non-irrigated 14 Fr TTs (169 cc vs 139 cc;  $p = 0.3$ ).

#### Conclusion:

In this study, intrapleural irrigation significantly reduces rHTX but only when coupled with a large-bore (28 Fr) TT. Irrigation failed to reduce rHTX volume when performed through a small-bore (14 Fr) TT. These preclinical results provide mechanistic support for reevaluating current chest tube practices and warrant prospective clinical investigation.

## **Meredith Hiller**

### ***Violence against emergency department health care workers and the effect of Wisconsin Act 209***

**Authors:** Hiller M, Nickel L, Sell C, Derse A, Jacobson N, Torkilsen C, Aranda J, Burmeister B, Chinn M

**Project Mentor:** Matthew Chinn, MD; Emergency Medicine

#### **Community Partner:**

**Background:** Emergency department (ED) workers face disproportionately high rates of workplace violence. In March 2022, Wisconsin enacted Act 209, creating a Class H felony for intentionally causing or threatening bodily harm to health care facility workers. No prior study had evaluated the on-the-ground impact of this legislation on the Wisconsin workers it was designed to protect.

**Methods:** An anonymous online survey was distributed to registered nurses, physicians, and advanced practice providers currently employed in Wisconsin EDs. Questions assessed demographics, experiences of bodily harm or threats during the reference period (March 23, 2022–June 30, 2023), awareness of Act 209, perceived safety, and barriers to reporting.

**Results:** A total of 194 Wisconsin ED workers responded; 70.6% reported experiencing bodily harm, threats, or both. The median number of bodily harm incidents was 2, and 51.4% did not report any to an employer or law enforcement. The median number of threats was 4, and 66.7% went unreported. Nurses experienced more threats than physicians. Overall, 40.2% of respondents were unaware of Act 209, and 82.1% did not feel safer following enactment. The most frequently cited reporting barrier was the belief that a patient's medical or psychiatric condition would complicate application of the law.

**Conclusions:** Despite legislative intent, Act 209 has not significantly changed the experience of workplace violence for Wisconsin ED workers. Violence remained prevalent and underreported, and most workers saw no improvement in their safety. Effective implementation requires broader awareness campaigns, institutional reporting infrastructure, and improved collaboration with law enforcement. Ensuring the safety of health care workers is essential to sustaining a critically needed workforce.

## Adam Homedi

### *The Effect of Thrombin on Plasma Lipid Levels in Mutant Mice*

**Authors:** Homedi, A, Zheng, Z, Zhang, Z, Ragan, D

**Project Mentor:** Dustin Ragan, PhD; Biochemistry

Dyslipidemia is a known risk factor for the development of atherosclerosis. Atherosclerosis leads to deleterious health outcomes such as heart attack and stroke. Dyslipidemia is associated with increased platelet count, activation, and aggregation. Oxidized LDL induces platelet aggregation through interaction with CD3. This results in increased expression of GPIIb/IIIa and P-selectin on platelets [4]. Dyslipidemia is associated with elevated levels of prothrombotic molecules such as VWF, FVII, thrombin. Thrombin influences lipoproteins and lipid metabolism. Hypercholesterolemia can modulate thrombin's activity and alter endothelial cells, thereby influencing thrombin's activity. This bidirectional relationship is crucial for understanding cardiovascular health.

Thrombin acts on platelets through PAR-1. PAR-1's role in the coagulation cascade is known, but Thrombin's effect on cholesterol levels through PAR-1 activation warrants investigation. With thrombotic disease being the primary cause of death worldwide, novel techniques for lowering cholesterol could change the course of atherosclerosis treatment. We collected plasma from mutated mouse strains. In R41Q mutant mice, both Thrombin and Anticoagulant Protein C (APC), another activating protease of PAR-1, are unable to activate PAR-1. In R46Q mice, APC is unable to activate PAR-1, however Thrombin is still able to activate the receptor. Comparing cholesterol levels in R41Q and R46Q mice to their wild type littermate controls will reveal Thrombin's effect on plasma cholesterol levels. Lower cholesterol levels in R41Q mice would implicate Thrombin's role in raising cholesterol levels.

While no statistical significance was found, a larger sample size is needed to increase the power of the study.

## Mohamed Hommeida

### *Debilitating pulsatile tinnitus from sigmoid plate dehiscence and sigmoid sinus diverticulum*

**Authors:** Hommeida M, El-Meanawy A

**Project Mentor:** Ashraf El-Meanawy, MD, MS, PhD; Medicine

A 25-year-old woman presented with progressive, debilitating left-sided pulsatile tinnitus (PT), which ceased when pressing on her left neck. She also endorses spinning sensation while lying down. ENT testing, including audiology test were normal. A trial of meclizine did not improve symptoms. Upon further investigation, a computed tomography (CT) scan of the sigmoid bone revealed left sigmoid plate dehiscence with sigmoid sinus diverticulum (SSD). Left carotid venous phase angiography confirmed bilateral transverse / sigmoid sinus stenosis and SSD measuring approximately 8 mmHg. Venous manometry using a 5Fr catheter revealed a 7-mmHg gradient across the stenosis. A 0.014" Instantaneous wave-free ratio (iFR) wire was also used, as a comparison to the 5Fr catheter, to measure pressure gradient and showed a 6-mmHg gradient across the stenosis. Treatment with stenting and coil embolization to improve the hemodynamically significant stenosis and occlusion of the diverticulum resolved her tinnitus immediately. This case presents a combination of etiologies (Sigmoid sinus diverticulum and stenosis) that can each independently cause PT and highlights the utilization of a relatively new modality to measure pressure gradient in cerebral venous intervention. Endovascular treatment appears safe and effective for patients with debilitating PT from SSD and venous sinus stenosis. In addition, the use of iFR wire which is used in interventional cardiology to measure the hemodynamic significance of coronary artery lesions, can be adapted by neurointerventionists to measure pressure gradient across venous stenosis and determine the hemodynamic significance in venous sinus stenosis. The use of iFR wire seems safe and reliable.

## **Marvin Hsieh**

### ***High TLR3 transcript levels correlate with high TIM3 and VISTA checkpoints, but not with outcome after immune checkpoint blockade***

**Authors:** Hsieh M, Nishizaki D, Jensen TJ, Pabla S, Conroy JM, DePietro P, Kato S, Kurzrock R

**Project Mentor:** Razelle Kurzrock, MD; Medicine

#### **Introduction:**

The discovery of Toll-like receptors (TLRs) has prompted interest in Toll-like receptor 3 as a mediator of inflammation and cell death in cancer. Its role in clinical outcomes and interaction with immune checkpoints remains unclear. We evaluated the association between TLR3 RNA expression, clinical outcomes, and immune checkpoint markers.

#### **Methods:**

TLR3 and immune checkpoint RNA expression were analyzed in 514 tumors (489 with complete clinical data). Expression was categorized as high ( $\geq 75$ th percentile) or not-high ( $< 75$ th percentile). Associations were assessed using univariate and multivariable logistic regression. Kaplan-Meier analysis compared overall survival (OS) and progression-free survival (PFS), with log-rank testing.

#### **Results:**

High TLR3 expression occurred in 17% (90/514) overall and 8% (11/140) of colorectal cancer (CRC) cases. It was most frequent in liver/bile duct (36.8%), pancreatic (29.1%), and ovarian cancers (27.9%). High TLR3 expression correlated with elevated VISTA (OR 2.12,  $p=0.004$ ) and TIM3 (OR 2.10,  $p=0.026$ ), and was less common in CRC (OR 0.39,  $p=0.008$ ). CRC was the only subtype significantly associated with TLR3 expression in regression analyses. TLR3 expression was not associated with OS or PFS in all cancers or CRC, regardless of immune checkpoint inhibitor treatment.

#### **Conclusion:**

High TLR3 expression correlates with increased VISTA and TIM3 expression but does not predict survival outcomes. CRC demonstrates lower TLR3 expression compared to other malignancies.

## **Akpevweoghene Ikoba, MS**

### ***Evaluation of Body Composition Changes and Associations to Biomarkers in a Weight Loss Intervention for African American Breast Cancer Survivors***

**Authors:** Ikoba AP, Awoyinka I, Stolley M.

**Project Mentor:** Melinda Stolley, PhD; Medicine

**Background:** African American breast cancer survivors (AABCs) face a disproportionate burden of obesity and metabolic comorbidities, contributing to poorer breast cancer outcomes. Although lifestyle interventions improve weight, data on body composition, regional adiposity, and its relationship to changes in metabolic or inflammatory biomarkers remain limited in AABCs. **Methods:** AABCs were randomly assigned to a 6-month structured lifestyle intervention or self-guided control group. Body composition measures including, percent body fat (%BF) and trunk fat mass, were assessed at baseline, 6 months, and 12 months. Mixed-effects regression models estimated changes over time and between groups. Exploratory baseline associations between body composition and metabolic and inflammatory biomarkers were also assessed to inform future analyses of body composition changes over time and their association with biomarkers.

**Results:** At 6 months, the intervention group showed greater reductions in %BF ( $\beta = -1.43$  vs  $-0.59$ ; difference  $\beta = -0.86$ ,  $p < 0.001$ ) and trunk fat mass ( $\beta = -1735$  g vs  $-692$  g; difference  $\beta = -1079$  g,  $p = 0.001$ ) compared to controls. At 12 months, reductions remained greater in the intervention group for %BF ( $\beta = -0.62$ ,  $p = 0.020$ ) and trunk fat mass ( $\beta = -891$  g,  $p = 0.006$ ), indicating sustained effects. At baseline, %BF and trunk fat were significantly associated with metabolic and inflammatory dysfunction, including C-reactive protein, C-peptide, leptin, and inversely with adiponectin. Future analysis will assess associations between longitudinal body composition changes and biomarkers.

**Conclusions:** The intervention produced significant reductions in total and central adiposity among AABCs. Durable improvements in trunk fat highlight the importance of targeting central adiposity in culturally tailored survivorship interventions to improve long-term outcomes.

## **Chidinma Ikonte, BS**

### ***Surgical Access in Ethiopia: A Geospatial Modeling Study***

**Authors:** Ikonte C, Iverson K, Zhou Y, Touray C, Keener K, Kifle F, Beyene A, Atkilt M, Belay E, Dodgion C, Xu W

**Project Mentor:** Katie Iverson, MD; Surgery

Access to essential surgical care varies significantly worldwide, particularly in low- and middle-income countries (LMICs). Prior studies estimate that patients in Ethiopia travel between 5 and 28.4 hours to reach surgical services. Our study determined the geographic accessibility of surgical facilities in Ethiopia using nationally available data to determine the proportion of the population within a two-hour travel time.

The coordinates of 839 hospitals reporting surgical volumes from the Ethiopian Federal Ministry of Health (FMOH) were geocoded and combined with geospatial data on road networks, elevation, land cover, population density, and travel barriers. Three travel scenarios were modeled: (1) driving+walking, (2) bicycling/horse + walking, and (3) walking only. Population coverage was analyzed at 30-minute, 1-hour, and 2-hour travel time thresholds.

Nationwide, 70.9% of Ethiopia's population had access to a surgical facility within 2 h under Scenario 1, compared to 55.4% and 25.1% for Scenarios 2 and 3, respectively. Regional disparities were significant: under Scenario 1, 99.6% of Harari's population had access within 2 h, while only 25.9% did in Somali. For walking only (Scenario 3), access ranged from 10.0% in Somali to 95.2% in Addis Ababa.

Following the launch of Ethiopia's Saving Lives through the Safe Surgery (SaLTS) initiative in 2015, access to surgical care improved from (39.6%) to (70.9%), by 2025. However, rural access to surgery remains a challenge, necessitating targeted interventions and regional implementation strategies to enhance surgical accessibility across sub-Saharan African countries.

## **Emily Imm**

### ***Recognizing Hazing-Related Trauma in the Emergency Department***

**Authors:** Hayes AK, Imm ER

**Project Mentor:** Alisa Hayes, MD; Emergency Medicine

**Purpose of Review:** This review summarizes traumatic injuries associated with hazing. Recognizing these injuries in hazing victims presenting to Emergency Departments (EDs) is challenging. Recognizing the injury patterns will aid in identifying, reporting and treating these patients more effectively.

**Recent findings:** There remains a dearth of literature on this topic within the last 5 years and beyond. This review utilizes older reviews and the author's own personal observations, approaches, and views as a practicing emergency medicine physician. Recent laws mandating reporting of hazing incidents on college campuses and media coverage raise awareness of this serious problem.

**Summary:** Hazing results in numerous and varied injuries to victims. These victims are seen in emergency departments for treatment of a wide range of presenting problems and diagnoses. This review categorized hazing trauma into physical, psychological, deprivation, and intoxication injuries. The interplay between injury types is important to recognize.

## **Jesse Isaacson**

### ***Effectiveness of low load resistance training with blood flow restriction in individuals with disabilities***

**Authors:** Isaacson J, Kull N, Billena R, Lee K, Weinman B

**Project Mentor:** Kenneth Lee, MD; Physical Medicine & Rehabilitation

**Community Partner:** Ryzing Fitness

**Background:** Blood flow restriction (BFR) training may allow low-load exercise to produce hypertrophy and strength gains comparable to higher-load resistance training, making it potentially useful for individuals with disabilities.

**Objectives:** To compare low-load blood flow restriction training (LLBFR) with low-load resistance training (LLRT) for changes in arm circumference, triceps brachii thickness, and 1-repetition maximum (1RM), and to assess tolerability of LLBFR.

**Methods:** Twelve adults were recruited in the Milwaukee area; 0 with qualifying disabilities and 12 without. Participants were randomized to LLRT or LLBFR and completed single-arm triceps cable extensions twice weekly for 6 weeks at 30% of estimated 1RM. In the LLBFR group, cuffs were inflated to 80% of arterial occlusion pressure. Arm circumference, ultrasound-measured triceps thickness, and 1RM were assessed at baseline and post-intervention. Percent change was compared using unpaired t-tests.

**Results:** Of 14 participants without disabilities enrolled, 12 completed the study (6 per group; adherence >91%). LLRT produced greater mean changes than LLBFR in arm circumference (+1.24% vs -0.89%;  $P=.39$ ), triceps thickness (+6.79% vs -1.64%;  $P=.20$ ), and 1RM (+29.52% vs +3.42%;  $P=.10$ ), but none were statistically significant. Seven adverse events occurred in 2 participants, including transient petechial rash and 1 episode of lightheadedness.

**Conclusions:** In this interim analysis, LLRT was not inferior to LLBFR for short-term changes in arm size or strength, and LLBFR was generally well tolerated. Completion of the disability cohort and larger, longer studies are needed to determine comparative efficacy and safety in higher-risk populations.

## **Takahiro Ishikuri, BS**

### ***Increasing pre-alert utilization for strokes in an urban private ambulance company***

**Authors:** Ishikuri T, Grawey T

**Project Mentor:** Tom Grawey, DO, FAEMS; Emergency Medicine

**Community Partner:** Bell Ambulance, Inc

**Background:** Early treatment of acute stroke is highly time-dependent, and prehospital notification, or pre-alert, by emergency medical services (EMS) is associated with improved in-hospital treatment outcomes. Despite guideline recommendations, pre-alert utilization remains suboptimal. This quality improvement project aimed to increase pre-alert use for suspected stroke patients in a large urban private ambulance service.

**Methods:** Using the Institute for Healthcare Improvement Model for Improvement, multiple Plan-Do-Study-Act (PDSA) cycles were implemented between May 2024 and March 2026. Interventions included adding a dedicated pre-alert documentation field in the electronic patient care report (ePCR), educational emails and videos, transition to a more user-friendly ePCR platform, informal crew surveys to identify knowledge gaps, and updated protocol guidance. Pre-alert utilization was measured as the percentage of stroke-positive calls with documented pre-alerts, analyzed through run charts in two-week intervals. On-scene time served as a balancing measure.

**Results:** From September 7, 2025 to April 18, 2026, 347 stroke-positive cases were identified. Median pre-alert utilization increased from 0% at baseline to 38.9% (range 0%–56.5%). The most notable improvement occurred immediately after implementation of the ePCR documentation field, with utilization rising to 48.4%. Subsequent interventions yielded variable and unsustainable gains. Average on-scene time remained stable (mean 15.4 minutes), with no evidence of delayed patient care.

**Conclusion:** System-level changes, particularly structured documentation, improved pre-alert utilization, whereas educational interventions alone had limited sustained impact. Future efforts should target workflow integration and behavioral reinforcement, including potential real-time prompts within ePCR systems.

## **Caidon Iwuagwu**

### ***Endometriosis Knowledge Among Emergency Medicine Physicians and Advanced Practice Providers: Diagnostic Skills and Symptom Recognition***

**Authors:** Iwuagwu C, Chen L, Slattery E, Srivastava P, Karra H, Tung S, Burton A, Bomtempo C, Aranda J

**Project Mentor:** Jamie Aranda, MD; Emergency Medicine

#### Introduction

Endometriosis is often associated with significant diagnostic delays, averaging 6.7 years, largely due to non-specific symptoms and inadequate diagnostic approaches. Emergency department (ED) visits by endometriosis patients exceed 15,000 annually, highlighting the need for adequate knowledge on endometriosis and how to correctly diagnose it. This study surveys emergency medicine (EM) attendings, residents, and advanced practice providers (APPs) at an academic ED and six community EDs to assess their knowledge and clinical practice in managing endometriosis-related ED complaints.

#### Methods

A questionnaire adapted from a prior study on endometriosis knowledge was modified for EM providers. It was administered by an anonymous survey (Qualtrics, Provo, UT) via email and monthly EM newsletters to physicians, residents, nurse practitioners, physician assistants, and fellows practicing at an academic ED and six community EDs. Descriptive statistics were applied to analyze responses.

#### Results

Of the 43 respondents, 65.1% were female, 32.6% male, and 2.3% non-binary. Most were physicians (55.8%), followed by residents (25.6%). 31.7% felt they lacked adequate knowledge about managing endometriosis in the ED while 14.6% did not consider endometriosis in their differential diagnoses despite 86% seeing patients with gynecological complaints several times per month. 61.0% recommended or offered a pelvic exam "most of the time" for these complaints though only 39.0% felt "moderately knowledgeable" on endometriosis. 75.6% expressed a desire for more education on the topic.

#### Conclusions

There may be a gap in endometriosis knowledge among EM providers, with many interested in further education. Addressing this gap through training may improve diagnostic accuracy, reducing delays.

## **Amanda Jentsch, BA**

### ***Enhancing the research experience of general surgery residents through a research-year writing intervention***

**Authors:** Jentsch AM, Istl AC, Kindel TL, Bouza EA, Peschman JR

**Project Mentor:** Jacob R Peschman, MD, MSPE; Surgery

**Background:** Research experience in residency forms the foundation for academic productivity as a faculty member and familiarity with navigating medical literature that guides excellent patient care. Scientific writing is a necessary skill that enables these endeavors. However, few formal writing interventions have been documented, particularly for surgical trainees.

**Intervention:** A scientific writing curriculum was created and piloted to hone the quality and clarity of resident physicians' scientific manuscripts.

**Methods:** Four sessions were conducted across four months, combining didactic instruction and facilitated workshops. All general surgery residents in dedicated research time were invited to participate. Sessions were designed in-house and yielded a tangible tool or manuscript deliverable. Pre- and post-curriculum surveys and individual session evaluations were administered via Qualtrics software.

**Results:** Seven of twelve invited residents attended at least one session, with attendance at individual sessions varying between three and five residents. Participants viewed all four sessions to be useful to their careers after residency and cited the live feedback aspect of workshops as a strength of the curriculum. Ten manuscript sections were reviewed during the workshop sessions, representing eight individual manuscripts-in-progress. Pre- and post-curriculum assessment revealed an improvement in median self-confidence scores in writing an abstract, results section, and discussion section, but assessment of significance was limited by the low n.

**Conclusion:** An edited version of this curriculum is currently underway for the 25-26 academic year. Future directions include sustainability measures to ensure curriculum continuity and creation of a distributable curriculum kit.

## Rachel Jones, BS

### *Estrogen receptor contribution to anti-inflammatory signaling in pediatric otitis media*

**Authors:** Jones RM, Khampang P, Samuels TL, Johnston N, Kerschner J

**Project Mentor:** Nikki Johnston, PhD; Otolaryngology

**Objectives:** Otitis media (OM) is a common infection in young children, particularly in males.  $17\beta$ -estradiol (E2) is suspected to play a major role in protection against middle ear (ME) pathogens due to its established role in immunity and recent identification as the leading upstream regulator of differentially expressed genes in pediatric patients with OM. Our prior work showed that E2 reduced inflammatory cytokine production in ME cells exposed to nontypeable *Haemophilus influenzae* (NTHi), however the estrogen receptor (ER) involved was unknown. This study examined the roles of ERs (ER $\alpha$ , ER $\beta$  and GPER1) in mediating cytokine suppression by E2 in in vitro pediatric OM models.

**Methods:** Immortalized middle ear (ME) epithelial cell lines from a pediatric patient with ROM (ROM tsSV40, ROM SV40) were exposed to ER agonists (PPT, DPN, G1), ER antagonists (Fulvestrant, PHTPP, G-15), E2, and/or bacterial components: lipopolysaccharide (LPS) or NTHi lysate. IL1 $\beta$ , IL6, IL8, RELA, NFkB1 and ESR1 variants were assayed by qPCR.

**Results:** Pretreatment with ER $\alpha$ /GPER1 agonist non-significantly attenuated LPS-induced IL1B, IL6, and IL8. Agonists targeting ER $\beta$  and GPER1 did not. Antagonist studies were inconclusive. ER $\alpha$ 36, a variant which suppresses inflammation in other systems, was expressed by the pediatric ME cells.

**Conclusion:** This study corroborates the anti-inflammatory effect of E2 in the ME and tentatively supports a role for ER $\alpha$ . Further investigation of the therapeutic potential of estrogen signaling in the ME during OM and receptor-specific mechanisms are warranted.

## Forrest Joyal

### *Examination of variability in predicted outcomes of epilepsy surgery in multi-disciplinary consensus conference*

**Authors:** Koop JI, Farias-Moeller R, Joyal F, Nader A, Kim I, Lew S

**Project Mentor:** Sean Lew, MD; Neurosurgery

#### RATIONALE

A standard part of the pre-surgical work up of intractable epilepsy patients is review and discussion of clinical variables in a multi-disciplinary clinical conference to identify the surgical intervention that will optimize clinical outcomes for each patient. Conferences involve achieving consensus neurologists, neurosurgeons, radiologists and neuropsychologists. This project aimed to understand how divergent perspectives may impact prediction of outcomes.

#### METHODS

A Qualtrics survey was distributed to every participant in weekly multi-disciplinary epilepsy surgery conferences after each patient presentation. The aim of the survey was to gauge each respondent's impression of the proposed intervention plan.

#### RESULTS

A total of 1467 surveys were completed on 161 patients. Patients were 58% pediatric and 42% adult. Rates of Engel outcome predictions varied on the basis of respondent specialty,  $\chi^2(8, 914)=30.13, p<.001$ , primary patient population  $\chi^2(4, 914)=67.56, p<.001$ , and years of practice,  $\chi^2(8, 14)=24.27, p=.002$ , but not on prior clinical relationship with patient,  $\chi^2(2, 914)=1.42, p=0.49$ . These differences were driven by differences in rates of Engle IV outcome predictions. Respondents most often predicting Engel IV outcomes included: Neurologists and Neurosurgeons; pediatric and lifespan providers; and those practicing 0-5 or 16-20 years. When predicted outcomes were limited to Engel I-II or Engel III-IV, predicted outcome rates only varied by respondent specialty,  $\chi^2(4, 914)=10.92, p=0.03$ .

#### CONCLUSION

Predicted Engel outcome scores from surgical options discussed in conference varied significantly by respondent specialty, years of practice and primary patient population. Most notably, Neurologists and Neurosurgeons, providers in practice 0-5 and 16-20 years, and pediatric or lifespan providers predicted Engel IV outcomes more than other respondents.

## Alexa Kambol

### *Early medical school readiness: an accelerated three-day pre-matriculation course to support incoming learners*

**Authors:** Kambol A, Falk-Steinmetz M, Patitucci T, Weaver C, Cook-Snyder D

**Project Mentor:** Denise Cook-Snyder, PhD; Physiology

#### PURPOSE

Over 30 U.S. medical schools report utilizing a pre-matriculation course (PMC) to prepare incoming students for success in medical school. While PMCs are particularly effective for academically disadvantaged students, many PMCs last several weeks and require significant institutional resources. Here, we determine the efficacy of an accelerated, three-day PMC in the Master's in Medical Physiology (MMP) program at the Medical College of Wisconsin. The MMP program is a one-year special master's program in which academically disadvantaged students are enrolled in first-year medical school courses alongside medical student peers.

#### METHODS

The PMC consisted of daily skills sessions and peer mentoring on time management, study habits, and test-taking. To actively apply these academic skills, students engaged with four hours of medical school lectures and completed a formative quiz on the last day of the course. Pre- and post-course surveys were used to evaluate self-reported readiness for medical school courses, and subsequent student performance in medical school courses was assessed compared to peers and previous cohorts.

#### RESULTS

On average, MMP students' confidence in time management, study habits, and test-taking skills increased during the PMC. Moreover, early data suggests the MMP students who completed the PMC outperformed previous MMP students and performed at the same level as their current medical student peers despite MMP students averaging lower undergraduate GPAs and MCAT scores than their medical student counterparts.

#### CONCLUSION

Our results are consistent with previous literature suggesting a PMC is an efficacious intervention for increasing student confidence and performance in academic skills before matriculating into medical school courses, regardless of the accelerated three-day time course and even with academically disadvantaged students.

## Jeanna Kedrowski

### *Food Demonstration in a Community Food Center to Promote Nutritional Choices*

**Authors:** Kedrowski J, Nelson D, MacMillan V

**Project Mentor:** David Nelson PhD, MS; Family & Community Medicine

**Community Partner:** NourishMKE

Food insecurity is a major problem in the United States which creates health disparities for those affected including increased risk of obesity, diabetes, and cardiovascular disease. This project is based on a partnership between NourishMKE, a collection of food centers in Milwaukee, and Medical College of Wisconsin (MCW) to determine how nutritional knowledge to combat health disparities can be shared with community members at the food pantry through food demonstration at NourishMKE's largest food pantry location. Additionally, implementation of a handbook for running the food demonstration will standardize demonstrations and provide guidelines for continuity during staff turnover. First, the current perception of the demonstration table was assessed via pre-survey to community members. Then, the implementation of recipes at the food demonstration table was standardized through the creation of a handbook with guidelines for food demonstration. This handbook includes parameters for nutritional standards in recipes for the food demonstration. After implementation, a post-survey was given to community members to assess for changes in perception related to the food demonstration table. The results indicate that changes to the demonstration table have taught community members about nutrition and improved the nutrition of the food they cook for their family. This project is part of ongoing improvements to the food demonstration and the data collected via surveys will continue to inform pantry services moving forward.

## **Kaleb Keener, BS**

### ***Neighborhood Disadvantage and Same-Day Surgical Cancellation in Children: A Multispecialty Cohort Study***

**Authors:** Keener K, Conway B, Feltracco H, Bergner C, Bantchev M, O'Connell M, Abebrese E, Klement K, Gourlay D.

**Project Mentor:** David Gourlay, MD; Surgery

**BACKGROUND:** Day-of-surgery cancellations (DoSC) represent a significant source of disruption in pediatric surgical care. The impact of neighborhood-level social vulnerability, measured by the CDC Social Vulnerability Index (SVI), in cancellation of pediatric surgical populations remains poorly understood.

**METHODS:** A retrospective cohort study of elective pediatric surgical encounters at Children's Wisconsin (2020–2025) was conducted. Patient residential addresses were geocoded and linked to 2020 CDC SVI data. Encounters were classified as completed, non-same-day cancellation, or same-day cancellation. Multivariable logistic regression models identified independent predictors of DoSC and any cancellation, adjusting for race, overall SVI ranking, season, and encounter year.

**RESULTS:** Among 72,489 elective encounters, 4,066 (5.6%) were canceled on the day of surgery and 8,187 (11%) were canceled before the day of surgery. Same-day cancellation rates increased across SVI terciles, from 4.0% in the lowest to 9.2% in the highest vulnerability tercile ( $p < 0.001$ ). In adjusted models, higher SVI ranking was independently associated with increased odds of both same-day cancellation (OR 1.84, 95% CI 1.59–2.12) and any cancellation (OR 2.20, 95% CI 1.95–2.48). Black or African American race was independently associated with higher odds of same-day cancellation (OR 1.74, 95% CI 1.57–1.93) after adjustment for neighborhood SVI.

**CONCLUSIONS:** Neighborhood social vulnerability and Black race are independent predictors of pediatric surgical cancellation. This occurred broadly across all surgical specialties supporting a system-level rather than specialty-specific interpretation of cancellation risk. The SVI offers a scalable mechanism to identify at-risk families at the point of scheduling and direct targeted preoperative support prospectively.

## **Jessica Kent**

### ***Comprehensive three-year pediatric resident mock code simulation curriculum on the care of the severely ill patient***

**Authors:** Kent JM, Rogers AJ.

**Project Mentor:** Amanda Rogers, MD; Pediatrics

**Intro:** Accreditation Council for Graduate Medical Education requires pediatric residents be able to provide initial management of severely ill patients by the end of training. Simulation provides exposure to low-frequency, high-risk clinical situations.

**Methods:** We utilized Kern's 6-steps of curriculum development. A needs assessment identified baseline content gaps to address. We implemented a 3 year, 9 case mock code simulation curriculum for pediatric residents targeting identified content with a focus on shock (septic, hypovolemic, obstructive), arrhythmias (supraventricular tachycardia, ventricular fibrillation, asystole), and respiratory failure (bradycardia, seizures, hypoventilation). Each year involved 3 cases over 3 hours and utilizes high-technology manikins and procedural trainers. Patients ranged from 10 days to 10 years. We assessed the curriculum using Kirkpatrick's Model, including reaction data assessing for change in self-reported confidence recognizing and managing targeted clinical events, free-text responses noting areas of improved knowledge, and behavior change assessing if residents led actual code events.

**Results:** 92 pediatric residents completed the curriculum. Reaction: Participation was associated with improved confidence recognizing and managing targeted clinical events (pre median 3-4, IQR 3-5; post 4-5, IQR 4-5,  $p < 0.05$ )

**Knowledge:** Themes of lessons learned included increased knowledge in clinical management, crisis resource management skills, and local resources. **Behavior change:** Residents were more likely to assume the code leader role in actual codes post curriculum (10% pre vs 40% post).

**Discussion:** Participation in the curriculum was associated with increased resident confidence in recognizing and managing targeted clinical content, improved knowledge, and greater resident participation as code leaders in actual code events.

## **Song Kim, BS**

### ***Gender-Associated Differences in Entrustability and Feedback in General Surgery Residency***

**Authors:** Kim S, Higgins RM, Tan WH

**Project Mentor:** Wen Hui Tan, MD; Surgery

**Introduction:** Entrustable professional activities (EPA) were developed to enhance competency-based performance assessments for general surgery trainees.

**Objectives:** We examined the impact of gender on EPA evaluations, focusing on entrustability and narrative feedback quality.

**Methods:** General surgery EPAs collected from July 2023 to November 2025 were retrospectively evaluated at a single institution. Ordinal logistic regression mixed-effects models were employed as appropriate. Written feedback quality was evaluated using the Quality of Assessment for Learning (QuAL) tool and grouped using directed content analysis.

**Results:**

3,077 EPA evaluations were collected from 94 faculty (40% female) evaluating 55 residents (72% female). Increasing resident post-graduate year (PGY) level and decreasing case complexity were significantly associated with higher faculty-assigned entrustability scores ( $p < 0.001$ ,  $p < 0.01$ ). Neither resident nor faculty gender were significantly associated with faculty-assigned entrustability ratings ( $p = 0.85$ ,  $p = 0.08$ ). However, female residents reported lower self-ratings of entrustability ( $p < 0.001$ ) compared to male peers. Patient care was the most frequently addressed competency. The overall mean QuAL score was 2.76 out of 5. Female attendings provided feedback more often, and wrote significantly longer and higher quality narrative comments (mean QuAL score of 3.24 versus 2.34 for their male counterparts,  $p = 0.001$ ;  $p < 0.01$ ).

**Conclusions:**

Resident nor faculty gender was an independent predictor of faculty-rated entrustability. Female residents reported lower self-rated entrustability, and female faculty consistently provided higher quality feedback. These findings underscore the importance of identifying specific metrics which inform resident entrustability and the need for continuous improvement in faculty feedback.

## **Gabriel King**

### ***Comparison of physical restraint use at a major academic medical center to national practice***

**Authors:** King GR, India L.

**Project Mentor:** Lara India, MD, FASA, DFPM; Anesthesiology

Physical restraints are commonly used throughout the United States for inpatient hospitalizations even though there are concerns regarding safety for staff and patients. National estimates can be obtained from datasets with ICD-10CM code Z78.1. This study evaluated coded physical restraint use at Froedtert Hospital and the Medical College of Wisconsin's academic medical center (F&MCW AMC) and compared institutional rates with national estimates from the National Inpatient Sample for the year 2023. The National Inpatient Sample is the largest all-payer inpatient database in the United States. It contains data from 97% of all discharges in the US, but excludes rehabilitation, long-term acute care, and psychiatric hospitals. Patient characteristics including age, sex, and ICU exposure were also compared.

Among 33,757 inpatient encounters at F&MCW AMC, 1,621 (4.8%) had physical restraint coding. In national data, the restraints were documented in 0.89% of hospitalizations. ICU exposure was more common in restrained patients than non-restrained patients (49.3% vs 10.2%) and 19.6% of ICU encounters had restraints while only 2.8% of non-ICU encounters had restraints. While the NIS does not track ICU exposure, delirium (OR 5.81), dementia (OR 3.24), and psychiatric disorders (OR 2.29) were strongly associated with restraint use for patients within that database.

While F&MCW AMC had higher rates of restraint than the national average, this difference likely reflects our hospital's higher-acuity patient population. Further research is indicated to evaluate institutional practices in restraint utilization and interventions to limit restraint use.

## Aaron Kleinertz

### ***Machine-perfused donation after circulatory death grafts improve access to liver transplant for primary biliary cholangitis patients***

**Authors:** Kleinertz A, Asassfeh A, Rawashdeh B, Harris M, Battula N, Prasad K, Raigani S

**Project Mentor:** Siavash Raigani, MD; Surgery

**Background:** Primary biliary cholangitis (PBC) is a small-duct cholangiopathy that can lead to end-stage liver disease requiring liver transplant (LT). Use of donation after circulatory death (DCD) donors in this population has been limited by historic concerns of biliary complications and inferior graft outcomes. Recent regulatory approval of normothermic machine perfusion (MP) technology has dramatically improved DCD utilization. However, outcomes of DCD-MP grafts in PBC recipients is poorly defined.

**Methods:** We performed a retrospective analysis of adult, first-time, deceased-donor LT recipients with PBC using the Organ Procurement and Transplantation Network registry (2015–2025). Recipients were stratified by donation after brain death with cold storage (DBD-CS), DCD-CS, and DCD-MP. Kaplan–Meier and multivariable Cox regression were used to estimate 1-year graft survival and adjusted hazard ratios. Temporal trends were assessed with Poisson regression.

**Results:** Among 1,604 recipients, 1,311 (82%) received DBD-CS, 141 (9%) DCD-CS, and 152 (9%) DCD-MP. One-year graft survival was similar across groups (DBD-CS 93.0%, DCD-CS 91.0%, DCD-MP 93.3%; log-rank  $p=0.76$ ). Adjusted analysis showed no association between donor type and 1-year graft failure (DCD-CS vs DBD-CS aHR 1.51, 95% CI 0.80–2.82,  $p=0.2$ ; DCD-MP vs DBD-CS aHR 1.03, 95% CI 0.49–2.16,  $p=0.94$ ). DCD-MP utilization increased 108.9% annually 2022–2025 ( $p<0.001$ ).

**Conclusion:** DCD-MP achieved 1-year graft survival comparable to DBD-CS in PBC LT recipients, supporting broader consideration of this strategy. Rapid growth in DCD-MP utilization reflects increasing programmatic confidence in contemporary preservation practices for PBC patients.

## Jacob Kodra

### ***Revision and complication rates after total joint arthroplasty in patients with monoclonal gammopathy of undetermined significance and multiple myeloma***

**Authors:** Kodra JD, Schweinert A, Memon AA, Andryk LM, Decker MM, King DM

**Project Mentor:** David M King, MD; Orthopaedic Surgery

**Background:** Multiple myeloma (MM) and monoclonal gammopathy of undetermined significance (MGUS) are plasma cell disorders with limited arthroplasty outcome data. This study aimed to evaluate outcomes of MM and MGUS patients undergoing hip and knee total joint arthroplasty (TJA), with a focus on postoperative complications and revision surgery.

**Methods:** A retrospective analysis was conducted of MM and MGUS patients who underwent TJA at our tertiary academic center from 2005–2023. Included patients had a history of MM or MGUS prior to undergoing primary TJA, with a minimum of 1-year postoperative follow-up. Univariate and multivariate logistic regression assessed postoperative complications and revision rates. Competing-risk models evaluated revision and secondary procedures with death as a competing event.

**Results:** A total of 68 patients (MM:  $n=43$ ; MGUS:  $n=25$ ) were analyzed with a mean follow-up of 5.16 and 5.35 years, respectively. Overall, 27.9% of patients experienced at least one postoperative complication and 25.4% required revision surgery. Revision risk did not differ significantly between MM and MGUS patients on competing-risk analysis (sHR 1.49, 95% CI 0.57–3.90,  $P=0.42$ ). On univariate analysis, avascular necrosis (OR 6.36,  $P=0.033$ ) and higher body mass index (OR 1.11,  $P=0.049$ ) were associated with postoperative complications. After multivariate adjustment, a primary arthroplasty indication of osteoarthritis was independently associated with lower odds of complications (OR 0.06, 95% CI 0.01–0.63,  $P=0.019$ ).

**Conclusion:** MM and MGUS TJA patients experienced complication and revision rates exceeding those typically reported in standard arthroplasty populations. MGUS patients had comparable revisions rates to MM, underscoring the potential relevance of MGUS in arthroplasty.

## **Kennah Konrad**

### ***Implementation of a Clinical Decision Support Tool to Enhance Intestinal Parasite Test Utilization***

**Authors:** Konrad KE, Liesman R, Ledebor N, Kolinski J, Wood M

**Project Mentor:** Macy Wood, PhD; Pathology

Intestinal parasitic infections represent a global health burden, but the prevalence varies substantially worldwide. In the United States, *Cryptosporidium* and *Giardia* are the most common parasites causing diarrhea, which can be detected simultaneously via antigen assays as the preferred test. In contrast, the Ova and Parasite (O&P) test is optimal for patients with travel to areas with endemic parasites other than *Giardia*. Both epidemiologic evaluation and symptom duration are necessary for choosing an appropriate diagnostic test to optimize high value, evidence-based care. At our institution, retrospective review revealed the O&P exam was the most frequently ordered stool parasite test, and had a low overall positivity rate (i.e., 1.82%). This study highlights the design and implementation of an integrated clinical decision support (CDS) tool to facilitate appropriate intestinal parasite test utilization for three laboratory tests (i.e., *Cryptosporidium*/*Giardia* antigen, O&P exam, and/or *Cyclospora* exam). Implementation of CDS resulted in a 62% decrease in O&P orders, while the *Cryptosporidium*/*Giardia* antigen and the *Cyclospora* exam remained relatively stable. A sustained reduction in O&P orders was observed for 12 months post implementation. This CDS tool provided an opportunity to support high value, cost effective patient care based on individual patient risk factors and symptoms. This simultaneously reduces unnecessary cost to the patient, laboratory and hospital, and allows laboratory staff to be redeployed to other high impact testing.

## **Thomas Kosten**

### ***Integrating People Who Use Drugs in Community Harm Reduction Through Community Advisory Boards***

**Authors:** Kosten TR, Murphy K, Murray S, Aleman C, Aichele C, Salazar J, Bauer Maher L.

**Project Mentor:** L Bauer Maher, MD, MPH, MS; Family & Community Medicine

**Community Partner:** Sixteenth Street Community Health Centers

**Introduction:** The rising prevalence of fentanyl and synthetic substances has intensified overdose mortality and infectious disease risk nationwide. Harm reduction programs are a critical component of community-based public health. However, the perspective of people who use drugs (PWUD) is often not considered in the implementation of these programs. Meaningful engagement with PWUD improves program relevance, trust, and effectiveness.

**Objective:** To develop a Community Advisory Board (CAB) protocol focused on integrating lived experience into program evaluation and improvement at the Sixteenth Street Community Health Centers Prevention Center (SSCHCPC) in Milwaukee, Wisconsin.

**Methods:** CAB bylaws were developed through literature review, analysis of existing harm reduction CAB models, and consultation with PWUD through PULSE, a statewide advocacy organization. An organizational assessment evaluated site readiness. Bylaws were refined through iterative review with SSCHCPC leadership. A bilingual digital survey was developed and administered to assess community needs and support CAB recruitment.

**Results:** CAB protocols establish a governance framework prioritizing lived experience, shared leadership, and clear policies for participation, confidentiality, and compensation. A 10-member board with rotating terms promotes sustainability and ongoing community representation. Preliminary survey data collection identified 15 people interested in CAB membership.

**Conclusions:** The CAB protocol offers a testable approach to integrating the perspective of PWUD in the evaluation and delivery of services that impact their lives. Survey responses indicate that direct community recruitment is a viable strategy for CAB engagement. This framework may help community health centers strengthen trust, improve program responsiveness, and advance equitable public health decision-making.

## **Snigdha Kosuri, MPH**

### ***How Students Cope: A Mixed Methods Evaluation of Coping Strategies Among Students Participating in a Trauma-Informed, School-Based Intervention***

**Authors:** Kosuri S, Chelius TH, Stoltenburg A, McGuire M, Antognoli D, Lumelsky P, Currie B, Hallowell C, Gundacker C, Meurer JR.

**Project Mentor:** John R Meurer, MD, MBA; Pediatrics

**Community Partner:** STRYV365

**BACKGROUND** Adverse Childhood Experiences (ACEs) are traumatic events associated with long-term adverse health outcomes. STRYV365 is a community-based organization implementing trauma-informed, school-based programming to support emotional regulation and coping among youth through peak team, a relationship-centered intervention, and Brain Agents, an interactive game. This study examined coping behaviors among participating students and their experiences with coping strategies.

**METHODS** This mixed-methods evaluation examined coping outcomes among students in grades 6–10 across four schools. Students completed self-report surveys at multiple time points; analyses focused on within-student changes from Wave 1 (baseline) to Wave 6 (follow-up). Quantitative analyses assessed differences by grade, gender, and school. Focus groups conducted in Fall 2023 explored experiences with stress and coping using a hybrid inductive–deductive approach.

**RESULTS** Among students with complete data (N = 130), improvements were observed across multiple coping indicators. Statistically significant increases were identified in well-being satisfaction (p = 0.017) and neighborhood trust (p = 0.006), with consistent positive trends across remaining indicators. Changes did not differ by grade, gender, or school. Qualitative findings reinforced these patterns, with emotion regulation and self-calming strategies most frequently described. Older students demonstrated more reflective and goal-directed coping approaches.

**CONCLUSIONS** Students participating in STRYV365 programming demonstrated increased well-being and neighborhood trust alongside widespread use of adaptive coping strategies. Consistent improvements across indicators and aligned qualitative findings support the potential of trauma-informed, school-based programming to strengthen coping processes associated with resilience among youth.

## **Chen Yu Ku, BSA**

### ***TYRO3- and TYRO3/MERTK- specific small molecule inhibitors decrease platelet activation responses***

**Authors:** Ku C, Laus W, Lyu K, DeRyckere D, Graham DK, Wang X, Branchford B

**Project Mentor:** Brian Branchford, MD; Pediatrics

Platelet activation is a highly regulated process involving multiple receptor-mediated signaling pathways, including those governed by the TAM family receptor tyrosine kinases (TYRO3, AXL, and MERTK). In this study, we evaluated the effects of two novel small-molecule inhibitors, UNC9615 (dual TYRO3/MERTK inhibitor) and UNC9775 (TYRO3-selective inhibitor), on human platelet activation. The aim of our study was to investigate whether these inhibitors differentially attenuate human platelet activation responses. We hypothesized that dual TYRO3/MERTK inhibition would demonstrate greater impact on decreasing platelet activation than TYRO3-selective inhibition.

Standardized concentration of platelets and whole blood samples were incubated with the small-molecule inhibitors and assessed using light transmission aggregometry and flow cytometry following stimulation with adenosine diphosphate (ADP) or collagen-related peptide (CRP). Platelet activation was quantified by aggregation responses, P-selectin expression, and PAC-1 binding to activated  $\alpha\text{IIb}\beta\text{3}$  integrin.

UNC9775 produced modest but selective reductions in platelet activation. Analysis of flow cytometry data showed that UNC9775 significantly decreased PAC-1 binding after ADP stimulation, indicating that UNC9775 inhibited the activation of the  $\alpha\text{IIb}\beta\text{3}$  integrin. UNC9615 was associated with a selective reduction in CRP-induced P-selectin expression and did not consistently demonstrate greater inhibition compared to TYRO3-selective inhibition.

Overall, UNC9615 and UNC 9775 demonstrated modest reduction in platelet activation at relatively low concentrations. These results help to determine relative contributions of various platelet activating receptors activation and support continued evaluation of TAM-targeted compounds as potential antithrombotic agents with reduced bleeding liability.

## Margaret Kvale

### ***36-Week RSS, birth weight and NAVA are associated with worsening respiratory status post-tracheostomy in severe BPD***

**Authors:** Kvale MI, Berlin KE, Sprecher AJ, Steuart RL, Scott W, Lagatta JM

**Project Mentor:** Kathryn Berlin, DO; Pediatrics

**Background:** The incidence of tracheostomy is increasing over time as more infants with severe bronchopulmonary dysplasia (sBPD) survive. While tracheostomy is often a step towards discharge home, some infants temporarily worsen after tracheostomy placement. Understanding risk factors for postoperative decompensation is essential for preoperative risk stratification and postoperative counseling and surveillance.

**Objective:** To identify clinical risk factors associated with worsening respiratory status after tracheostomy in infants with sBPD.

**Methods:** Single-center retrospective cohort study of infants with severe BPD requiring tracheostomy from 2019 to 2024. Data included demographics, markers of underlying lung disease, and mode of respiratory support and respiratory severity scores (RSS) at 36- and 40-weeks PMA, the day before tracheostomy, and 14 days post-tracheostomy were collected. Change in respiratory status was defined by the change in RSS from the day before tracheostomy to two weeks after tracheostomy. Paired t-test was used for statistical analysis.

**Results:** In total, 42 infants with severe BPD requiring tracheostomy were identified. 43% of patients had higher RSS values 2 weeks after tracheostomy. Risk factors for higher post-tracheostomy RSS include higher pre-tracheostomy RSS at 36 weeks PMA, use of NAVA at 36 weeks PMA, later tracheostomy placement, and greater use of neuromuscular blockade (NMB) after 36 weeks PMA.

**Conclusion:** Nearly half of infants with BPD demonstrated a higher RSS two weeks after tracheostomy placement, and patients with earlier markers of respiratory instability were more likely to worsen after tracheostomy. These findings can inform preoperative counseling and risk stratification for tracheostomy placement in infants with BPD

## Taylor Lewis

### ***Risk of hypertensive disorders of pregnancy in nulliparas with treated versus untreated mood and anxiety disorders***

**Authors:** Lewis TM, Hernandez AM, Sunji N, Zhang L, Pan AY, Palatnik A

**Project Mentor:** Anna Palatnik, MD; Obstetrics & Gynecology

The impact of mood and anxiety disorders (MAD) on the risk of developing hypertensive disorders of pregnancy (HDP) remains unclear. This study aimed to explore risk of HDP in nulliparous patients with treated or untreated MAD. This was a secondary analysis of the prospective observational cohort study, Nulliparous Pregnancy Outcomes Study: Monitoring Mothers-to-Be (nuMoM2b). Nulliparas with singleton gestations  $\geq 20$  weeks without chronic hypertension were grouped as follows: no MAD, untreated MAD, treated MAD. Treatment was defined as use of psychotropic medication for psychiatric indication. HDP risk was compared between groups using univariate and multivariate analyses. Planned covariates included known HDP risk factors: race, BMI, diabetes. Of the 8,492 patients included in the analysis, 81.0% had no MAD diagnosis, 11.9% had untreated MAD, 7.1% had treated MAD. Patients with treated MAD were more likely to be older, white, non-Hispanic, college-educated, privately insured, have higher pre-pregnancy BMI, and score higher on the Edinburgh Postnatal Depression Scale (EPDS) in early pregnancy. Compared to patients with no MAD, risk of any HDP was similar across groups in unadjusted and adjusted models. Risk of preeclampsia alone was also not significantly different by MAD diagnosis or treatment exposure. To account for patients who may have undiagnosed or undertreated MAD, a multivariate model was created to examine the risk of any HDP or preeclampsia alone by EPDS score, which showed no significant difference in risk. This cohort analysis found no difference in the risk of HDP by MAD diagnosis, psychotropic treatment, or worst mood symptoms during pregnancy.

## Monica Lewis

### *Trends in the Perioperative Management of Pediatric Esophageal Button Battery Ingestions*

**Authors:** Lewis M, Adams J, Friedland DR, Shay SG

**Project Mentor:** Sophie Shay, MD; Otolaryngology

Background:

Pediatric esophageal button battery ingestions (BBI) have serious and potentially fatal sequelae. In 2018, the National Capital Poison Center (NCPC) recommended preoperative use of honey and sucralfate and intraoperative acetic acid to neutralize the erosive effects of BBI on esophageal mucosa.

Objectives:

This study examined perioperative management of BBI at a tertiary children's hospital and compliance with the 2018 NCPC recommendations.

Methods:

Retrospective chart review from January 1, 2015, to December 31, 2023. Demographic and clinical data were collected. Descriptive statistics and c2 analyses were used.

Results:

A total of 891 records of foreign body ingestion were reviewed with 28 BBI managed at our institution (57% male, median age =  $2.50 \pm 0.70$  years). Intensive care unit admission was required in 18% of patients, and median length of hospital stay was  $2.0 \pm 0.64$  days, with a 14% 30-day readmission rate. The leading injuries from BBI were mucosal injury (89%), esophageal strictures (32%), and esophageal leaks (21%). Regarding perioperative management, 7 patients (25%) were given honey preoperatively, 8 patients (29%) were given sucralfate preoperatively, and 12 patients (43%) were given acetic acid intraoperatively. There were no significant correlations between perioperative management and complications. Between 2019 and 2023, the proportion of cases following NCPC recommendations steadily increased, with an average annual rise of 8.25% for honey use and 20.75% for acetic acid.

Conclusion:

Our institution has experienced increased compliance with NCPC BBI recommendations. Further awareness of these guidelines among healthcare providers is essential in minimizing serious complications.

## Brian Li

### *Differences between enrolled and non-enrolled individuals recruited for the Men Moving Forward lifestyle intervention trial*

**Authors:** Li B, O'Connell K, Stolley MR

**Project Mentor:** Melinda Stolley, PhD; Medicine

Background: Black prostate cancer (PC) survivors remain underrepresented in lifestyle intervention research despite substantial survivorship challenges. The Men Moving Forward (MMF) randomized trial evaluates a community-based lifestyle intervention designed specifically for Black PC survivors. This study assessed differences between enrolled and non-enrolled individuals to evaluate potential selection bias.

Methods: Recruitment data from MMF were analyzed using REDCap records. Eligible participants were Black or African American men with non-metastatic PC. Variables compared between enrolled and non-enrolled individuals included age at first contact, time since diagnosis, number of recruitment phone calls, and Social Vulnerability Index (SVI). Two-sample t-tests were used for comparisons.

Results: Of 1,187 individuals contacted, 158 enrolled in MMF. Enrolled participants were younger than non-enrolled individuals (66.7 vs. 68.9 years,  $p = 0.003$ ) and had a shorter time since diagnosis (5.9 vs. 7.9 years,  $p < 0.001$ ). Enrolled participants also required fewer phone calls on average (3.65 vs. 4.95,  $p < 0.001$ ), suggesting greater responsiveness or fewer communication barriers. SVI did not differ significantly between groups (0.89 vs. 0.90,  $p = 0.54$ ).

Conclusions: Enrollment in MMF was associated with younger age, shorter survivorship duration, and fewer recruitment contacts, highlighting potential selection bias. These findings emphasize the importance of targeted recruitment strategies to improve inclusion of older and longer-term survivors in lifestyle intervention trials involving Black PC survivors.

## **Lauren Loftis, B.A.**

### ***Black transgender identity disclosure: the influence of family support***

**Authors:** Loftis LE, Pfister SL, Corroero AN

**Project Mentor:** Sandra Pfister, PhD; Pharmacology & Toxicology

Black transgender and gender-diverse individuals remain underrepresented in LGBT+ research despite growing self-identifying LGBT+ populations (Jones, 2025). Existing research suggests that family support, LGBT+ community connection, and identity salience influence identity disclosure among Black LGBT+ individuals (Pastrana, 2016), yet little research has focused specifically on Black transgender populations. This study examined how perceived family support influences the time between self-recognition and disclosure of transgender identity among Black transgender individuals.

Data were drawn from the TransPop Study (Meyer et al., 2016), a nationally representative survey of transgender and gender-diverse adults in the United States. Participants included Black or African American transgender and gender-nonbinary individuals who completed measures from the Gender Minority Stress and Resilience Scale (Testa et al., 2015) and the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). The study examined whether greater family support was associated with quicker disclosure of transgender identity.

Although findings were not statistically significant ( $p = .076$ ), results revealed an unexpected trend. Contrary to prior research and the original hypothesis, participants reporting lower levels of family support tended to disclose their identities sooner after self-recognition than those with higher levels of support. These findings suggest that Black transgender identity disclosure may be shaped by unique intersectional and familial dynamics not fully reflected in broader Black LGBT+ research (Dennis, 2025; Miller, 2011). Continued research focused specifically on Black transgender experiences is needed.

## **Katherine Loper**

### ***An analysis of a high-frequency ventilator alarm using a SEIPS PETT scan***

**Authors:** Loper KE, Scanlon MC

**Project Mentor:** Matt Scanlon, MD, MS; Pediatrics

**Background:** Alarm fatigue from non-actionable device alarms threatens patient safety in critical care. Using the Systems Engineering Initiative for Patient Safety (SEIPS) PETT scan for analysis, we deconstructed a high-frequency ventilator alarm event in a pediatric ICU patient to map and categorize the work system of people, environment, tools/technology and tasks to identify improvement opportunities by locus of control.

**Methods:** An expert panel consisting of the healthcare workers involved in the pediatric ICU conducted a prospective PETT scan across the six domains. Over multiple meetings, barriers and facilitators were categorized as local/unit, organizational, external, or not modifiable.

**Results:** Barriers were classified as local/organizational/external/not modifiable. People: 36 stakeholder groups with 116 interactions. Tasks: 19 tasks, 59 interactions. Tools/technology: 26 categories, 82 interactions. Physical environment: 12 categories, 75 interactions. Socio-organizational environment: 34 categories, 77 interactions. External factors: 7 categories, 34 interactions. Barriers clustered around role clarity, limited alarm customization, competing alarm soundscape, and variable room layout; facilitators included engaged unit leadership and respiratory expertise.

**Conclusion:** A single ventilator alarm reflected a complex socio-technical work system with many actionable targets in practice. Priorities include clarifying responder roles and escalation, role-based alarm education, standardizing bedside supply placement, and improved onboarding and periodic review of patient-specific alarm parameters. Limitations include one case, expert-panel subjectivity, and minimal measurements; next steps pair PETT findings with quantitative alarm data and subsequent PDCA cycles while monitoring for downstream consequences of those changes.

## Clayton Lundberg

### *Hospital admission and survival of patients with brain metastases diagnosed in the emergency care setting*

**Authors:** Soto DJ, Lundberg CW, D'Agostino E, Wirth S, Wendel S, Amidon RF, Catalino MP, Lobo JM, Anderson RT, Brady W, Nguyen L, Schneider B, Guterman I, Sheehan JP, Bovi JA, Thomas AA, Fadul CE.

**Project Mentor:** Joseph Bovi, MD; Radiation Oncology

Brain metastases (BMETS) are commonly diagnosed in emergency care setting (ECS)—such as the emergency department (ED) or after direct admissions—yet research on their admission patterns, management, and survival is limited. This study examines the clinical course, outcomes, and potential impact of an admission algorithm for patients diagnosed with BMETS in ECS. This is a retrospective study conducted across three academic hospitals, analyzing admissions and survival of BMETS patients in ECS. Patients were age at least 18 years with imaging-confirmed BMETS. We developed an admission algorithm that was retrospectively applied to assess the rationale for hospitalization. Primary outcomes included admission rates, length of stay (LOS) in the ED and hospital, and overall survival. Among 312 patients, 250 had brain imaging available at initial ECS presentation; 241 (96.4%) were admitted. Median ED LOS was 7 hours, increasing with multiple imaging studies ( $P < .001$ ) and consults ( $P < .01$ ). Median hospital LOS was 6.7 days, prolonged by inpatient interventions (9.9 v 6.2 days,  $P < .001$ ) and poor functional status (8.6 v 5.4 days,  $P < .001$ ). Median survival post-discharge was 4.4 months, influenced by functional status ( $P < .001$ ) and comorbidities ( $P < .004$ ). Applying the admission algorithm, 224 (89.6%) required hospitalization while 26 (10.4%) were eligible for outpatient care. BMETS patients in ECS have high admission rates and poor survival. A standardized admission algorithm may reduce ED LOS by identifying patients who require hospitalization. Further research is needed to refine triage and improve outcomes.

## Evalyn Mackenzie

### *Evaluating rehabilitative potential and contractility of the pharynx and esophagus in patients diagnosed with ineffective esophageal motility*

**Authors:** Mackenzie E, Hassan H, Kern M, Balasubramanian G, Shaker R, Sanvanson P

**Project Mentor:** Patrick Sanvanson, MD; Medicine

Ineffective esophageal motility (IEM) is one of the most common esophageal motility disorders. Patients with IEM have difficulty swallowing food boluses due to ineffective peristalsis. The esophagus possesses both striated and smooth muscle portions. Increasing the strength of striated muscle contractility has the potential to improve esophageal peristalsis and to lessen symptoms of IEM. In this study, we hypothesized that the contractile vigor of the pharynx and esophagus in patients with IEM would increase after 6 weeks of using a Swallow Resistance Exercise Device (sRED). We studied 4 individuals (4 female, 0 male, ages 47.25 (average)  $\pm$  21.75 (standard deviation)) with a clinical diagnosis of IEM based on previous esophageal manometry studies. Participants underwent two total esophageal manometry visits that were 6 weeks apart and wore an sRED during assigned swallowing exercises of 30 swallows 3 times per day. The exercise plan lasted 6 weeks starting at an sRED pressure of 20 mmHg and increasing by 10 mmHg each week until reaching the final pressure of 60 mmHg. Paired sample t-tests were used to compare pre-sRED and post-sRED data. The sRED device was safe and exercises were well-tolerated by the participants, but there were no statically significant improvements for any of the conditions. A larger sample size and optimization of the sRED protocol are needed to assess if there is truly no improvement in pharyngeal and esophageal contraction with utilization of the sRED. In the future, we could compare patients' clinical symptoms to their manometry data and investigate if alterations in applied pressure of the sRED could elicit different responses to the exercises.

## Ryan Majinski

### *A retrospective evaluation of vasopressor choice in neonatal shock*

**Authors:** Majinski RJ, Berlin KEK

**Project Mentor:** Kathryn EK Berlin, DO, FAAP; Pediatrics

**Background:** Without a dedicated neonatal hemodynamics team, many NICUs utilize a chosen first-line antihypotensive medication instead of targeted therapy for the treatment of neonatal shock. Many units are replacing first-line dopamine with first-line epinephrine for its more favorable side-effect profile, but there is limited evidence to support this switch in neonates.

**Primary Aim:** To test the hypothesis that, within our NICU, patients treated initially with epinephrine do not have improved outcomes over those first treated with dopamine.

**Secondary Aim:** To test the hypothesis that a change in medication management after the use of echocardiography correlates with reduced patient mortality.

**Methods:** We conducted a retrospective cohort study of neonates with shock treated at a single Level IV NICU from October 2012 to December 2021. We directly compared mortality and morbidity outcomes among patients receiving first-line dopamine or first-line epinephrine therapy. Patients were additionally stratified by whether treatment was modified following echocardiography.

**Results:** Of 551 eligible neonates, 310 received first-line dopamine therapy, 216 received first-line epinephrine therapy, and 25 received a different initial vasoactive agent. Comparing the dopamine and epinephrine groups, there was no significant difference in mortality, length of stay, use of multiple vasoactive agents, incidence of severe intraventricular hemorrhage, or incidence of severe bronchopulmonary dysplasia. There was also no significant difference in mortality among neonates whose shock treatment was modified after echocardiography (n=70).

**Conclusion:** Epinephrine is not associated with better outcomes than dopamine when used indiscriminately as a first-line antihypotensive agent for the treatment of neonatal shock.

## Lyiba Malik

### *ED CAHPS survey result correlation between patient sex, race, and arrival times*

**Authors:** Malik LM, Rubin J, Chinn M

**Project Mentor:** Matthew Chinn, MD; Emergency Medicine

#### Introduction

The Emergency Department Consumer Assessment of Healthcare Providers and Systems (ED CAHPS) is a standardized tool used to measure patients' perspectives on care. It includes demographic data, including race and sex, to identify insights in care perception. Our hospital has identified differences across demographic groups.

#### Objectives/Hypothesis

This study aims to determine whether race and sex differ by ED arrival time and if this influences patient perception, given that wait times increase throughout the day and peak overnight.

#### Methods

Patient sex and race were obtained from ED CAHPS surveys over one year (n=2,932). Patients were grouped by arrival time (7a–3p, 3p–11p, 11p–7a). Chi-square tests assessed relationships between care ratings, demographics, and arrival time.

#### Results

There was a significant relationship between race and arrival time (p<.001): Black patients comprised a greater proportion (37%) of 11p–7a arrivals, while White patients comprised a greater proportion (66%) of 3p–11p arrivals. Sex also differed by arrival time (p<.001): females accounted for more arrivals (65%) from 3p–11p, while males accounted for more (39%) from 11p–7a. Additionally, ED care ratings varied by arrival time (p<.001): lowest ratings (1s, 8.0%) were more common overnight, while highest ratings (5s, 66%) were more common during 7a–3p.

#### Conclusion

ED CAHPS data highlight differences in care perception. Lower ratings are more frequent overnight, when wait times are longer and patient demographics differ. Further investigation is needed to determine if time of arrival is a confounding variable of poor ED CAHPS scores.

## **Saundra Manyitabot, BS**

### ***Who Screens Positive? Predictors of PHQ-9 Elevation Among Emerging Adults in Primary Care Settings***

**Authors:** Manyitabot S, Nickel L, Fendrich M

**Project Mentor:** Michael Fendrich, PhD; Emergency Medicine

Mental health conditions among emerging adults represent a growing public health concern. This study evaluated demographic predictors of elevated PHQ-9 scores and psychiatric follow-up rates among emerging adults presenting to primary care.

We conducted a single-center retrospective cohort study of emerging adults screened with the PHQ-9 in primary care clinics associated with a large Midwest academic health system between April 2021 and August 2025.

Emerging adults aged 18 to 26 presenting for annual wellness visits, annual exams, or physical examinations.

Of 39,518 eligible encounters, PHQ screening occurred at 22,698 (57.4%). Among the 9,419 patients comprising the analytic cohort, 8.3% screened positive (PHQ-9 score  $\geq 10$ ). In multivariable logistic regression, Black race (OR 1.36, 95% CI 1.10–1.66), Hispanic ethnicity (OR 1.74, 95% CI 1.33–2.26), and other employment status (OR 1.36, 95% CI 1.07–1.70) were independently associated with higher odds of a positive screen. Male sex (OR 0.59, 95% CI 0.50–0.70), married status (OR 0.56, 95% CI 0.42–0.74), and student status (OR 0.61, 95% CI 0.50–0.74) were protective. Of the 1,043 patients who screened positive, only 147 (14.1%) received a follow-up psychiatric appointment, with no statistically significant differences in follow-up rates by any demographic variable.

Elevated depressive symptoms were disproportionately concentrated among Black, Hispanic, and economically marginalized emerging adults. Despite this, psychiatric follow-up rates were uniformly low across all demographic groups, indicating a systemic gap between positive screening and treatment engagement. Findings underscore the need for equitable, structurally responsive approaches to depression screening and follow-up in primary care settings serving young adults.

## **Sagar Matharu**

### ***Mobile Diagnostic Platforms and Mammography Access: A Retrospective Analysis of Screening Completion Across Mobile Clinic and Federally Qualified Health Center Encounters***

**Authors:** Matharu SS, Lodes MW

**Project Mentor:** Mark W. Lodes, MD; Institute for Health & Humanity; Pediatrics

**Background:** Mammography is the principal modality for early breast cancer detection, yet completion rates remain uneven across population.<sup>1–3</sup> Women served by federally qualified health centers (FQHCs) and other safety-net settings face geographic, financial, and operational barriers that contribute to delayed or missed screening.<sup>4–6</sup> Mobile diagnostic platforms have been proposed as one strategy to narrow this access gap, but comparative data on screening completion between mobile and fixed-site cohorts are limited.<sup>7–12</sup>

**Methods:** We conducted a retrospective cohort analysis with adults with at least one outpatient encounter between January 1, 2018 and December 31, 2023 were eligible. The Mobile Clinic cohort included patients with at least one mobile clinic encounter, while the FQHC cohort included patients with FQHC or fixed-site outpatient index encounters. The primary outcome was completion of mammography after the index encounter. Univariate logistic regression was performed. Time-to-completion was estimated using the Kaplan-Meier method.

**Results:** The Mobile Clinic cohort was 70.88% female and the FQHC cohort 74.66% female ( $p < 0.01$ ). Compared with the FQHC cohort, the Mobile Clinic cohort had a higher proportion of Black adults (17.77% vs 13.91%,  $p < 0.01$ ) and a lower proportion of White adults (59.55% vs 71.28%,  $p < 0.01$ ). Mobile clinic encounters were independently associated with higher mammography completion (OR 1.975, 95% CI 1.899–2.053,  $p < 0.001$ ). Time-to-completion curves separated within the first one to two years of follow-up and persisted across the observation window.

**Conclusion:** Index mobile clinic encounters were associated with nearly double the odds of mammography completion and faster time-to-screening compared with FQHC or index outpatient encounters.

## Hailey Mattheisen

### *Comparative analysis of growth hormone-secreting mixed gangliocytomas and pure growth hormone pituitary adenomas*

**Authors:** Hailey Mattheisen, Abigail Peterson, Abdullah Memon, E. Kelly S. Mrachek, Samon Tavakoli, Adriana Ioachimescu, Nathan Zwagerman, Stephanie Cheok

**Project Mentor:** Stephanie Cheok, MD; Neurosurgery

**Introduction:** Mixed gangliocytoma-pituitary adenomas (MGPA) are rare sellar tumors, often presenting with signs and symptoms of acromegaly due to the somatotrophic component. The pathogenesis is not well understood, with few cases reported. We present our institutional experience in surgical management and compare surgical outcomes in growth hormone (GH)-secreting MGPA and GH-secreting pituitary adenomas (GHPA).

**Methods:** We retrospectively reviewed demographic and clinical data of adult patients with MGPA and GHPA operated at our institution from 2018 to 2024.

**Results:** Six MGPA patients (3 males, 3 females) and 40 GHPA patients (20 males, 20 females) were included. Mean age was 47 (range 36–65) and 49 years (range 19–76), respectively. Common symptoms in both groups were headaches, acral enlargement, and facial changes. All patients underwent endoscopic endonasal transsphenoidal approach (EETA). Preoperative mean IGF-1 levels were similar. Tumor diameter was larger in MGPA (23 mm vs. 15 mm,  $p=0.034$ ).

Cavernous sinus invasion Knosp 4 was more common in MGPA (16 %) than GHPA (5 %) ( $p=0.121$ ). Hormonal remission, defined as normalized IGF-1 at 3–6 months postoperatively, was achieved in 50 % of MGPA and 48 % of GHPA patients. Mean follow-up time for MGPA and GHPA patients was 19 months and 34 months respectively. Neither group experienced disease recurrence.

**Discussion:** MGPA is a rare subtype of pituitary adenoma; however, it represented 12.8 % of operated GH-secreting tumors at our institution. In our series, MGPA were larger tumors and more likely to invade the cavernous sinus than GHPA. EETA was safe and effective in both groups, with similar remission rates.

## Jacob Matthews, BS

### *The Impact of Shock and Immobility on Skin Injury Risk*

**Authors:** Matthews JR, Popies JA, Srivastava P, Tarima S, Peschman JR, Sinson GP, Roberts CJ

**Project Mentor:** Christopher J. Roberts PhD, MD; Anesthesiology

#### Abstract

**Background:** Hospital-acquired pressure injuries (HAPIs) are a significant concern in critical care. Skin failure has been defined as a distinct pathophysiological entity resulting from systemic shock and hypoperfusion, rather than direct pressure alone. This study compares the association between specific shock states and immobility with the development of skin failure compared to HAPIs in intensive care unit (ICU) patients.

**Methods:** This secondary analysis of prospectively collected data (Oct 2022-Oct 2023) from six adult ICUs included patients developing new skin injuries. Injuries were classified by etiology: skin failure (associated with systemic shock) or HAPI (pressure/immobility-related). We analyzed perfusion-related (e.g., ECMO, lactate) and immobility-related variables (e.g., prolonged ventilation, OR time) using multivariate logistic regression to identify differentiating factors.

**Results:** Among 78 patients with ICU-acquired skin (48 HAPI, 30 skin failure), those with skin failure had significantly higher peak lactate (median difference  $\sim 2.0$  mmol/L,  $p=0.011$ ). Following multivariate adjustment, factors independently associated with skin failure over HAPI included higher peak lactate (OR = 1.11 per mmol/L increase, 95% CI 1.01-1.22,  $p=0.033$ ), ECMO use (OR= 7.14, 95% CI 1.69-33.33,  $p=0.007$ ), mechanical ventilation >72 hours (OR= 4.17, 95% CI 1.00-16.67,  $p=0.050$ ), and operating room time >6 hours (OR = 3.70, 95% CI 1.05-12.50,  $p=0.042$ ).

**Conclusions:** Skin failure in critically ill patients appears to be a distinct clinical entity. Its risk profile, characterized by indicators of systemic shock and potentially prolonged critical illness interventions, differs from that of traditional HAPIs. This distinction is vital for developing targeted assessment tools and interventions beyond current HAPI prevention algorithms.

## **Abdullah A. Memon, BS**

### ***Multimic Selection of Cancer-Testis Antigens as Precision Immuno-oncologic Targets in Head and Neck Cancer***

**Authors:** Memon AA, Awan MJ, Espinosa OV, Kuehn R, Frei A, Foeckler J, Bruening J, Akakpo K, Massey B, Stadler M, Wong S, Himburg HA, Zenga J

**Project Mentor:** Joseph Zenga, MD; Otolaryngology

**Background:** Head and neck squamous cell carcinoma (HNSCC) is an aggressive malignancy with an increasing need for precision therapeutics. Cancer-testis antigens (CTAs) represent promising targets given their tumor-associated expression.

**Methods:** We employed bulk RNA-sequencing for discovery, and leveraged single-cell RNA sequencing for validation. We further rigorously validated our findings using external transcriptomic datasets and TCGA. The Cancer-Testis Antigen Database (CTdatabase) determined the physiologic expression distribution for each identified CTA. Finally, we used CopyKAT to separate HNSCC epithelium into malignant and benign populations within the same patients.

**Results:** Bulk and single-cell RNA-sequenced data identified several CTAs (DKKL1, SPANXB1, SPANXD, and ACTL8) upregulated in recurrent tumors. An expanded reanalysis revealed that CTAs were robustly expressed radiation-recurrent and novo tumors. Immunohistochemistry was performed on ACTL8 to confirm transcriptional level findings at the protein level. To refine the tumor-specific CTA list, an exclusionary analysis using single-cell RNA-sequenced data from normal oral mucosa was conducted, removing any CTAs with any expression in normal tissue. This resulted in a final list HNSCC specific CTAs, of which 14 CTAs overlapped across all transcriptomic datasets. Finally, using CopyKAT, CTAs were specifically enriched in malignant epithelial populations compared with benign populations within the same patients with HNSCC.

**Conclusions:** We present a set of 23 testis-restricted and 44 testis-selective CTAs were orthogonally validated in multiple tumor datasets. Of these, a core set of 14 CTAs were consistently detected across all datasets. Their tumor specificity and broad expression bolster their potential as promising precision immuno-oncologic targets for future T-cell receptor engineering efforts.

## **Philisha Mesidor, MSGH**

### ***Defining and Assessing Surgical Efficiency in Addis Ababa's Tertiary Hospitals: A Cross-Sectional Study Using DEA***

**Authors:** Mesidor P, Binalfewu Z, Kedru Y, Kifle F, Belay E, Yohannes T, Daniel S, Abu-Hamdan F, Dodgion CM, Beyene A, Iverson KR

**Project Mentor:** Katie Iverson, MD, MPH; Surgery

**INTRODUCTION** Efficient hospital resource utilization is essential for strengthening surgical systems in low resource settings. Guided by the World Health Organization technical efficiency framework, we applied Data Envelopment Analysis (DEA) to benchmark eight tertiary hospitals in Addis Ababa.

**METHODS** This study employed a two-stage approach, applying DEA to assess technical efficiency followed by regression analysis to explore the relationship between high-risk caseloads and efficiency. This cross-sectional study analyzed surgical technical efficiency in 8 hospitals. Efficiency inputs and outputs were extracted from the Ethio-SOS, a nationwide cohort study that enrolled 4,412 adult surgical patients at 46 public hospitals.

Technical efficiency was operationalized as the ratio of surgical beds to completed surgeries. Furthermore, an ordinary least squares (OLS) regression assessed the relationship between high-risk caseloads and efficiency. We used the African Surgical Outcome Survey (ASOS) risk calculator to estimate complication.

**RESULTS** Efficiency scores ranged from 0.263 to 1.0 (median: 0.633), with 3 hospitals achieving optimal overall technical efficiency. Seven of the 8 hospitals had a variable return to scale, either increasing or decreasing. Regression analysis showed a non-significant relationship between high-risk cases and efficiency (coefficient: -0.762, p-value: 0.282).

**CONCLUSION** This study provides a baseline for understanding surgical efficiency of tertiary hospitals in Addis Ababa, contributing to broader knowledge of surgical efficiency assessments. Given the varied returns to scale across hospitals, further mixed methods research can contextualize the results produced by this study. Future investigations will build on these findings to uncover strategies for improving hospital performance and advancing collaborative studies in Ethiopia.

## Ethan Mickelson

### *Evaluating the Impact of Student-Produced Physical Examination Videos in a First-Year Clinical Skills Curriculum*

**Authors:** Mickelson E, St. Denis E, Lewis M, Seshan M, Mackenzie E, Mitchen T, Treat R, Chou E

**Project Mentor:** Erica Chou, MD; Pediatrics

**Background:** Physical examination (PE) skills are foundational to medical education, yet students often encounter challenges learning and applying skills. PE instruction varies across institutions and online videos may not align with institution-specific expectations. To address this gap, student-created PE videos aligned with local curriculum standards were developed for first-year medical students. This study evaluated the impact of these videos on student preparation, confidence, and performance during a clinical skills session.

**Methods:** This study was conducted during the 2024–2025 academic year within the Early Clinical Learning curriculum at MCW. Three videos were developed based on institutional rubrics and distributed before in-class sessions. Data was collected using anonymous surveys assessing video usage, perceived helpfulness, and confidence. Facilitators evaluated student performance using standardized PE rubrics.

**Results:** Of 167 respondents, 96 students (57%) viewed the videos in their entirety prior to the session. Among viewers, 70% rated the videos a 4 or 5 on a 5-point Likert scale for preparation, and 53% rated them a 4 or 5 for confidence performing the examination. Most students reported that the videos were clear (86.5%) and appropriately paced (85%). No significant differences were observed in facilitator-assessed PE performance between students who viewed the videos and those who did not, or between students with and without prior healthcare experience (all  $p > 0.05$ ).

**Conclusions:** Institution-specific PE videos were well received and improved student-reported preparation and confidence. Although objective performance differences were not observed, these videos may serve as valuable supplemental resources for supporting early clinical skills education.

## Jocelyne Milke

### *The Brain Doctors: Transforming Mental Health Education for Elementary School Students*

**Authors:** Milke J, Patiño G, Johnston B

**Project Mentor:** Bryan Johnston, MD; Family & Community Medicine

**Community Partner:** Milwaukee Academy of Science and St. Marcus

Mental health challenges often begin in early childhood, yet schools—especially those in low-income and minority communities—face persistent barriers to implementing mental health education. To address this gap, Brain Doctors, a medical student-led initiative, developed and evaluated an updated two-lesson curriculum for 3rd grade students in Milwaukee focused on emotional regulation, mindfulness, and community wellness.

The curriculum was delivered in Spring 2025 at two community partner schools: Milwaukee Academy of Science and St. Marcus Lutheran School. School staff participated in early planning to ensure developmental and cultural relevance, observed lesson delivery, and provided informal feedback. A licensed child psychologist reviewed the curriculum to align content with age-appropriate vocabulary and mental health concepts. Media materials were updated to include diverse, familiar characters and images reflecting students' cultural backgrounds.

A within-subjects pretest-posttest design was used with 110 students completing a 10-item knowledge assessment and a post-session satisfaction survey. While knowledge scores improved across five learning objectives (items 1, 3, 4, 6, and 8), results were not statistically significant ( $p > 0.05$ ), possibly due to high baseline knowledge or assessment limitations. Despite limited measurable gains, student engagement was high. Most students reported enjoying the sessions, feeling heard, and intending to share what they learned. Future work will focus on assessing students' confidence in applying coping strategies and managing emotions to better capture program impact. These findings support the value of culturally responsive, age-appropriate mental health education in early childhood.

## **Sarah Miller, BS**

### ***Assessing patient outcomes of a violence prevention program at Children's Wisconsin***

**Authors:** Miller SE, Levas MN

**Project Mentor:** Michael Levas, MD; Pediatrics

#### Introduction

Firearm-related injuries are the leading cause of death among youth in the United States. Violent injury often follows a cyclic pattern, with reinjury rates as high as 40% across the country. Hospital-based violence intervention programs, such as Project Ujima at Children's Wisconsin, aim to interrupt this cycle by providing resources to vulnerable patients. This retrospective study evaluates utilization and engagement among recent participants in this program.

#### Methods

A retrospective chart review was conducted of patients presenting to the Children's Wisconsin emergency department with gunshot wounds between 2018 and 2022. Data was extracted from electronic medical records and case management databases for 347 patients. Descriptive statistics were used to characterize demographics, prior injury history, and program engagement.

#### Results

Among the patients referred to Project Ujima, the majority were male (80.1%), with a median age of 16 years, and 81.1% identified as Black. Prior violent injury was documented in 32.3% and 16.4% experienced reinjury. The most common reason for program closure was loss to follow-up (17%), and only 7.5% completed the program. Physical health services (43.2%) and crisis intervention (36.6%) were the most frequently utilized resources. Only 13% of patients demonstrated high program engagement.

#### Conclusions

Pediatric firearm-related injury remains a major public health concern, with many patients experiencing recurrent violent injury. This evaluation of Project Ujima suggests that hospital-based violence intervention programs can connect patients to essential resources; however, overall program engagement remains limited. Strengthening early engagement strategies and addressing barriers to sustained participation will be critical to improving program impact.

## **Talulah Mitchem**

### ***Polypharmacy in Multiple Sclerosis: Risk Factors and Disease-Modifying Therapies***

**Authors:** Lauren Beranek, BS, Abbey Stoltenburg, MA, Talulah Mitchem, BA, Jakob Alden, BS, Roberto S. Hernandez, PhD, Ahmed Z. Obeidat, MD, PhD

**Project Mentor:** Ahmed Obeidat, MD, PhD; Neurology

**Importance:** Polypharmacy in multiple sclerosis (MS) is a complex and understudied issue in the United States, with unclear contributions from demographic and clinical factors.

**Objective:** To determine factors that affect the polypharmacy risk profile in a U.S. MS population

**Design, Setting, and Participants:** Retrospective cohort study of MS patients seen at a comprehensive MS center in Milwaukee, Wisconsin, from January 2016 to March 2023. Of 1,898 patients with a G35.0 diagnostic code, 500 met inclusion criteria.

**Main Outcomes and Measures:** Prevalence of polypharmacy, defined as >5 medications taken for >30 days, among U.S. MS patients and association with race, socioeconomic status, medication class, and other possible predictors.

**Results:** Among 500 patients (age 19–85 years; 70% female; 78% White, 16% Black, 6% other; median ADI 55; mean disease duration 10 years), 45% had current polypharmacy. At diagnosis, 13% met criteria for polypharmacy; 32.8% of those without polypharmacy at diagnosis progressed to polypharmacy by 2023. Significant predictors of progression included years since diagnosis and total number of medications at data retrieval (both  $p < 0.001$ ). The number of medications at diagnosis predicted ongoing polypharmacy ( $p < 0.001$ ; 95% CI, 1.60–2.35), with each additional medication associated with 1.92-fold greater odds. Disease-modifying therapy use was not associated with reduced medication burden ( $p = 0.5$ ). Race/ethnicity, sex, and socioeconomic status were not significant predictors.

**Conclusions and Relevance:** Polypharmacy predicts future polypharmacy, suggesting prevention should focus on early prescribing practices. Disease-modifying therapies alone do not reduce medication burden, highlighting the need for more intentional, coordinated, and system-level approaches to MS symptom management.

## **Aiden Moore**

### ***The impact of the surgeon's preference card on supply cost and wasted supplies for robotic vs. laparoscopic cholecystectomy***

**Authors:** Moore AJ, Wagner C, Gould JC.

**Project Mentor:** Jon C Gould, MD, MBA; Surgery

Robotic operations are shown to be associated with increased costs compared to the laparoscopic approach. This discrepancy can be partly related to choices surgeons make about consumable surgical supplies. We sought to identify the relationship between surgeon preference cards and supply costs in patients undergoing laparoscopic versus robotic cholecystectomy and to determine their impact on cost and waste variability. A retrospective analysis was performed on 50 patients undergoing either approach. Individual preference cards utilized for each procedure were compared for disposable supplies, cost, and wasted supplies. Given the 10-use limit per robotic instrument, 10% of the cost of each instrument was allocated to each procedure. Wasted supplies were calculated over a year and averaged per case for each preference card. Most preference cards (67% laparoscopic and 73% robotic) had consumable supplies that did not appear on any other card. Costs associated with supplies on preference cards alone were greater for robotic procedures (\$775 vs. \$317,  $p < 0.01$ ) with a range of \$675 to \$865 for robotic and \$241 to \$444 for laparoscopic. Actual case costs for consumable surgical supplies used in the cohort was also greater for robotic procedures compared to laparoscopic (\$1509 vs. \$557,  $p < 0.01$ ) ranging from \$720 to \$2360 for robotic and \$269 to \$731 for laparoscopic. Mean waste per procedure was higher in robotic cases (\$40.33 vs. \$7.31), though not statistically significant ( $p = 0.1$ ). In conclusion, we show that robotic cholecystectomy is associated with increased costs compared to laparoscopy. However, there exists significant variability in case cost per surgeon within both techniques contributed to by a lack of standardized and outdated preference cards.

## **Lucas Moyer**

### ***Outcomes of open and endovascular repair of civilian extremity vascular injuries***

**Authors:** Moyer L, Driscoll J, Adams A, Rossi A, Yang Y, Pokryzwa C, Jean X, Murphy P, Rossi P, Kugler N

**Project Mentor:** Nathan Kugler, MD; Surgery

**Objectives:** Endovascular management of extremity vascular injuries is an emerging alternative to traditional open surgical repair. This study aims to compare outcomes following open (OSR) or endovascular repair (EVR) of traumatic extremity vascular injuries. We hypothesized technical success and early patency would not be significantly different between OSR and EVR.

**Methods:** A retrospective analysis of patients presenting between 01/2011-12/2021 with an extremity vascular injury at an urban Level One trauma center. Included were blunt or penetrating vascular injuries to a major extremity vessel with equipoise regarding selection of OSR or EVR (brachial, femoral, and popliteal arteries). Primary and secondary outcomes were compared utilizing Fisher's exact test. The primary outcome was technically successful revascularization. Secondary outcomes included hospital length of stay, transfusion requirements, mortality, 6-month patency, and complications such as pneumonia. A subsequent matching analysis controlling for the injury severity score (ISS) was conducted.

**Results:** A total of 243 patients presented with a major extremity vascular injury. 226 underwent OSR and 17 underwent EVR. Patients treated with EVR had a higher ISS (17vs12,  $p=0.03$ ). Matched analysis controlling for ISS found no significant difference in technical success or secondary outcomes.

**Conclusions:** Patients with extremity vascular trauma treated with EVR at our institution were more severely injured than OSR patients. However, patients undergoing EVR had similar outcomes. This demonstrates that EVR can be considered in and may be important for selected severely injured patients. Prospective studies still need to be performed to determine which injuries may benefit from a minimally invasive approach.

## Elena Muntz, BS

### *Are we missing cerebral palsy: video-based training overinflates HINE scores in high-risk infants*

**Authors:** Muntz EJ, Cabacungan E, Cohen S, Carlton K

**Project Mentor:** Katie Carlton, MD; Pediatrics

**Introduction:** High-risk infant follow-up programs (HRIF) provide screening for complications of prematurity including cerebral palsy (CP). The Hammersmith Infant Neurological Exam (HINE) stratifies a patient's risk for CP. Hands-on training is gold standard, but access remains limited and cost prohibitive, so video-based training is widely used. CHW HRIF clinics implemented the HINE using video-based training.

**Specific Aim & Hypothesis:** To describe CP risk-stratification of our study cohort after video-based HINE training. We hypothesize that video-based training leads to overinflated HINE scores.

**Methods:** A retrospective cohort study of 292 patients cared for in the CHW NICU and HRIF clinics who received a HINE at 6 or 12-months adjusted age. CP risk-stratification was performed by comparing a patient's HINE score to optimality and CP cut-off scores. A linear regression model was used to compare 12-month HINE scores with developmental testing results (Bayley Scales of Infant and Toddler Development, BSID) by calculating coefficient of determination (R<sup>2</sup>) value.

**Results:** At age 6 months, 46% of HINE scores were at/above optimality (70), 10% were at/below CP cut-off (59). At age 12 months, 68% of HINE scores were at/above optimality (73), 11% were at/below CP cut-off (65). There was no correlation between HINE and BSID results at 12-months (R<sup>2</sup>=0.39, BSID=1.43\*HINE-15.0).

**Conclusion:** HINE scores after video-based training were more likely to be above optimality. We speculate that video-based training leads to overinflated HINE scores and lack of correlation between HINE and BSID results at 12 months.

**Next Steps:** A comprehensive, hybrid HINE training curriculum was developed.

## Sadica Murphy

### *Barriers to Breastfeeding with a Focus on Antenatal Milk Expression (AME)*

**Authors:** Murphy S, Cohen L, Marion E, Seshan M, Bobholz F, McBride H, Joyner S, Peebles J, Palatnik A.

**Project Mentor:** Anna Palatnik, MD; Obstetrics & Gynecology

Breastfeeding provides significant maternal and infant health benefits. However, disparities in breastfeeding persist in the United States, with Wisconsin demonstrating some of the largest gaps. Antenatal milk expression (AME) is a potential intervention to support breastfeeding outcomes, though limited research has evaluated perceptions and experiences with AME across diverse populations. This descriptive cohort study evaluated pregnant individuals receiving care within the Froedtert OBGYN department in Milwaukee, Wisconsin. Participants completed a pre-survey assessing breastfeeding knowledge, attitudes, and perceptions regarding breastfeeding and AME, followed by an optional post-survey evaluating breastfeeding and AME outcomes. Descriptive statistics summarized demographic characteristics and survey responses. Logistic regression analyses evaluated associations between breastfeeding status, Infant Feeding Intentions scores, and Iowa Infant Feeding Attitude Scale scores.

Of 208 participants, 95 completed both surveys and were included in the primary analysis. Most participants were Non-Hispanic White, married, privately insured, and employed full-time. While 73.4% had previously heard of AME, over half were unsure about its benefits. Among postpartum respondents, 32.7% reported performing AME and generally viewed it favorably. They reported willingness to use it in future pregnancies and recommend it to others. Common barriers included provider discouragement and concerns regarding labor induction. Higher Infant Feeding Intentions scores (OR 1.19, p=0.006) and Iowa Infant Feeding Attitude Scale scores (OR 1.07, p=0.018) were significantly associated with breastfeeding postpartum. AME was generally well received and may support breastfeeding outcomes in Wisconsin. Additional research is needed to evaluate AME in medically complex pregnancies and diverse populations.

## **Shruti Narayan, MA**

### ***Development of a comprehensive clinical and tissue inventory database for cervical cancer research with future integration of tissue microarray (TMA) data***

**Authors:** Narayan SL, Rader JS.

**Project Mentor:** Janet S Rader, MD; Obstetrics & Gynecology

Cervical cancer is the second most common cancer among women of reproductive age worldwide, necessitating continued research to reduce morbidity and mortality. Tissue microarrays (TMA) are invaluable for high-throughput biomarker analysis, but their development and management are often limited by challenges in patient selection and the integration of clinical correlate data. Existing TMA databases often lack sufficient disease-specific breadth of clinical data and do not support the generation of TMAs from existing patient cohorts. To address these gaps, we have developed a relational database using REDCap, designed to manage clinical, pathology, and tissue inventory data for cervical cancer research. The clinical dataset includes demographics, vital status, smoking history, prior dysplasia, and other cervical cancer-specific variables. The pathology dataset captures information on 22 distinct cervical cancer types and subtypes, including staging, grading, tumor characteristics, and additional relevant parameters. This database contains data from 2,086 patients with invasive and preinvasive cervical cancer and 1,589 unaffected family members from the Cervical Cancer Genetic Epidemiology (CerGE) and Molecular Characterization of Cervical Cancer projects, along with associated blood, buccal, DNA, and tissue samples collected over multiple decades. This system enables efficient querying of de-identified patient data, streamlines tissue block selection for TMA creation, and facilitates correlation of TMA findings with matched frozen tissue and blood-based experiments. Future expansion will integrate TMA experimental data, enabling unified management of clinical and TMA data, virtual TMA generation, and enhanced translational cervical cancer research, ultimately contributing to the development of novel diagnostic and therapeutic strategies.

## **Catherine Nguyen, BS**

### ***Assessment of Medical Student and Faculty Preference for Webcast Use in MCWFusion Phase 1 Integrated Science Blocks***

**Authors:** Nguyen CL, Chou EY

**Project Mentor:** Erica Chou, MD; Pediatrics

**Introduction:** Webcasts are a crucial tool for content delivery in medical education programs, specifically the preclinical curriculum. Given their increasing use, establishing best practices for creation and design is essential to optimizing educational efficacy and learner engagement. This study evaluated the congruence between current webcast formatting in the MCWFusion preclinical curriculum and the stated preferences of medical students and faculty.

**Methods:** This was a cross-sectional study using Qualtrics surveys distributed to students and faculty members involved in the MCWFusion Phase 1 Science blocks. Student and faculty surveys were distinct and assessed perspectives on perceived educational utility, optimal length, and webcast structure. Additional data including average length and number of Phase 1 webcasts was analyzed.

**Results:** 62 student and 47 faculty responses were collected. The largest proportion of students (53%) and faculty (36%) indicated a preference for webcasts between 15-30 minutes, which diverges from the current Phase 1 mean length of ~35 minutes (n=438). Both groups (74% students; 47% faculty) favored a segmented structure of a series of webcasts, each 15–30 minutes in length. Students generally preferred webcasts over traditional classroom lectures. While faculty acknowledged the merits of webcasts, many cited important concerns including limited real-time feedback, delayed assessment of student comprehension, and difficulty creating engaging content.

**Conclusion:** Working towards a segmented, 15–30-minute format that aligns with the shared preferences of students and faculty will further enhance content delivery within the MCWFusion preclinical curriculum. Addressing faculty concerns regarding asynchronous learning in future initiatives is vital to maximizing webcast efficacy.

## Vincent Nguyen, BS

### ***Military Medical Academic Enrichment Experience (MMAE): A Pilot Pre-Post Study Demonstrating Improved Medical Student Knowledge of Military and Veteran Healthcare***

**Authors:** Gonzales J, Strong M, Nguyen V, Lee K, Burek G

**Project Mentor:** Dr. Kenneth Lee, MD; Physical Medicine & Rehabilitation

#### Background

Military-connected patients represent a clinically important population, yet medical trainees may receive limited formal instruction in military culture, Veterans Affairs (VA) systems, Department of Defense (DoD) structure, and service-related health concerns. The Military Medical Academic Enrichment Experience (MMAE) was developed at the Medical College of Wisconsin to provide future physicians with practical tools to improve care for current and former military members. The curriculum addressed DoD/VA structure, military service timelines, healthcare eligibility, military culture, PTSD, and basic military history-taking.

#### Methods

A 20-question pretest/posttest design was used to evaluate learner knowledge before and after the MMAE curriculum. Questions 1–10 were multiple choice and graded using an answer key. Questions 11–20 included free-response items and were scored using flexible criteria that accepted synonymous wording and clinically equivalent responses. Nine matched participants had complete pretest and posttest data and were included in the final paired analysis. Matched participant scores were analyzed using descriptive statistics, a paired-samples t-test, effect size calculation, and Wilcoxon signed-rank testing.

#### Results

Mean total scores increased from 10.78/20 on the pretest to 17.78/20 on the posttest, reflecting a mean gain of 7.00 points. This improvement was statistically significant,  $t(8) = 8.08$ ,  $p = 0.000041$ , with a very large effect size, Cohen's  $d_z = 2.69$ . The Wilcoxon signed-rank test also supported significant improvement ( $p = 0.0039$ ).

#### Conclusion

Participation in MMAE was associated with improvement in learner knowledge of military and veteran healthcare topics. These findings support continued development of military-focused educational programming in medical training.

## Natalie Norton, BS

### ***Assessing Quality of Life in Patients with Dermatologic Diseases in Bagamoyo, Tanzania***

**Authors:** Norton NB, Han MM, Estill MC, Lukwaro M, Dennis M, Mmbaga G, Mcharo JJ, Humphrey SR, Juma O, Wanat KA.

**Project Mentor:** Karolyn Wanat, MD; Dermatology

Dermatology needs throughout Tanzania remain unmet due to lack of specialized physicians, medical education, reliable transportation, and supplies. This study aims to identify which dermatologic diseases and social factors have the greatest impact on quality of life in Bagamoyo, Tanzania. This study included patients aged 16 and older who presented to the Bagamoyo District Hospital for routine dermatologic care. Participants who provided consent filled out the Dermatology Quality of Life Index (DLQI) and a demographics survey. Study variables were compared by DLQI score categories, 0-5 (no to small effect) vs. 6+, (moderate to extremely large effect) using chi-squared analysis. This study included a total of 99 participants. The average age was  $37.9 \pm 13.8$  and the majority were female (72.7%). The mean DLQI score was  $6.64 \pm 6.8$ . A  $p$  value  $<0.05$  was considered statistically significant unless otherwise stated. Disease characteristics (itch, hypopigmentation and distribution on the lower extremities), diagnosis (eczema) and social factors (location, travel, and treatment cost) were associated with DLQI scores  $\geq 6$  indicating moderate to severe impact on quality of life. These results reinforce the importance of addressing social factors as key mediators in the relationship between dermatologic disease and QoL and point to concrete factors to target through optimization of resource allocation and ongoing research collaboration. Future studies are needed to better understand these relationships and potential confounders as well as to determine whether these findings vary geographically within Tanzania.

## Timothy O

### *Investigating the association of concussion and repetitive head impacts with blood-based markers of neurological injury.*

**Authors:** O TK, Brett BL, Savitz J, Teague TK, Meier TB.

**Project Mentor:** Timothy B Meier; Neurosurgery

**Purpose:** There is an urgent need to determine the effects of repetitive head impacts (RHI) experienced through sport in younger, active athletes. We assess associations of blood-based biomarkers of peripheral inflammation and neurological injury with metrics of RHI in male collegiate athletes.

**Methods:** Male athletes (N=133) completed semi-structured interviews for RHI exposure and a fasting blood draw. Concentrations of inflammatory markers (interleukin (IL)-1ra, IL-6, IL-10, tumor necrosis factor alpha, C-reactive protein (CRP), and interferon gamma) and neurological markers (neurofilament light (NfL), tau, and glial fibrillar acidic protein) were measured in serum using Meso-Scale Discovery S-PLEX and V-PLEX assays. Linear models tested for group differences in biomarker levels based on current sport (football, non-football contact sport, non-contact sport). Additional models tested associations of biomarkers with years of football experience and years of non-football contact sport experience across all athletes. Models accounted for concussion, age, and waist-hip ratio.

**Results:** There was a significant effect of current sport on NfL ( $F(2,123) = 3.37, p = 0.038$ ); with lower levels in football compared to non-football contact sport athletes ( $[MD](SE) = -0.181 (.072), p = .013$ ). There was a significant positive association of years of football exposure with CRP levels when treating years of exposure as continuous measures ( $B(SE) = .057 (.026), p = .029$ ). There were no other associations of biomarkers with RHI ( $ps > 0.05$ ).

**Conclusions:** Overall, this study finds minimal evidence that participation in football or other contact sports is associated with biomarkers of neurological injury or inflammation in active male athletes, with only weak associations with NfL and CRP observed.

## Mackenzie O'Connell, MS, RDN

### *Care utilization and clinical outcomes among high-risk patients enrolled in a postpartum navigation program: a retrospective matched cohort study*

**Authors:** Hernandez AM, O'Connell M, Griffin N, Kruper A, Graettinger K, Palatnik A, Peebles J

**Project Mentor:** Jacqueline Peebles, MD; Obstetrics & Gynecology

**Introduction:** This study examined postpartum care utilization and health outcomes among participants enrolled in a postpartum patient navigation (PN) program.

**Methods:** Pregnant patients  $\geq 32$  weeks gestational age at-risk for postpartum morbidity were invited to enroll in a PN program. Qualifying risk factors included obstetric complications, hypertensive disorders of pregnancy, diabetes, or risk factors for perinatal mood and anxiety disorder. Enrolled patients met with the navigator at delivery and at 2, 6, and 12 weeks postpartum. A matched cohort of patients who delivered in the 6 months prior to program implementation served as controls, matched by race, ethnicity, parity, delivery method, and high-risk criteria. Bivariable analyses compared adherence to standard postpartum care recommendations.

**Results:** Of 174 eligible patients, 100 enrolled in the PN program and were matched to 100 historical controls. Groups did not differ in demographic or clinical characteristics. Overall attendance at a comprehensive postpartum visit was similar (94 vs. 90%,  $p=0.30$ ); however, PN participants were more likely to attend in-person (56 vs. 39%,  $p=0.02$ ), be screened for postpartum depression (96 vs. 69%,  $p<0.001$ ), continue breastfeeding at 6 weeks (91 vs. 65%,  $p<0.001$ ), and enroll in remote hypertension monitoring (59 vs. 27%,  $p=0.01$ ).

**Conclusion:** Participation in a postpartum PN program was associated with more in-person postpartum visits, higher postpartum depression screening rates, longer breastfeeding duration, and improved uptake of remote blood pressure monitoring.

## **Emmanuel Okwudi**

### ***Virtual Primary Care Quality Analysis***

**Authors:** Okwudi EO MA; Crotty BH MD, MPH, FACP, FAMIA; Buchanan S MSN, RN

**Project Mentor:** Brooke Crotty MD MPH; Medicine

**Importance:** Patients have shown comparable or even better satisfaction rates with telemedicine than in-person office visits in the setting of primary care, but little has been done to determine if telehealth can be a first-stop for primary care

**Objective:** To measure objective quality metrics that can determine if telemedicine can provide efficient, actionable, and equitable care to different populations.

**Design:** This is a retrospective chart review of the electronic health record data on virtual visits conducted between May 25, 2025, and April 10, 2026, among adult patients at the Here Health virtual clinic in Menomonee Falls, WI.

**Results:** Overall deflection rate of 71.2%, 50% medication provision rate, 88.5% same day order rate, and the 86.7% diagnostic readiness stat. Clinically insignificant p-values (1.00, 0.81, 0.49) when comparing differences in deflection for gender, race, and age.

**Conclusion:** In this retrospective chart review, patients were likely to avoid in-person appointments after an appointment and receive treatment within the same day. Telemedicine can be a beneficial complement to traditional primary care that does not compromise equity. Future work should look to scale to more encounters and direct in-person comparison.

## **Cameron Otto**

### ***Incidence of Baseline ECG and the Development of Cardiovascular Disease in a Diverse Cohort of Patients Diagnosed with Cancer: A Retrospective Study***

**Authors:** Otto CJ, Shah R, Nagavally S, Whittle J, Osinski K, Brown SA

**Project Mentor:** Jeffrey Whittle, MD, MPH; Medicine

**Background:** Cardiovascular disease (CVD) remains a major risk for mortality in patients diagnosed with cancer.

Obtaining a baseline ECG prior to cancer treatment could identify cardiovascular status and risk factors. We hypothesize that receipt of an ECG prior to cancer diagnosis associates with fewer adverse cardiovascular outcomes after cancer treatment.

**Methods:** We identified a cohort of 4,592 adults diagnosed with cancer and with LVEF ascertainments. We analyzed demographics, presence of an ECG  $\leq$  3 years prior to cancer diagnosis, and CVD diagnoses before and after cancer diagnosis.

**Results:** Of 4,592 individuals, 3,726 (81%) received a baseline ECG. There was no significant difference in the sex among those who obtained a baseline ECG (51% male) and those who did not (49% male) ( $p=0.4$ ). Similarly, there was no significant difference in race among those who received a baseline ECG (18% black, 78% white) and those who did not receive a baseline ECG (16% black, 77% white) ( $p=0.14$ ). Individuals with a history of CVD prior to cancer more frequently received baseline ECGs compared to those without a history of CVD prior to cancer ( $p<0.001$ ). Following cancer diagnosis, new development of composite CVD, as well as individually assessed heart failure, atrial fibrillation, coronary artery disease, and stroke, was less frequently diagnosed in patients with a baseline ECG than in those without a baseline ECG ( $p<0.001$ ).

**Conclusion:** Overall, our results suggest that obtaining a baseline ECG prior to cancer treatment may be associated with improved CVD outcomes, even in those without pre-existing CVD.

## Daniel Palamarchuk

### ***Outcomes of Total Anomalous Pulmonary Venous Return Repair Over Five Decades: Impact of the Interdigitated Technique on Survival and Postoperative Pulmonary Vein Stenosis***

**Authors:** Palamarchuk D, Kirkpatrick EC, Maldonado J, Pan A, Liegl M, Mitchell ME

**Project Mentor:** Edward Kirkpatrick, DO; Pediatrics

To evaluate 50-year surgical outcomes following total anomalous pulmonary venous return (TAPVR) repair comparing traditional versus interdigitated approaches on mortality and pulmonary vein stenosis (PVS) across cardiac subgroups. **Methods:** A single-institution retrospective review of all primary TAPVR repairs from February 1974 to October 2023 (N=185) with prospective follow-up. Repairs were classified as traditional (single confluence and mirror atrial incision) or interdigitated (multi-vein and atrial cuts with 3D box-like anastomosis). Mortality was compared using Fisher's exact tests; overall and PVS-free survival analyzed using Kaplan–Meier and log-rank methods. Subgroups included single ventricle (SV), biventricular (BiV), and BiV with CHD, stratified by surgical era. Cox proportional hazards models identified risk and protective factors. **Results:** Interdigitated repair patients had lower median surgical weight (3.3 vs 3.7 kg,  $p=0.0007$ ) and younger age at surgery (3.0 vs 28.5 days,  $p=0.0004$ ). Interdigitated repair was associated with lower mortality (22% vs 40%,  $p=0.032$ ) and improved survival in SV patients ( $p=0.039$ ), though not in SV with heterotaxy. Median survival was 1.75 years for SV, 8.0 years for BiV with CHD, and not reached for BiV. Early mortality occurred in 19% overall, with SV disproportionately affected (33%,  $p=0.01$ ). Multivariable analysis identified infracardiac anatomy and longer bypass as mortality risk factors, while greater gestational age, and interdigitated repair (HR 0.33,  $p=0.012$ ) were independently protective. Overall PVS incidence was 21% and did not differ by technique or subgroup. **Conclusions:** Interdigitated repair is associated with improved survival following TAPVR repair, with potential benefit in SV patients. PVS remains prevalent regardless of surgical approach, underscoring the need for continued innovation and long-term follow-up.

## Arth Patel

### ***Evaluating the financial and operational impact of after-hour and weekend retinal surgeries: a comparative analysis in ophthalmology***

**Authors:** Patel AJ, Bilal SE, Liu JE, Ahmad BU

**Project Mentor:** Baseer Ahmad, MD; Ophthalmology

#### **Purpose**

Retinal surgeries are often done urgently, but studies show that certain pathologies treated with non-immediate intervention do not affect clinical outcomes. However, after-hour cases may have significantly more financial and operational impact than do regular-hour cases, with potential implications for system capacity and workforce sustainability. Our project aims to assess these concerns across three surgical settings

#### **Methods**

Retrospective, de-identified surgery and staffing cost data were collected from January 2023 to December 2024. Cost analysis was done by multiplying staff on-the-clock time by institutional mean wages. Operational efficiency metrics included procedure start delay, preoperative wait time, OR occupation time, procedure duration, and hospital stay duration.

#### **Results**

Data from 263 cases were analyzed including 184 EI regular-hour, 68 FH after-hour, and 11 FH regular-hour cases. After-hour FH per case mean staffing costs were 96% and 86% higher than regular-hour FH and EI costs respectively. Factors driving differences were off-the-clock rates and inefficiencies including procedure start delay (250% greater), preoperative wait time (99.2% longer), OR occupation time (15.8% increase), and hospital stay duration (31.5% longer).

#### **Conclusion**

After-hour retinal surgeries were associated with higher costs and reduced operational efficiency compared to ambulatory cases due to off-the-clock wages and workflow delays. Prior studies show that non-immediate surgeries do not affect clinical outcomes in certain pathologies. Institutions may increase savings and improve efficiency by safely moving appropriate cases to regular hours, which may reduce strain on system capacity and workforce sustainability. Future work should evaluate clinical outcomes and identify criteria for distinguishing emergent situations from nonemergent retinal pathologies.

## **Gabriella Patiño, BS**

### ***The Brain Doctors: Transforming Mental Health Curriculum for Elementary Students***

**Authors:** Patiño G, Milke J, Johnston B

**Project Mentor:** Bryan Johnston, MD; Family & Community Medicine

**Community Partner:** Milwaukee Academy of Science and St. Marcus Lutheran School

Mental health challenges often begin in early childhood, yet schools face persistent barriers to implementing mental health education. To address this gap, Brain Doctors, a medical student-led initiative, developed an updated two-lesson curriculum for 3rd grade students in Milwaukee focused on emotional regulation, mindfulness, and community wellness. The curriculum was delivered in Spring 2025 at two community partner schools: Milwaukee Academy of Science and St. Marcus Lutheran School. School staff participated in early planning to ensure developmental and cultural relevance, observed lesson delivery, and provided informal feedback. A licensed child psychologist reviewed the curriculum to align content with age-appropriate vocabulary and mental health concepts. Media materials were updated to include diverse, familiar characters and images reflecting students' cultural backgrounds.

A within-subjects pretest-posttest design was used with 110 students completing a 10-item knowledge assessment and a post-session satisfaction survey. While knowledge scores improved across five learning objectives (items 1, 3, 4, 6, and 8), results were not statistically significant ( $p > 0.05$ ), possibly due to high baseline knowledge or assessment limitations. Despite limited measurable gains, student engagement was high. Most students reported enjoying the sessions, feeling heard, and intending to share what they learned. Future work will focus on assessing students' confidence in applying coping strategies and managing emotions to better capture program impact. These findings support the value of culturally responsive, age-appropriate mental health education in early childhood.

Both partner schools provided consent to be named. While co-authorship was offered in recognition of their contributions, they respectfully declined.

## **Samantha Penzkowski**

### ***Evaluating Emergency Department Adherence to the Head CT Imaging Guideline for Traumatic Injury***

**Authors:** Penzkowski, S., Peschman, J., Milia, D., Carver, T.

**Project Mentor:** Thomas Carver, MD; Surgery

**Background:** Trauma is the foremost cause of mortality among individuals under the age of 45, with traumatic brain injury (TBI) constituting a substantial portion of these cases. Head computed tomography (hCT) is critical for diagnosing and assessing TBI. While enabling the identification of potentially life-threatening conditions, universal hCT can lead to increased costs. Our trauma service has a guideline to assist physicians in determining the necessity of hCTs. This study aims to evaluate adherence to this guideline. We hypothesized that 5% of hCTs could be avoided with guideline adherence.

**Methods:** This retrospective chart review was performed on all adult ( $\geq 18$  years) trauma activations at an ACS level 1 trauma center from 01/2023-09/2023. Patients were excluded if a hCT was performed at a referring institution. Data collected included demographics, hCT usage and results, initial Glasgow Coma Scale (GCS), use of anticoagulants, drug or alcohol usage prior to the event.

**Results:** 1,242 of 2,626 trauma activations met inclusion criteria (47.3%). 122 patients (9.8%) received hCTs outside of the guideline and 9 of those patients (7.3%) were found to have intracranial hemorrhages. None of these patients required subsequent neurosurgical intervention.

**Conclusion:** Although only ~10% of hCT were obtained outside of the guideline, these patients highlight a potential benefit of scrutinizing our ordering practices. Further optimization of hCT utilization could reduce unnecessary imaging and associated healthcare costs.

## Steve Peralta

### *Enhancing preparedness and inspiring future healthcare professionals through stop the bleed training in milwaukee public schools*

**Authors:** Peralta SA, Davis C, Carlos V

**Project Mentor:** Christopher Davis, MD, MPH; Surgery

**Community Partner:** Milwaukee Fire Department

This project aims to address the gap in emergency preparedness within Milwaukee Public Schools (MPS) through the implementation of Stop the Bleed (STB) training. STB is a life-saving initiative designed to empower community members with skills to act effectively in emergencies involving trauma. Initial efforts have focused on integrating this training into select schools, and early successes have been achieved through partnerships with dedicated teachers and the Milwaukee Fire Department (MFD).

The pilot program targets training 30-50 students in High School, with plans to expand throughout the academic year. Collaborations with the Milwaukee Public School Board of Directors in the 8th district and MFD are central to scaling these efforts. The overarching goal is to equip students with critical skills, enhance emergency response capabilities, and reduce feelings of helplessness in crisis situations. Furthermore, this project seeks to cultivate student instructors and encourage careers in healthcare.

To date, multiple training sessions have been conducted at Reagan High School, and important relationships have been established with MFD and the school board. Looking ahead, this initiative aims to provide STB training to 50-150 students at a Milwaukee public High School, with expansion into additional schools planned for the future.

As community partnerships continue to strengthen, this project holds significant promise for broader implementation across MPS. By establishing annual STB courses, the program aims to create a sustainable structure that enhances public safety, improves emergency preparedness, and inspires students to pursue careers in STEM and healthcare.

## Justin Perez Chavez

### *Water bead growth and shrinking in different solutions in vitro*

**Authors:** Perez J, Schuh JM, Dounce C, Morelos A, Abebrese E, Bergner C, Salazar JH

**Project Mentor:** Jose H Salazar Osuna, MD, PhD; Surgery

#### Background

Water beads are toys that expand by absorption. When ingested, they have been implicated in small bowel obstructions. Laxatives have been administered after ingestion in attempt to prevent obstruction. Our primary aim was to evaluate the growth patterns and maximal diameter of various water beads in multiple solutions. Our secondary aim was to identify a liquid capable of shrinking expanded water beads.

#### Methods

Water beads (10 standard size brands; 3 jumbo) were tested for growth and shrinking. Growth was assessed in nine clinically relevant liquids (e.g. tap water, simulated gastric fluid) and shrinkage in four (Gastrographin™, Omnipaque™, honey, and Gatorade™). Diameter was measured at intervals for 96 hours. Expanded beads were transferred to shrinking solutions and measured for 24 hours.

#### Results

Standard size water beads grew to a maximum 0.9 cm - 1.7 cm. Jumbo beads grew to a maximum 4.9 – 6.0 cm. All brands grew in polyethylene glycol (PEG). Gastrographin™ and honey substantially shrank expanded beads (mean jumbo bead diameter decrease at 24 hours of 31% and 32% respectively). The shrinking effects of Omnipaque™ (7%) and Gatorade™ (6%) were less pronounced.

#### Conclusion

Ingestion of water beads has caused intestinal obstruction in children. In vitro growth of water beads demonstrates that standard size beads do not grow larger than most blueberries, but jumbo beads can grow larger than a golf ball. Water beads substantially expand in polyethylene glycol, which puts into question its use as a laxative to treat water bead ingestions. Gastrographin™ and honey shrink water beads; clinical utility should be explored.

## Abigail Peterson

### ***Determinants of Morbidity Following Retrosigmoid Craniotomy: A Cohort Analysis***

**Authors:** Peterson A, Mattheisen H, Shahbandi A, Cheek S, Zwagerman N

**Project Mentor:** Stephanie Cheek, MD; Neurosurgery

**Objectives:** Approximately 10% of brain tumors arise in the cerebellopontine angle (CPA). The retrosigmoid approach is commonly used for resection of CPA tumors, yet predictors of postoperative outcomes remain incompletely defined. This study evaluates several factors associated with outcomes following retrosigmoid tumor resection.

**Methods:** We retrospectively reviewed adult patients undergoing retrosigmoid surgery at our institution from 2018–2025. Demographic, socioeconomic, perioperative, imaging, and outcome data were analyzed using standard univariate and regression statistical tests.

**Results:** Seventy-nine patients were included (61% female), mean age 56 years, BMI 30.0, and tumor diameter 26.8 mm. Gross total resection was achieved in 54% and 30-day mortality was 1.3%. Tumors were vestibular schwannomas (VS's) (49%) and meningiomas (33%). Sex, BMI, and closure type were not significant outcome predictors. Older patients had less severe permanent facial weakness ( $p=0.010$ ). Patients without private insurance had larger tumors than privately insured patients ( $p=0.031$ ). VS's had higher cranial nerve (CN) deficit rates than meningiomas ( $p=0.006$ ). Larger tumors were associated with postoperative headache (OR 3.20,  $p=0.020$ ) and longer hospital stay ( $B=1.513$ ,  $p=0.003$ ).

**Conclusion:** Outcomes after retrosigmoid resection are driven primarily by tumor factors. Larger tumor size was associated with more challenging postoperative recovery, including increased headaches and prolonged hospitalization, while VS histology was linked with increased CN deficits. Increased age was unexpectedly associated with less severe postoperative facial weakness. These findings may improve preoperative counseling, risk stratification, and surgical planning for patients undergoing retrosigmoid tumor resection.

## Josh Pfeifer

### ***Retrospective study of suctioning in bronchiolitis***

**Authors:** Joshua Pfeifer, Mahua Dasgupta MS, Ke Yan PhD, Tracey Liljestrom MD

**Project Mentor:** Tracey Liljestrom, MD; Pediatrics; Medicine

**Objective:** To examine the association between suctioning modality and gaps in suctioning with length of stay (LOS).

**Patients and Methods:** We performed a retrospective cohort study of children aged 2 to 24 months hospitalized on the acute care floor with a primary diagnosis of bronchiolitis between September 1, 2022, and April 30, 2024. Gaps in suctioning were defined as > 4 hours without suctioning in the first 24 hours after admission. Percent nasopharyngeal (NP) suction was calculated based on all suctioning events in the first 24 hours. Primary outcome was LOS. Secondary outcomes included escalation of respiratory support, the need for nasogastric (NG) feeds, transfer to the ICU, and 7-day readmissions.

**Results:** There was no correlation between the number of gaps in suctioning and LOS ( $p=.39$ ). Increasing proportion of NP suctioning was associated with increasing LOS ( $p<.0001$ ). Decreased gaps in suctioning indicated decreased odds of needing NG feeds ( $p=0.03$ ). Gaps in suctioning were not correlated to transfers to the ICU, escalation of respiratory support, or 7-day readmissions. NP suctioning percentage was associated with transfer to the ICU ( $p<0.0001$ ), escalation of respiratory support ( $p<0.0001$ ), highest level of respiratory support ( $p=0.0006$ ), but not with NG feeds or 7-day readmissions.

**Conclusions:** For children hospitalized with bronchiolitis, percentage of NP suctioning in the first 24 hours was associated with longer LOS, escalation of respiratory support, and ICU transfers. Gaps in suctioning >4 hours were associated with NG feeds but not LOS.

## Drew Price

### *Dissemination of a patient-prioritized research agenda for kidney stone disease: patient perceptions and opportunities*

**Authors:** Price, D, Taisan, G, Sheridan, K, Dauw, C, Scales, C, Zellers, C, Zellers, K, Streeper, N, Ellison, J

**Project Mentor:** Jonathan Ellison, MD; Urologic Surgery

#### Objective:

To query a broad group of stakeholders, including patients, caregivers, clinicians, and researchers, for feedback on a patient prioritized research agenda for kidney stone disease, and assess stakeholder perceptions of community engagement opportunities for kidney stone disease.

#### Methods:

We surveyed stakeholders who previously engaged in a broad-reaching effort to develop a patient-prioritized research agenda, inquiring as to the relevance of the final research agenda. Importance was rated for each agenda item on a scale of 1 (least important) to 9 (of critical importance). Surveys were administered electronically and distributed via a variety of channels over three rounds.

#### Results:

Of the 68 / 162 (42%) returned and fully completed surveys, five of the six agenda items met or exceeded median importance values of seven, demonstrating that they were of critical importance to a majority of stakeholders. Overall, only 33% and 22% of patients and caregivers reported ease in finding educational resources and support groups for kidney stone disease. While 93.7% of the cohort felt the work being done was meaningful, 71.4% of the cohort were willing to personally enroll in at least one of the agenda items if given the opportunity.

#### Conclusions:

A patient-prioritized research agenda for kidney stone disease reflects important topics to most stakeholders, including patients and caregivers. This agenda will help guide future research directions that stakeholders feel have the greatest immediate need to be addressed. Opportunities to further engage kidney stone community members are needed and should include ready access to support groups and educational materials.

## Giovanni Quiroz Delfi

### *The Impact of DRP1 and MFN1/2 Modulation on Mitochondrial Morphology and Dynamics in Endothelial Cells*

**Authors:** Quiroz Delfi GO , Gutierrez-Huerta CA , Birch EC , Beyer AM

**Project Mentor:** Andreas Beyer, PhD; Medicine;Physiology

Endothelial microvascular dysfunction is a modifiable risk factor that predicts major adverse cardiac events. Mitochondrial fission and fusion are important regulators of cellular and mitochondrial homeostasis and regulate and we hypothesize that altering mitochondrial fission and fusion may play a critical role in modulating endothelial function. Mitochondrial fission is primarily mediated by DRP1. Fusion is mediated by OPA1 and OMA1 which conjoin the mitochondrial internal membrane while MFN1 and MFN2 conjoin the mitochondrial outer membrane. To investigate this, we modulated DRP1 and MFN1/2 using an AAV vector and siRNA to HMEC-1 cells and in a proof-of-principle experiment, subsequently measured the amount of protein expressed for each by western blot analysis. We then used immunofluorescence to visualize mitochondrial networks and hypothesized that increasing DRP1 would lead to increased fragmentation. To assess mitochondrial function, we conducted a series of Seahorse experiments to assess oxygen consumption rate (OCR). Western blot analysis revealed that levels of DRP1 increased 30% with AAV treatment and decreased by 38% when treating with siRNA. IF analysis presented that AAV-DRP1-treated cells had increased mitochondrial fragmentation; this phenotype was also observed when HMEC1 cells treated with AAV-MFN1/2. Seahorse analysis showed that treating with AAV-MFN1 increased mitochondria OCR; however, treatment with AAV-MFN2 did not. Treatment with AAV-DRP1 did not alter HMEC1 mitochondria OCR. In contrast, treatment with siMFN1, siMFN2, and siDRP1 all increased mitochondria OCR in this cell type. Our results show that altering DRP1 and MFN1/2 lead to distinct phenotypes but overall show that causing a disbalance of mitochondria fission and fusion is linked to morphologic changes coupled with changes in mitochondrial ATP production efficiency.

## Damini Rao

### *Improving Health Education at a Local Shelter for Unhoused Men*

**Authors:** Rao DR, Diehr S

**Project Mentor:** Sabina Diehr, MD; Family & Community Medicine

**Community Partner:** The Guest House

This paper describes the development of a community-based health education initiative for unhoused men residing at a local shelter. Recognizing that socially marginalized men experience significant disparities in healthcare access, health literacy, and treatment outcomes, the project aimed to create an approachable environment for improving health awareness and promoting healthy behaviors. Existing literature highlights the unique barriers faced by unhoused men, including stigma in healthcare settings, limited continuity of care, and reliance on emergency services. In response, this initiative emphasized accessible and practical health education tailored to residents' needs.

Program development began with collaboration between shelter staff, case managers, and medical students to identify relevant topics and establish trust. Monthly evening sessions were conducted over six months and addressed subjects such as personal hygiene, oral care, foot care, mental health, diabetes, and skin conditions. Presentations were designed to encourage open discussion and engagement. Surveys collected participant feedback regarding clarity, usefulness, and potential behavioral changes.

Fifteen surveys were completed during the study period. Results demonstrated positive participant experiences, with all respondents reporting that they enjoyed the sessions and felt treated with kindness and respect. Many participants described learning new information and identified specific health-related behaviors they intended to adopt. However, barriers such as medical jargon, limited resources, and challenges sustaining long-term behavioral change were identified. Overall, the findings suggest that small-scale, community-centered educational initiatives can improve health awareness and foster empowerment among unhoused men.

## Ian Rodriguez

### *Pediatric tinnitus: risk factors for abnormal physical findings*

**Authors:** Melin S, Rodriguez I, Adams JA, Friedland DR, Shay SG

**Project Mentor:** Sophie Shay, MD; Otolaryngology

#### BACKGROUND

Pediatric tinnitus is poorly understood in both presentation and management. This study aims to identify common conditions associated with pediatric tinnitus and predictors of physical examination or audiologic findings.

#### METHODS

Retrospective chart review of pediatric patients (age <18.0 years) seen for tinnitus between 2015-2024. Patients with preexisting hearing loss, tympanostomy tubes, or prior otologic surgery were excluded. Demographics, audiologic findings, and clinical data were collected.

#### RESULTS

A total of 543 patients seen for pediatric tinnitus of which 147 (27.1%) had an abnormal finding. Fifty-six patients (12.9%) had an abnormal physical exam finding, 67 (13.2%) had an abnormal tympanogram, and 74 (14.7%) had an abnormal audiogram. Perceived hearing loss was associated with abnormal physical exam (odds ratio [OR]=2.34, 95% confidence interval [CI] [1.30-4.21], p=0.003), audiogram (OR= 3.89, 95% CI [2.33-6.51], p<0.001), and tympanogram (OR= 1.81 95% CI [1.04-3.14], p=0.035). Precipitating event was significantly associated with abnormal physical exam findings (OR= 2.27 95% CI [1.05-4.92], p=0.037). Children younger than 9 years were more likely to have an abnormal tympanogram (OR= 2.22, 95% CI [1.91-4.14], p=0.012), and those older than 12 years were more likely to have abnormal audiometry (OR= 2.83, 95% CI [1.218-6.581], p=0.016), respectively).

#### CONCLUSIONS

For all children presenting with tinnitus, audiologic assessment is necessary, though age is a likely effect modifier for abnormal audiometry. Patients reporting hearing difficulty or those with a precipitating event should be evaluated by otolaryngology. We propose a tinnitus referral protocol such that children without risk factors may be seen directly by audiology for evaluation and tinnitus counseling.

## Sean Rodriguez, BS

### ***Age and Racial Disparities in Manipulation Rates Following Total Knee Arthroplasty: an 11-Year Review***

**Authors:** Rodriguez SR, Mickelson EJ, Decker MM, Neilson JC, Conrardy RD, Yang K, Wiese D, Nettrour JF

**Project Mentor:** John F Nettrour, MD; Orthopaedic Surgery

**Introduction:** Manipulation under anesthesia (MUA) is a recognized treatment for early postoperative stiffness following total knee arthroplasty (TKA). Although limited preoperative range of motion is a known risk factor, the influence of other patient-related factors remains unclear. This study evaluated the association of employment status, marital status, language, and socioeconomic factors with MUA following primary TKA.

**Materials and Methods:** A retrospective review of a prospectively collected multicenter database was performed for primary TKAs from July 1, 2012 to December 3, 2023. Cases were contributed by 23 surgeons across 7 surgical sites. Patients undergoing MUA within 16 weeks of index TKA were identified. Demographics, employment status, marital status, primary language, and Area Deprivation Index (ADI) were collected. Differences in MUA incidence were analyzed using two-sample t-tests and Pearson's chi-squared tests. Multivariate and matched case-control logistic regression analyses were performed to identify independent predictors of MUA. Statistical significance was defined as  $p < 0.05$ .

**Results:** Among 6,110 primary TKA patients, 265 (4.3%) underwent MUA within 16 weeks. Patients requiring MUA were significantly younger than those who did not (median age 67 vs. 73 years,  $p < 0.001$ ). Self-identification as Black or African American was associated with increased MUA incidence (10.3% vs. 4.3% overall,  $p < 0.001$ ). Gender, marital status, employment status aside from "disabled," other racial categories, primary language, and ADI were not significantly associated with MUA incidence.

**Conclusion:** Younger age and Black/African American race were independently associated with higher rates of MUA following TKA. These findings may help inform postoperative expectations and guide efforts to optimize outcomes following knee arthroplasty.

## Katelyn Rokus, BS

### ***School stress in adolescent suicide attempts and nonsuicidal self-injury***

**Authors:** Rokus KE, Kohlbeck SA, Huang S, Pickett ML

**Project Mentor:** Sara Kohlbeck, PhD, MPH; Psychiatry

Suicide is one of the leading causes of death in adolescents and young adults in the United States. Adolescents face unique social, emotional, and educational challenges at school, but little is known about how these factors are related to suicide and nonsuicidal self-injury (NSSI). This study aims to investigate the relationship between suicide attempts, NSSI, and different categories of school-related stress in a cross-sectional survey of adolescents ages 10 to 17 seen in the emergency department. Participants provided survey data rating the stressfulness of different aspects of school. Demographic variables included age, race/ethnicity, gender, and sexual orientation. Ratings from participants with and without past suicide attempts and NSSI were compared to determine the relationship between NSSI, suicide attempts, and school-related stress. On average, participants with past suicide attempts or NSSI had higher ratings of school-related stress than those without. Participants with one or more past suicide attempts had significantly higher ratings for the stress of future uncertainty. Those with NSSI in the past year had significantly higher ratings for the stress of future uncertainty, stress of school performance, and stress of peer pressure. These findings provide support for school-based prevention programs for suicide and NSSI, as well as qualitative research into the stressful and protective aspects of school, especially those related to future uncertainty, school performance, and peer pressure.

## **Taylor Roska**

### ***Disability Ethics in Medical Education: Evaluating a Hybrid Didactic and Community Panel Curriculum at the Medical College of Wisconsin***

**Authors:** Roska TJ, Friedrich AB

**Project Mentor:** Annie Friedrich, PhD; Institute for Health & Humanity

People with disabilities (PwDs) represent a significant and historically underserved patient population within healthcare. Despite growing incorporation of social inequity into medical training, disability-focused education remains underrepresented in medical school curricula. In response to this gap, we developed a pilot disability ethics educational session for clinical medical students at the Medical College of Wisconsin-Milwaukee.

The session combined a faculty-led didactic presentation with a community panel featuring individuals with disabilities and caregivers discussing lived experiences within healthcare. Student objectives included increasing understanding of ableism, improving familiarity with barriers faced by PwDs, and highlighting lived experiences through narrative learning. Session effectiveness was evaluated using optional pre- and post-session electronic surveys assessing student familiarity, comfort, and perceptions regarding disability in healthcare.

Students reported strong overall satisfaction with the session and perceived it as a valuable addition to their medical education. Following the seminar, students demonstrated increased familiarity with disability-related healthcare challenges and greater confidence working with PwDs in clinical settings. Learners particularly emphasized the value of hearing directly from community members, citing the panel as one of the most impactful aspects of the curriculum. Many students also expressed interest in continued disability-focused education and increased representation of PwDs within standardized patient experiences.

These findings suggest that hybrid didactic and community-based educational models may serve as an effective approach for incorporating disability ethics into medical training and fostering more inclusive, patient-centered care.

## **Michael Roth, M.S., B.S.**

### ***Firearm violence exposure and prevention attitudes among Milwaukee youth: A secondary analysis of MY VOICE***

**Authors:** Roth MA, Snooks KC.

**Project Mentor:** Kellie Snooks, DO, MPH; Pediatrics

**Background:** Firearm violence is a leading cause of death among youth in the United States, with disproportionate impact on Black adolescents in urban communities. Despite extensive national research, local data on how adolescents in high-burden cities like Milwaukee experience firearm violence remains limited.

**Methods:** This study is a secondary analysis of MY VOICE (Milwaukee Youth Voices: Open Conversations on the Gun Violence Epidemic), a mixed-methods study designed to gauge youth perspectives on gun violence. Pre- and post-focus group survey data was collected from 30 youth and young adults ages 14–21 in the Milwaukee, Wisconsin area.

Frequency of exposure to firearm violence in community and school settings, perceived solvability of firearm violence, and demographics were assessed. Associations between demographic factors and weekly exposure were evaluated using Fisher's exact tests and risk ratios with 95% confidence intervals.

**Results:** Eleven participants (36.7%) reported weekly or more frequent community exposure to gun violence, and 5 (16.7%) reported weekly school exposure. No statistically significant differences in exposure were identified by race or age, and confidence intervals were wide. Fourteen participants (46.7%) believed gun violence can be fixed, and 80% endorsed at least some belief in solvability. Participants with higher community exposure were less likely to believe gun violence can be fixed (36.4% vs. 52.6%), though this difference was not statistically significant.

**Conclusion:** Despite frequent exposure to firearm violence, Milwaukee youth largely maintain optimistic outlooks regarding its solvability. These findings are consistent with national trends and highlight the importance of incorporating youth voices into community-focused firearm violence prevention efforts.

## Filip Saitis

### *Incidence, Staging, and Outcomes of Merkel Cell Carcinoma in Solid Organ Transplanted Patients*

**Authors:** Saitis FA, Waugh E, Kasprzak J, Kersting KE, Clarke CN, Istl AC, Hillmer R

**Project Mentor:** Ryan Hillmer, PhD; Cell Bio, Neuro, Anatomy (CBNA)

#### Background

Solid-organ transplant recipients (SOTRs) are more likely to develop skin cancers with worse oncologic outcomes than immunocompetent (IC) patients. However, data analyzing differences between SOTRs and IC patients with Merkel cell carcinoma (MCC) is scarce. This study aims to characterize outcomes in SOTRs with MCC and report granular details about their treatment.

#### Methods

This retrospective cohort study examined patients treated for MCC between January 2000-March 2025 at a single high-volume tertiary care center. We obtained demographic, clinicopathologic, treatment, and outcomes data for SOTRs with MCC. The primary outcome was overall survival (OS). A secondary outcome was median time from diagnosis of MCC to death.

#### Results

We identified 14 patients with Merkel cell carcinoma (MCC) and history of solid organ transplant and 16 distinct instances of primary MCC lesions amongst these patients. One-year overall survival (OS) in our cohort was 44% and five-year OS was 13%. The median time between diagnosis of MCC and patients' death was 10 months (IQR 7-20).

#### Conclusions

SOTRs with MCC have worse OS compared to historical data for immunocompetent patients. Further investigations are required to determine which factors are most responsible for SOTRs' poor OS. Our results point to the necessity for screening and treatment strategies tailored to the SOTR MCC population.

## Arantxa Sanchez

### *Evaluating the Impact of BMI on Robotic Adrenalectomy Outcomes*

**Authors:** Sanchez A, Lisevick AB, Dream SY

**Project Mentor:** Sophie Y. Dream, MD, MPH; Surgery

#### Background

Robotic adrenalectomy can be performed via transabdominal (TA) or retroperitoneoscopic (RP) approaches, but the impact of BMI on outcomes remains unclear. The Posterior Adiposity Index (PAI), predictive of operative time in RP adrenalectomy, has not been studied in robotic cases. This study evaluated the impact of BMI and PAI on outcomes in TA and RP robotic adrenalectomy.

#### Methods

This retrospective cohort study included adult patients who underwent robotic adrenalectomy from 5/2018–6/2024. Patients were grouped by surgical approach. Demographics, comorbidities, surgical history, nodule characteristics, and outcomes (operative time, blood loss, length of stay (LOS), complications) were analyzed by approach and BMI. PAI correlations with operative time and blood loss were assessed in RP cases.

#### Results

Among 150 patients (mean age 55, 69% female), 99 underwent TA and 51 underwent RP robotic adrenalectomy. TA patients had larger nodules (3.0 vs. 2.0 cm,  $p=0.028$ ), higher BMI (34.5 vs. 30.9,  $p=0.048$ ), and more blood loss (10 mL vs. 5,  $p<0.005$ ). Operative time, LOS, and complications were similar between approaches. Patients with a BMI  $>30$  had more pulmonary comorbidities and greater CPAP use than those with BMI 25–30. LOS differed slightly due to outliers in the BMI  $>30$  group ( $p=0.030$ ), while operative time, blood loss, and complications were similar across BMI groups. PAI, BMI, and preoperative characteristics did not significantly affect operative time.

#### Conclusion

Robotic platforms may mitigate the technical challenges of adrenalectomy in patients with elevated BMI. PAI does not appear to predict operative time in robotic adrenalectomy.

## **Parker Schimmers, BA**

### ***Delisting from the kidney transplant waiting list: Impact on patient survival***

**Authors:** Schimmers P, Cooper E, Glime W, Asassfeh A, Arpali E, Dunn T, Cooper M, Rawashdeh B

**Project Mentor:** Matthew Cooper, MD; Surgery

**Background:** Kidney transplant programs may remove high-risk patients from the national transplant waiting list to reduce peri-transplant complications and improve post-transplant survival. The designation “too sick,” frequently reported to the Organ Procurement and Transplantation Network (OPTN), lacks specificity. Limited data describe survival outcomes among patients who are delisted and become ineligible for transplantation. This study characterizes reasons for delisting and evaluates survival following removal.

**Methods:** We performed a retrospective analysis of adults aged 18 years and older removed from the kidney transplant waiting list between January 2011 and December 2015. Patients were categorized by primary reason for delisting as medical or psychosocial. Primary endpoints were 5-year survival and restricted mean survival time (RMST) at 5 years.

**Results:** Among 240 eligible patients, 124 (51.7%) were delisted for medical reasons and 116 (48.3%) for psychosocial reasons. Cardiovascular comorbidities were the most common medical cause (44 patients, 35.5%). Overall, 55% of delisted patients survived 5 years. Patients delisted for medical reasons had a 5-year survival rate of 43% and an RMST of 3.3 years; those delisted for cardiovascular causes had 44% survival. Patients delisted for psychosocial reasons demonstrated superior outcomes, with 70% 5-year survival and an RMST of 4.31 years ( $P < 0.001$ ). At 5 years, patients with coronary artery disease had 51% survival versus 57% among those without coronary artery disease ( $P = 0.046$ ).

**Conclusion:** Cardiovascular disease is the leading cause of delisting. Despite this, many delisted patients survived longer than anticipated, underscoring the need for more precise, patient-centered transplant eligibility criteria.

## **Jacob Schleicher**

### ***Mid or short-term outcomes of different pavlik protocols for developmental dysplasia of the hip***

**Authors:** Schleicher JC, Tassone CJ

**Project Mentor:** Channing J Tassone, MD; Orthopaedic Surgery

**Background:** Developmental dysplasia of the hip (DDH) is a common orthopedic disorder in newborns, affecting up to 34 per 1000 live births. For infants under 6 months, the Pavlik harness (PH) is the standard treatment, achieving an 80-97% success rate (Atalar et al., 2007). However, about 2.81% may experience residual acetabular dysplasia (RAD) (Gahleitner et al., 2024) or require further intervention after failed treatment. This study compares long-term outcomes between a 6-week and a 12-week PH protocol, including treatment success, RAD incidence, and need for surgery.

**Methods:** This retrospective chart review included patients aged 6 months or younger diagnosed with unilateral or bilateral DDH between 2012 and 2019, showing ultrasound-reduced hips within 4 weeks of full-time PH use. Patients were followed until either no RAD was observed at 2-4.5 years or RAD required surgery. Exclusions included neuromuscular diseases, congenital anomalies, known syndromes, and absence of long-term follow-up. Fisher’s exact test and Mann-Whitney test were used, with a p-value  $< 0.05$  considered significant.

**Results:** Thirty-eight patients met the inclusion criteria. Demographics, physical exam findings, and radiographic measurements did not differ significantly between groups. Time to first normalized  $\alpha$ -angle differed significantly, with a median of 6.0 weeks in the short-course group versus 7.5 weeks in the long-course group ( $p=0.002$ ). PH success did not differ significantly between treatment durations ( $p=0.33$ ).

**Conclusion:** A 6-week PH protocol was not associated with lower success or increased surgical intervention compared with a 12-week protocol. Initial ultrasound may not appropriately guide PH treatment protocol decisions for young children with DDH.

## **Caitlin Schwanke**

### ***Provider perception of hazards in pediatric and cardiac intensive care***

**Authors:** Bushee C, Venkitachalam R, Schwanke CA, Scanlon MC

**Project Mentor:** Raji Venkitachalam, MBBS; Pediatrics

#### **INTRODUCTION**

Hospital environments contain numerous hazards that can harm patients. Patient safety efforts have largely focused on retrospective analyses of adverse events, with fewer prospective approaches. Unlike other industries that emphasize proactive hazard identification and mitigation, healthcare has not widely adopted structured, evidence-based strategies. As an initial step, we assessed hazard awareness among providers in pediatric and cardiac intensive care units (PICU, CICU).

#### **METHODS**

This project was deemed non-human subjects research. A list of potential hazards was developed across categories including high-risk medications, personnel, lines/drains/tubes, technology, environment, and patient-specific factors. High-risk medications were based on the Institute for Safe Medication Practices (ISMP) list. Hazards were identified from de-identified patient charts on five randomly selected days, and patient rooms were assessed for environmental risks. Physicians and advanced practice providers (APPs) identified hazards using a standardized definition, and their responses were compared to those of the research team.

#### **RESULTS**

Eighteen providers (10 physicians, 8 APPs) were interviewed across 98 patient encounters. Physicians identified 30% of hazards, while APPs identified 15%. Providers were more likely to recognize lines, tubes, and certain high-risk medications such as vasoactive infusions. They also identified patient-specific risks not captured by the research team.

#### **CONCLUSION**

Providers identified fewer than half of observed hazards, highlighting the need for greater emphasis on proactive hazard recognition to improve patient safety and guide system-level interventions.

## **Austen Schweinert, BS**

### ***Quantifying Sleep and Stress in Pediatric Surgical Fellows Using a WHOOP Device: A Pilot Study***

**Authors:** Schweinert AR, Larson A, Aprahamian CJ, Calkins CM

**Project Mentor:** Casey Calkins, MD; Surgery

**Intro:** Physician wellness has received increased attention over the past 15 years, especially following the COVID-19 pandemic, which intensified burnout among healthcare providers. This pilot study evaluated stress and recovery patterns in a pediatric surgical fellow using the WHOOP wearable device, which continuously collects physiologic data including heart rate variability (HRV), sleep, strain, and recovery. The objective was to assess associations between wearable-derived stress markers and work responsibilities (call days, regular workdays, and days off).

**Methods:** This prospective 3-month study included one fellow from the Pediatric Surgery Department at Children's Wisconsin/MCW. The participant wore a WHOOP device continuously, recording daily strain, HRV, sleep duration, and sleep performance. Daily work experiences were collected using Qualtrics surveys. Kruskal-Wallis and Mann-Whitney U tests compared WHOOP metrics across work conditions (on-call, post-call, normal workday, off-duty) and subjective rigor of the day. Significance was set at  $p < 0.05$ .

**Results:** Eighty-six observational days were analyzed. Sleep duration differed by workday category ( $p = 0.003$ ), with the lowest median sleep post-call (307 min, IQR 199–374) and highest on off-duty days (457 min, IQR 341–509). Sleep was reduced post-call versus normal workdays ( $p = 0.035$ ) and on/post-call versus off-duty ( $p < 0.01$ ). Sleep duration also varied by day rigor ( $p = 0.038$ ), with shorter sleep after moderate-severe days (336 min) compared with mild days (386 min). Sleep performance was lower after moderate-severe days (67%) versus mild days (77%) ( $p = 0.029$ ). HRV and strain trended higher post-call but were not significant.

**Conclusions:** Wearable technology can detect physiologic effects of surgical training, particularly reduced sleep duration and performance, supporting further research on physician wellness.

## **Drake Seibert, BA**

### ***Skin cancer prevention behaviors among patients at a free urban sexually transmitted infection clinic***

**Authors:** Seibert DW, Bobholz MJ, John SA, Burich-Weatherly R; Petroll AE, Nyitray AG

**Project Mentor:** Alan Nyitray, PhD; Psychiatry

**Community Partner:** Brady East STD Clinic

**Background:** Skin cancer is the most common malignancy, and early detection reduces mortality, but access to care, including knowing where to obtain a skin exam, remains a barrier. This study assesses factors associated with knowledge of where to obtain a skin cancer screening among patients at a free urban sexually transmitted infection clinic.

**Methods:** We conducted a cross-sectional Qualtrics survey given to patients aged  $\geq 14$  years at Brady East STD Clinic (BESTD) in Milwaukee, Wisconsin (August 2024–July 2025). The primary outcome, knowledge of where to obtain a skin exam, was analyzed using bivariate and multivariable logistic regression to assess associations with demographic and behavioral factors.

**Results:** Among 131 respondents, fewer than half (42.7%) knew where to obtain a skin exam; this knowledge was associated with older age, white race, private insurance, and regular sun protection use. In the multivariable analysis, increasing age was associated with higher odds of knowing where to go, while lack of insurance and prior tanning bed use were associated with lower odds.

**Discussion:** Knowledge of where to obtain a skin exam was lower among younger, uninsured individuals and those with a history of tanning bed use, highlighting gaps in access among high-risk populations. Targeted education and improved referral pathways to dermatologic care, particularly in free clinic settings, may help address these disparities.

## **Maya Seshan, BS**

### ***Firearm Patent History: A Pilot Exploration***

**Authors:** Seshan M, Hargarten S

**Project Mentor:** Stephen Hargarten, MD, MPH; Emergency Medicine

Over 4,000,000 children live in homes with unsecured and loaded firearms. In 2023, 6,194 children and adolescents died from firearm-related events. Prior studies suggest that firearm safety technologies may provide additional risk reduction for unintentional firearm injury and death; however, the origins of engineered firearm safety mechanisms have received limited research attention. This pilot study sought to determine the prevalence of selected handgun safety technologies and their patents, develop a chronology of their invention, and examine the cultural impetus for their creation through patent records, company catalogs, and historical sources.

Four safety features were selected: grip safeties, magazine safeties/disconnects, loaded chamber indicators, and drop safeties. Patents linked with these safety devices were analyzed, and additional data points were recorded. Data sources included the USPTO database, lens.org, historical and current manufacturer catalogs, and firearm history forums.

The search yielded 7,304 patents, ranging from the early 1800s to 2020. Drop safeties had the most patents ( $n=3,403$ ), followed by grip safeties ( $n=2,518$ ), magazine disconnects ( $n=901$ ), and loaded chamber indicators ( $n=482$ ). The US military and police were driving forces for three of the four mechanisms analyzed. Military or police involvement was found in 87.5% of drop safety cases, 90% of magazine disconnect cases, and 80% of grip safety cases. Other catalysts included fatal and nonfatal injuries and technology innovation.

Integrating firearm safety features is critically important to reducing unintentional deaths and injuries. Patent activity across three centuries suggests that manufacturers should be partners in reducing unintentional firearm-related morbidity and mortality.

## Sebastian Sewera, BS

### *Holding up the Mirror: Utilizing the Perspectives of Medical Students to Improve the Clinical Learning Environment*

**Authors:** Tasse I, Sewera S, Vepraskas S, Kay C, Pavlic A, Muntz M

**Project Mentor:** Ashley Pavlic, MD; Emergency Medicine

#### Purpose

We sought to understand medical students' perspectives of behaviors that foster psychological safety (PS) within the clinical learning environment (CLE) during their third-year clerkships.

#### Methods

Midway through clerkships, medical students wrote brief narratives responding to a prompt asking them to reflect on clinician educators who made them feel psychologically safe. Responses were reviewed, and qualitative codes were developed using grounded theory. Two team members coded each reflection which were organized via thematic analysis with an iterative approach with a larger workgroup of medical educators.

#### Results

The most used codes included, "creating an anti-perfectionist environment", "creating an environment where questions are okay," and "creating an environment where everyone belongs/inclusive". Of 765 narratives, 39% referenced internal medicine physicians, followed by pediatrics (23%) and surgery (18%). Students identified residents (70%), attendings (21%), and fellows as leaders who fostered PS.

#### Conclusion

Medical students recognize behaviors that foster PS within the CLE. While PS is included in general faculty onboarding and "Residents as Teachers" activities, emphasis on the specific behaviors that foster PS is lacking in resident and faculty development curricula. We plan to use existing metrics to identify the impact of these interventions in CLE improvement and share via future scholarly work with transparency to all CLE participants through departmental report cards.

## Diaa Shammout

### *Influence of Scholarly Projects on Residency Application Outcomes Amidst Transition to Pass/Fail Grading for USMLE STEP 1*

**Authors:** Shammout D, Sheriff SA, Abdelrahim MT, Jha P

**Project Mentor:** Pinky Jha, MD; Medicine

#### Background:

Scholarly activity during medical school is an important factor in residency selection and influences match success. After the USMLE Step 1 exam transitioned to pass/fail reporting in January 2022, greater emphasis was expected to be placed on other aspects of residency applications, including research productivity. This shift may have reinforced trends toward increased scholarly output, often emphasizing quantity over quality. This study examined the role of scholarly work in residency outcomes and students' perceptions of holistic application review.

#### Methods:

An IRB-approved Qualtrics survey was distributed to fourth-year medical students at the Medical College of Wisconsin. The survey evaluated perceptions of the role of scholarly projects in securing residency positions. Data were analyzed using descriptive statistics and Fisher's exact tests in R version 4.1.2, with  $p < 0.05$  considered significant. Free-text responses were analyzed for common themes.

#### Results:

Of 187 students surveyed, 59 responded (response rate >30%), and 93% matched successfully. Among matched students, 56% secured their first-choice residency. Internal medicine, anesthesiology, and psychiatry were the most common specialties. No significant differences were found between students who matched to their top choice and those who did not in publication number or interview discussion of research ( $p = 0.85$ ). However, 63% reported that presenting or publishing research was highly beneficial.

#### Conclusion:

These findings highlight the perceived importance of scholarly work in residency applications and emphasize the value of early involvement in high-quality research aligned with student interests.

## **Rayba Shaw Shaw, B.S.**

### ***Social determinants of health and readmission patterns among medicaid managed care beneficiaries: A quality improvement analysis.***

**Authors:** Shaw R, Lodes MW.

**Project Mentor:** Mark W Lodes, MD; Medicine;Pediatrics

**Community Partner:** MyChoice Wisconsin and Molina Healthcare

Hospital readmissions remain a major indicator of care quality, particularly among Medicaid beneficiaries with complex medical and social needs. This quality improvement (QI) project, conducted in collaboration with My Choice Wisconsin and Molina Healthcare, examined patterns of single versus multiple hospital readmissions among Medicaid managed care members using two de-identified datasets. Initially designed to investigate associations between housing instability, food insecurity, and transportation barriers using a structured Social Determinants of Health (SDoH) questionnaire, the intermediate dataset provided for analysis included living arrangement, program type, demographic characteristics, and diagnosis patterns. These were analyzed as initial SDoH-aligned indicators.

The analysis included 147 hospitalization–readmission events across 85 unique members from November 2023 to November 2024. Of these members, 62% experienced one readmission episode, while 38% experienced two or more. Living arrangement patterns suggested that members living independently in their own homes or apartments displayed a higher likelihood of multiple readmissions compared with members residing in structured residential facilities. Diagnosis patterns showed high frequencies of respiratory infections, COPD exacerbations, heart failure, sepsis, and urinary tract infections—conditions sensitive to transitional care quality and self-management capacity. Program type patterns identified Partnership and DSNP–Family Care beneficiaries as representing most of the high-utilizing members. These findings highlight the need for improved SDoH data capture, strengthened transitional care workflows, and targeted support for independently living, medically complex members. Future QI cycles should integrate structured SDoH fields into MIDAS to enable more precise outcomes and intervention design.

## **Salma Sheriff, BS**

### ***Fostering resilience through mentorship and game-based learning: a mixed methods trial of the STRYV365 trauma-informed school program***

**Authors:** Meurer JR, Lumelsky P, Chelius TH, McGuire M, Stoltenburg A, Bates G, Kosuri S, Sheriff S, Harvey T, Gundacker C, Sparapani R, Antognoli D, Hallowell C, Currie B

**Project Mentor:** John R Meurer, MD, MBA; Institute for Health & Humanity

**Community Partner:** STRYV365

Adverse childhood experiences (ACEs) can have long-term negative effects on emotional regulation, social skills, and academic performance. Social-emotional learning (SEL) interventions are crucial for fostering resilience and positive behaviors. This study evaluates how the STRYV365 trauma-informed interventions, integrating emotional intelligence (EI) principles through coaching, physical activities and a video game, impacted students facing ACEs. A clustered cross-over incomplete block factorial randomization trial was conducted in four Milwaukee schools, involving students in grades 5–10. SEL outcomes were measured through surveys and qualitative data from focus groups and interviews. 329 students assented to completing six surveys over four semesters with 57 students participating in focus groups and 68 in interviews. 29 teachers also completed focus groups. Based on qualitative findings, both interventions led to improvements in self-awareness, self-management, relationship skills, decision-making, emotional regulation and resilience. Teachers reported increased student engagement and emotional openness. Regression models of survey data showed coaching significantly improved emotional regulation ( $p=0.04$ ) and the video game enhanced coping strategies ( $p=0.03$ ), with marginal synergy in co-delivery. Students exposed to adversity, particularly family incarceration, had lower self-awareness. This study demonstrates the potential to improve SEL outcomes among children experiencing adversity through trauma-informed coaching and educational video games. While coaching significantly improved emotional regulation, video game implementation encountered challenges with student engagement, indicating that its scalability depends on enhanced implementation strategies. These findings highlight the important role of EI in trauma-informed interventions for urban youth.

## Adileen Sii

### ***Building Foundations in AANHPI Culturally Intelligent Care: A Module and Live Training for Future Healthcare Providers***

**Authors:** Adileen C. Sii, BS; Maya L. Seshan, BS; Andrew N. Doan, BS; Lana M. Minschew, PhD, MEd; Kajua B. Lor, PharmD

**Project Mentor:** Jacquelyn Laplant, MD; Ophthalmology

**Community Partner:** Milwaukee Consortium for Hmong Health

The Health Advancement for Asian Pacific Islanders through Education (HAAPIE) program at the Medical College of Wisconsin is a student-led initiative dedicated to improving cultural humility with Asian American Native Hawaiian Pacific Islander (AANHPI) communities. This pilot study examines the effectiveness of a hybrid curriculum comprised of online modules and an in-person session to enhance learners' cultural awareness in caring for AANHPI communities. The session focused on the Hmong, Burmese, and Karen communities, underrepresented Southeast Asian refugee communities in Milwaukee. The online course included six modules whereby students completed an introductory session, "Module 1: Local Spotlight—the Hmong", and chose two of four elective modules (Cancer, Diabetes, Cardiovascular, Mental Health). The in-person session featured a didactic lecture by a board-certified physician, an overview of AANHPI health disparities, and a panel discussion with a local shaman and two community health workers. Pre- and post-session evaluations were conducted, and learners overwhelmingly reported that the session was effective in improving their self-reported cultural knowledge, awareness, and skills regarding care for AANHPI communities. Integrating in-person workshops with digital content enhanced cultural humility training by providing both increased accessibility and flexibility in learning and applying these skills. The in-person session allowed for interactive, community-engaged experiences, accommodating diverse learning needs while fostering deeper cultural understanding and practical application in clinical settings. This approach aligns with findings that emphasize the importance of combining various educational modalities to improve cultural humility with healthcare professionals.

## Samuel Simon

### ***Preventing a Return to Homelessness: A Scoping Review of the Literature in a Post-Truth Climate***

**Authors:** Nelson D, Weber A, Tasse I, Simon S

**Project Mentor:** David Nelson, PhD, MS; Family & Community Medicine

**Objectives.** To examine how post-COVID homelessness prevention research aligns with, or diverges from, shifting political narratives and policy, situating homelessness within broader debates about the role of politics in public health. **Methods.** We conducted a scoping review following PRISMA-ScR guidelines, searching PubMed for articles published between April 3, 2019, and April 3, 2024. Eligible studies evaluated interventions designed to prevent a return to homelessness among adults. Data were extracted and synthesized thematically to identify dominant intervention models and outcomes.

**Results.** Seventeen studies met inclusion criteria. All evaluated housing-based interventions. Twelve studies incorporated structured case management services, including Assertive Community Treatment or Intensive Case Management, and seven included supplemental supports such as income assistance, employment services, or peer support. Across diverse populations and settings, HF, particularly when paired with high-intensity case management, consistently demonstrated superior housing retention and reduced returns to homelessness. No novel intervention models emerged during the study period, despite rising homelessness and evolving post-pandemic needs.

**Conclusions.** The persistence of Housing First as the most effective intervention, alongside growing political resistance to its implementation, highlights the tension between public health evidence and politicized policymaking. Homelessness illustrates how public health is both shaped by and embedded within political systems, and how departures from evidence-based governance can undermine health equity. Strengthening productive relationships between politics and public health, by grounding housing policy in scientific evidence rather than partisan ideology, is essential to preventing recurrent homelessness and improving population health.

## **Sohil Singh, BS**

### ***Clinical pathways and outcomes of head and neck lymphatic malformations: a decade-long review at a multidisciplinary vascular anomalies clinic***

**Authors:** Singh S, Chun RH, Carlberg VM, Adams J, Friedland DR, Puccia R

**Project Mentor:** Ryan Puccia, MD; Otolaryngology

**Introduction:** Head and neck lymphatic malformations (HNLMs) are anatomically complex and often require multimodal management, but contemporary outcomes from multidisciplinary programs incorporating targeted agents and glue embolization are not well described.

**Methods:** We performed a retrospective case series of children with HNLMs seen in a multidisciplinary vascular anomalies clinic from 2014-2024. Demographic, anatomic, imaging, genetic, treatment, and 90-day postoperative complication data were abstracted from the electronic health record and analyzed with descriptive statistics and exact/nonparametric tests.

**Results:** Fifty-nine patients were included; 39.0% had multiregional disease. Lesions were microcystic in 42.4%, macrocystic in 37.3%, and mixed in 20.3%; macrocystic/mixed lesions were larger than microcystic lesions (median 5.6 vs 2.6 cm,  $p < 0.01$ ). Median age at multidisciplinary evaluation was 7.7 years. Eight patients (13.6%) underwent PIK3CA testing, and all were positive. Sclerotherapy was performed in 40 patients (67.8%; 86 procedures) and was the cornerstone intervention; 25.4% received systemic therapy (sirolimus and/or alpelisib), and three underwent n-BCA glue embolization-assisted resection. Overall, 10 patients (16.9%) experienced  $\geq 1$  complication. Per-procedure complication rates were 5.8% after sclerotherapy, 11.3% after resection without embolization, and 0% after glue embolization. Cyst morphology and lesion size were not significant predictors of complications.

**Conclusion:** Children with HNLMs in this multidisciplinary program had substantial disease burden, delayed specialty evaluation, and frequent need for multimodal therapy. Complication rates were modest and not clearly driven by morphology, size, or procedure type, supporting early referral, structured care pathways, and broader molecular testing to enable targeted therapies.

## **Makayla Slaby, BS**

### ***Near-peer teaching and its impact on self-assessed teaching efficacy among medical student tutors***

**Authors:** Slaby MS, Ashworth R.

**Project Mentor:** Rachel Ashworth, MD; Pediatrics

**INTRODUCTION** Near-peer teaching (NPT) has become increasingly prominent in medical education. Prior studies have demonstrated clear benefits for learners. However, there is limited evaluation of the impact of structured longitudinal NPT programs on peer tutors' development as educators. We aimed to evaluate the impact of participation in an NPT program on tutors' self-assessed teaching efficacy and confidence.

**METHODS** This was a single-institution, survey-based study of a preclinical NPT program at the Medical College of Wisconsin. Second- and third-year medical students facilitated small-group learning sessions for first-year medical students during their preclinical curriculum. Electronic surveys were distributed to peer tutors before and after participation and to learners during participation. Survey items assessed teaching confidence and efficacy, foundational knowledge, and clinical reasoning.

**RESULTS** From peer-tutors, 17 baseline and 33 post-participation responses were collected. Agreement with statements assessing teaching confidence and teaching efficacy increased from 75% at baseline to 98% post-participation. Agreement with statements assessing foundational knowledge and clinical reasoning increased, as well, from 73% to 100% and 76% to 100%, respectively. Additionally, 98 learner survey responses were collected. Among learners, 96% agreed peer-tutors explained concepts clearly and effectively, and 100% agreed peer discussion enhanced confidence in their medical knowledge.

**CONCLUSIONS** Participation in NPT was associated with increased self-reported teaching efficacy among peer tutors and knowledge benefit among both tutors and learners. Structured NPT programs are a mutually beneficial education model that may provide an opportunity to support both learners and the early development of medical students as educators.

## Ellen Slattery

### *Patient-reported reasons for nonuse of diabetes technology in pediatric type 1 diabetes*

**Authors:** Slattery E, Kaeppler C, Yan K, Liegl M, Wolfgram P

**Project Mentor:** Peter Wolfgram, MD; Pediatrics

**Objective:** Continuous glucose monitors (CGMs) and insulin pumps improve glycemic control and quality of life in type 1 diabetes (T1D). We sought patient-reported reasons for not using CGMs or pumps for management of pediatric T1D.

**Methods:** Anonymous surveys were administered to patients with a diagnosis of T1D for  $\geq 6$  months in a pediatric diabetes clinic who were not using a pump or CGM. Surveys collected self-reported duration of T1D, HbA1c range, pump/CGM information sources, and reasons for nonuse of diabetes technology.

**Results:** Wearability/aesthetics was the most common reason for nonuse of both pumps and CGMs (pump: 69.2%; CGM: 85.7%), followed by lack of trust in technology (pump: 38.5%; CGM: 14.3%).

**Conclusion:** A substantial proportion of both CGM and pump nonusers reported current or future interest in use of technology, and over half of pump nonusers indicated that additional education might increase their likelihood of adoption. These results highlight the importance of consistent, patient-centered discussions and education regarding available technologies. Early discussion of pump benefits and patient concerns may build trust as a large proportion of pump nonusers in our cohort had a relatively recent T1D diagnosis and most learned about pumps from our medical team.

## Victoria Smith, BS

### *Impacts of a climate health equity course for public school educators*

**Authors:** Smith VT; Talarico K; De Leon E; El Manssouri A; Rublee C; Beyer K

**Project Mentor:** Kirsten Beyer, PhD, MPH, MS; Institute for Health & Humanity

**Community Partner:** Milwaukee Public Schools

**Background:** Milwaukee Public Schools (MPS) educators are tasked with integrating climate change education into their curriculum. A Climate Health Equity curriculum was developed to prepare educators to integrate climate change related instruction into their teaching, helping students to understand the natural environment and actions they can take to slow climate change and mitigate negative health outcomes.

**Methods:** Participants enrolled in a course for MPS educators across all levels of education. Three cohorts of teachers were engaged in the course from January 2024 to May 2025. Paper surveys were administered at the beginning and conclusion of the course to evaluate the impact of the curriculum. Measures included the Climate Change Hope Scale, Milwaukee Environmental Health Literacy Scale, Climate Change Knowledge Test, and Colorblind Racial Attitudes Scale. Statistical analyses, including descriptive statistics and paired t-tests, was used to examine pre/post change. Analyses were conducted in Stata.

**Results:** Participants had greater hope for the environment in the context of climate change ( $p < 0.001$ ), experiencing a greater belief in themselves ( $p < 0.001$ ) and their communities ( $p < 0.001$ ) to create beneficial environmental change. In addition to a higher degree of optimism regarding climate change, participants also gained greater health literacy ( $p < 0.001$ ) and self-efficacy ( $p < 0.001$ ). Participants also gained a greater awareness of racial privilege ( $p = 0.027$ ) and institutional discrimination ( $p = 0.043$ ), which underly a comprehensive understanding of climate health equity.

**Conclusion:** This curriculum was impactful for educators in how they view climate change, health, and equity. Similar curricula can be beneficial for building climate change knowledge and resilience within educational systems.

## **Wanda Snell, MS**

### ***Long-term seizure outcomes after anterior temporal lobectomy***

**Authors:** Snell W, Green C, Janecek J, Deb A, Yang K, Raghavan M, Mueller W, Pillay S, Lew S, Carlson C, Gupta K, Pandya V, Swanson SJ

**Project Mentor:** Sara Swanson, PhD; Neurology

Anterior temporal lobectomy (ATL) is an effective treatment for drug-resistant temporal lobe epilepsy (TLE), yet long-term outcomes and the influence of follow-up attrition remain incompletely characterized. We retrospectively reviewed 390 adults who underwent ATL at a single tertiary epilepsy center from 1991 to 2024. Seizure outcomes were recorded at 6-12 months and at 2, 5, and 10 years using Engel classification; additional analyses evaluated mortality, documentation completeness, and demographic, cognitive, imaging, and seizure-related predictors. Among patients with gradable documentation, a substantial proportion achieved Engel Class I outcomes at each interval (74.3% at 6-12 months; 85.7% at 10 years). Documentation availability declined over time, but attrition analyses found no significant demographic, socioeconomic, cognitive, or seizure-related differences between those retained and those without documented follow-up, supporting the internal validity of available estimates. In outcome-weighted mixed-effects models accounting for repeated measures and class imbalance, greater lifetime generalized tonic-clonic seizure burden was independently associated with lower odds of postoperative seizure freedom, while superior Trail Making Test Part B performance was associated with higher odds of seizure freedom over time. Time effects were not consistently significant at later intervals in adjusted models. These results indicate that, although descriptive Engel rates among patients with gradable data suggest durable seizure control after ATL, adjusted longitudinal analyses identify lifetime GTCS burden and preoperative executive-function performance as the most salient predictors of outcome and argue for standardized long-term outcome tracking in epilepsy surgery research.

## **Hannah Soczka**

### ***Developing family medicine residents as community health educators***

**Authors:** Soczka H, Johnston B, Songco D

**Project Mentor:** Bryan Johnston, MD; Family & Community Medicine

**Community Partner:** Meta House

Community-engaged medical education can improve health literacy while strengthening relationships between medical training programs and underserved communities. Family Medicine residents from MCW partner with Meta House, a residential treatment program for women with substance use disorders, to deliver health education sessions during community medicine rotations. Although these sessions aim to support participant health and recovery, their impact from the perspective of Meta House participants has not been well evaluated. This study explored how resident-led health education influences participants' understanding of health, engagement with healthcare, and recovery. Family Medicine residents delivered weekly one-hour health education sessions including presentations, discussion, and open question-and-answer periods. Participants who had attended several sessions were invited to complete semi-structured interviews near the end of treatment. Interviews were audio-recorded, transcribed verbatim, and de-identified. Open thematic coding was conducted until thematic saturation was reached. Fifteen participants were interviewed. Five themes emerged: (1) health education supported a holistic approach to recovery by addressing physical health alongside emotional healing; (2) sessions were valuable across diverse educational backgrounds and encouraged peer learning; (3) the group format created a safe environment that reduced barriers to discussing health concerns; (4) healthy behaviors were reframed as coping strategies during recovery; and (5) participants described reconnecting with their bodies and recognizing the importance of preventive care. Resident-led community health education may support recovery by improving health knowledge, promoting empowerment, and encouraging re-engagement with primary care while strengthening community-academic partnerships.

## **Matt Strong Strong, BS**

### ***Military Medical Academic Enrichment Experience (MMAE): A pilot pre-post study demonstrating improved medical student knowledge of military and veteran healthcare***

**Authors:** Gonzales J, Strong M, Nguyen V, Lee K, Burek G

**Project Mentor:** Kenneth Lee, MD; Physical Medicine & Rehabilitation

#### **Background:**

Military-connected patients represent a clinically important population, yet medical trainees may receive limited formal instruction in military culture, Veterans Affairs (VA) systems, Department of Defense (DoD) structure, and service-related health concerns. The Military Medical Academic Enrichment Experience (MMAE) was developed at the Medical College of Wisconsin to provide future physicians with practical tools to improve care for current and former military members. The curriculum addressed DoD/VA structure, military service timelines, healthcare eligibility, military culture, PTSD, and basic military history-taking. Three M2 medical students co-hosted the elective.

#### **Methods:**

A 20-question pretest/posttest design was used to evaluate learner knowledge before and after the MMAE curriculum. Questions 1–10 were multiple choice and graded using an answer key. Questions 11–20 included free-response items and were scored using flexible criteria that accepted synonymous wording, acronyms, and clinically equivalent responses. Nine matched participants had complete pretest and posttest data and were included in the final paired analysis. Scores were analyzed using descriptive statistics, paired-samples t-test, effect size calculation, and Wilcoxon signed-rank testing.

#### **Results:**

Mean total scores increased from 10.78/20 on the pretest to 17.78/20 on the posttest (mean gain = 7.00 points). This improvement was statistically significant,  $t(8) = 8.08$ ,  $p = 0.000041$ , with a very large effect size (Cohen's  $d_z = 2.69$ ). The Wilcoxon signed-rank test confirmed significance ( $p = 0.0039$ ).

#### **Conclusion:**

Participation in the MMAE curriculum was associated with substantial improvement in medical student knowledge of military and veteran healthcare topics. These findings support continued development of military-focused educational programming in medical training.

## **Sophia Sorenson**

### ***Investigating the long-term effects of prenatal cannabidiol exposure on brain development in mice***

**Authors:** Sorenson SE, Martinez Ramirez CE, Hillard CJ

**Project Mentor:** Cecilia J Hillard; Pharmacology & Toxicology

Cannabidiol is used by people for all manner of ailments, including nausea, anxiety, and pain. Many pregnant women will use CBD for the above reasons, but there is little data on the safety of CBD for the developing fetus. Preliminary data suggests that prenatal CBD leads to autism-like behavioral deficits. In preclinical studies, autism-like behaviors have been associated with changes to embryonic neurogenesis and adult hippocampal neurogenesis. We hypothesize prenatal CBD exposure will cause autism-like behavior and increased embryonic hippocampal neurogenesis. The first aim of the study was to test that prenatal CBD exposure causes autism-like behavior. **Methods:** To assess for autism-like deficits in behavioral flexibility and spatial memory, Morris water maze experiments were performed. The second aim of the study was to determine if prenatal CBD exposure leads to increased embryonic hippocampal neurogenesis which was assessed via immunohistochemistry data. Pregnant dams were provided with single pieces of control cereal or CBD-containing cereal, and experiments were conducted on adult mouse offspring. Data analysis was done via two-way ANOVA. **Results:** CBD-exposed female offspring had significantly increased time to reach a new platform. However, there was no significant increase in number of mature neurons for male or female mice. **Conclusions:** Behavioral data suggests impaired behavioral flexibility in CBD-exposed mice. Embryonic hippocampal neurogenesis plays a critical role in the development of the hippocampal tri-synaptic circuit, which is essential for spatial memory and behavioral flexibility. Prenatal CBD treatment may alter hippocampal neurogenesis thereby impairing this circuit.

## Vishal Srinivasan

### *Exploring the Use of Photovoice to Develop Cultural Intelligence in Medical Students*

**Authors:** Srinivasan V, Minshew LM

**Project Mentor:** Lana M Minshew, PhD, M.Ed; School of Pharmacy

Over the last 100 years, the United States has become home to an increasingly diverse population, representing numerous cultures. It is, therefore, imperative that healthcare professionals develop cultural intelligence to provide culturally sensitive care. However, the question of how best to incorporate cultural intelligence in medical education remains unsolved. Photovoice, a qualitative, participatory methodology in which individuals use photography and narrative discussion, provides a unique way to express and reflect upon experiences. In this study, six medical students from diverse backgrounds participated in a photovoice project in which they were asked to select and discuss photographs representing their own culture and a culture different from their own. Individual semi-structured interviews were conducted and analyzed using thematic analysis, from which six themes emerged: Process-Driven Factors, Traditions, Intrinsic Factors, Culture as a Place, Extrinsic Factors, and Reflection and Introspection. These findings suggest that Photovoice has significant potential as an innovative and engaging tool for developing cultural intelligence in medical students.

## Emily St. Denis

### *Evaluating the Impact of Student-Produced Physical Examination Videos in a First-Year Clinical Skills Curriculum*

**Authors:** Mickelson E, St. Denis E, Lewis M, Seshan M, Mackenzie E, Mitchen T, Treat R, Chou E

**Project Mentor:** Erica Chou, MD; Pediatrics

**Background:** Learning Physical exam (PE) skills is challenging for medical students. Institution-specific videos may standardize instruction and improve confidence. This study evaluated the impact of student-created PE videos on preparation, confidence, and performance during a first-year clinical skills course.

**Methods:** Three musculoskeletal and neuromotor PE videos were developed based on institutional PE rubrics and distributed to students as preparatory work prior to in-class sessions. Surveys and facilitator assessments were analyzed using descriptive statistics and non-parametric tests.

**Results:** Of 167 respondents, 57% viewed the videos. Students rated them highly for preparation ( $3.9 \pm 0.8$ ) and confidence ( $3.6 \pm 0.9$ ). No significant differences in facilitator-assessed performance were observed.

**Conclusions:** Institution-specific videos improved preparation and confidence but did not independently enhance PE performance.

## Zoe Sternberg

### *Evaluation of the Froedtert & MCW Ignite Pilot Program: An Educational Outreach Program to Spark Interest in Health Science Careers*

**Authors:** Sternberg ZA, Siker M

**Project Mentor:** Malika Siker, MD; Academic Affairs

Workforce shortages disproportionately affect regions experiencing health inequities. Early exposure to role models and hands-on experiences has been shown to increase interest in biomedical careers. Educational outreach programs that promote early engagement in health science careers may help address this challenge. Froedtert & the Medical College of Wisconsin (F&MCW) launched the Ignite program to provide students with immersive experiences aimed at increasing awareness of and interest in health science careers. This study evaluated the feasibility and early impact of the Ignite pilot program.

Ignite outreach events consisted of half-day campus visits including hands-on learning activities, a health science career panel, and discussions on health equity. Schools were invited to participate, with priority given to those located in ZIP codes identified as having significant health shortages. Participants completed voluntary anonymous pre- and post-event surveys assessing awareness of health science careers, interest in healthcare professions, and familiarity with F&MCW programs. Responses were compared by changes in the proportion selecting “agree” or “strongly agree.” The program hosted 15 events involving 353 students with a median age of 15 years. Among participants, 74% identified as female and 67% as underrepresented in medicine. Post-event surveys demonstrated increased interest (14%), knowledge (69%), and exposure (46%) to health science careers. Awareness of F&MCW programs increased by 135%, and interest increased by 107%. Student satisfaction was high, with 95% reporting activities were fun and 91% reporting increased knowledge.

These findings suggest Ignite is a feasible and engaging outreach model that may increase awareness and interest in healthcare careers among diverse student populations.

## Grant Stille

### *Examining age-related variation in human foveal cone density*

**Authors:** Stille G, Warr E, Grieshop J, Carroll J.

**Project Mentor:** Joseph Carroll, PhD; Ophthalmology

**Background:** Foveal cone photoreceptors are essential for high-acuity vision. Adaptive optics scanning light ophthalmoscopy (AOSLO) enables cellular-resolution imaging of the foveal cone mosaic, but normative data across the lifespan remain limited and are critical for distinguishing healthy aging from early disease.

**Purpose:** This study aimed to evaluate age-related differences in cone density across the retina using AOSLO images of the cone mosaic.

**Methods:** Sixty-nine subjects with normal vision (age range: 13–67 years) were imaged using AOSLO. High-resolution montages were created, and 300x300 $\mu$ m or 500x500 $\mu$ m foveal ROIs were extracted. Cone coordinates were identified, and a custom MATLAB script generated density heat maps. Cone density was measured at peak cone density (PCD) and 0.1–0.5 degrees eccentricity in superior and temporal directions; values were averaged at each eccentricity to yield one density per eccentricity. Age correlations with PCD were assessed via linear regression. Mixed-effects ANOVA with Tukey post hoc testing compared 3 age groups (10–24, 25–29, and 30 years or older) across eccentricities.

**Results:** Linear regression showed a non-significant correlation between age and PCD ( $R^2=0.02$ ,  $p=0.24$ ). Mixed-effects ANOVA revealed significant differences in cone density between the 10–24 and 25–29 age groups at 0.1–0.4 degrees eccentricity ( $p<0.05$ ). All other comparisons were not significant.

**Conclusions:** Foveal cone density is highly variable but appears generally stable with age. The observed density increase between the 10–24 and 25–29 age groups may relate to axial elongation during young adulthood. These findings improve our understanding of retinal aging and normative baselines.

## Megan Sullivan

### *Brain imaging findings in children with paroxysmal sympathetic hyperactivity after acute severe brain injury*

**Authors:** Sullivan MM, Scanlon MC, Maheshwari M, Yan K, Schmidt RE, Balakrishnan B

**Project Mentor:** Binod Balakrishnan, MD; Pediatrics

**Introduction:** Paroxysmal sympathetic hyperactivity (PSH) is characterized by episodic increases in sympathetic and motor activity following brain injury. Causes include traumatic and anoxic brain injury, intracranial hemorrhage, and CNS infection. PSH is associated with longer hospitalization and poorer outcomes. This study aimed to describe MRI brain findings and their relation with clinical course of children with new-onset PSH.

**Methods:** This retrospective single-site study included patients  $\leq 18$  years with acute severe brain injury, PSH symptoms, and brain MRI obtained during pediatric intensive care unit (PICU) admission from 2019-2023. Demographics, diagnosis, symptoms, and medications were collected. MRIs were manually scored for lesions across three sequences (SWI, FLAIR, DWI) in eight brain regions.

**Results:** Of 49 patients, median age was 11 years, 63% were male. Primary diagnoses were TBI (45%), cardiac arrest (16%), CNS infection (10%), intracranial bleed (8%). Median initial GCS was 3, hospital length of stay (LOS) 42 days, PICU LOS 17 days. Median number of maintenance medications was 3, included Clonidine (86%), Propranolol (71%), Bromocriptine (59%), Baclofen (39%), Gabapentin (37%), Dexmedetomidine (4%). Median daily average PSH modified clinical symptom score based on heart rate, respiratory rate, systolic blood pressure, temperature was 6.14. There was positive correlation between total FLAIR MRI lesions and number of maintenance medications ( $p=0.005$ ). There was positive correlation between total DWI MRI lesions and median daily PSH score ( $p=0.0071$ ) and between prefrontal cortex and anterior cingulate cortex lesions and median daily PSH score ( $p=0.0265$ ).

**Conclusion:** Certain types of MRI lesions are common in patients with PSH after acute brain injury and correlate with severity of clinical course of PSH.

## Gabriella Swistara

### *Examining the Mental Health Benefits of Poetic Form vs. Free Verse in Medical Students*

**Authors:** Swistara G, Spellecy R

**Project Mentor:** Ryan Spellecy, PhD; Institute for Health & Humanity

**Introduction:** Medical students suffer from a variety of mental health concerns including burnout, depression, anxiety, and suicidal ideation. Poetry therapy has demonstrated positive results in several populations, but has not been used in medical students before. This pilot project sought to explore if those same positive results could be replicated in medical students.

**Hypothesis:** One, poetry therapy will demonstrate mental health benefits in medical students. Two, poetic form will provide greater mental health benefits than free verse.

**Study Methods:** Mixed methods design used both quantitative mental health surveys (GAD-7, PHQ-9, MBI) and qualitative participant feedback. Groups consisting of medical students were randomly assigned to free verse or sonnet arms. Surveys were collected before and after the 3-month intervention period.

**Results:** There were mean declines in GAD-7, PHQ-9, and MBI scores across participants in all groups except MBI-B; however, when adjusted for outliers, median scores showed decline in burnout on MBI-B. Paired t-tests were run to further support the findings between poetry writing and positive mental health outcomes but were not statistically significant. An independent t-test was then run to assess sonnet vs free verse and was also not statistically significant. In the qualitative pre-surveys, participants often commented on a need for creativity, self-expression, and mental health benefits. In post-surveys, many participants noted improvement in their writing and a therapeutic benefit to writing weekly.

**Conclusions:** Our data was limited by our small sample size which decreased power. Additionally, running multiple tests on the same sample increases the likelihood of getting a false positive via type I error. Although limited, our results are promising and future directions should focus on replicating these findings in larger groups.

## Isabelle Tasse

### ***Holding up the Mirror: Utilizing the Perspectives of Medical Students to Improve the Clinical Learning Environment***

**Authors:** Tasse I, Sewera S, Vepraskas S, Kay C, Pavlic A, Muntz M

**Project Mentor:** Marty Muntz, MD; Medicine

#### Purpose

We sought to understand medical students' perspectives of behaviors that foster psychological safety (PS) on their third year clerkships.

#### Methods

Midway through their clerkships, medical students wrote brief narratives responding to a prompt asking them to reflect on clinician educators who made them feel psychologically safe. Responses were reviewed, and qualitative codes were developed using grounded theory. Two team members coded each narrative which were then organized via thematic analysis with an iterative approach.

#### Results

Of 765 clerkship narratives analyzed, 29% referenced internal medicine team members, followed by pediatrics (25%) and surgery (22%). Students identified residents (77%), attendings (15%), fellows, and senior students as leaders who fostered PS. The most commonly used codes included, "creating an antiperfectionist environment", "creating an environment where questions are okay," and "creating an environment where everyone belongs/inclusive".

#### Conclusion

Medical students recognize behaviors that foster PS. While PS is included in general faculty onboarding and "Residents as Teachers" activities, we will plan professional development activities to improve specific behaviors in this study. We plan to use existing metrics to identify the impact of these interventions in CLE improvement and share via future scholarly work with transparency to all CLE participants through departmental report cards.

## Grace Tews

### ***Prevalence, risk factors, and treatment of substance use among refugees in Sub-Saharan Africa: a scoping review***

**Authors:** Tews G, Bobholz M, Johnston B, Dickson-Gomez J, Glasman L

**Project Mentor:** Bryan Johnston, MD\*; Julia Dickson-Gomez, PhD; Laura Glasman, PhD; Family & Community Medicine; Institute for Health & Humanity

**Background:** Sub-Saharan Africa (SSA) has a prominent refugee population and increasing rates of substance use.

Refugees who use substances in SSA have overlapping risk factors and may be vulnerable to compounding consequences. Enhancing the understanding of substance use in this context is critical for informing future research and global intervention efforts.

**Objective:** This scoping review aims to identify the prevalence, risk factors, and consequences of substance use among migrants, refugees, and internally displaced persons (IDPs) in SSA, while also investigating the accessibility to harm reduction and treatment options.

**Methods:** A systematic search of four electronic databases yielded 276 articles. Following independent title and abstract screening, 24 full-text articles were assessed by separate reviewers, with 16 meeting final inclusion criteria. Data extraction and summarization was completed to identify salient information.

**Results:** While prevalence reporting was limited, available data indicate high levels of substance use. Findings regarding demographic risk factors varied; however, trauma exposure was consistently identified as a primary contributor. A broad range of substances used were identified with variation limiting comparability across studies. Substance use was linked to substantial physical, mental, and social health burdens, yet access to formal treatment services remained severely limited.

**Conclusions:** Substance use among displaced populations in SSA is a multifaceted public health challenge. While the sequelae of substance use among refugees are documented, data regarding true prevalence and specific risk factors remain fragmented. There is a clear need for more research and implementation of accessible, culturally appropriate harm reduction and treatment programs, though currently hindered by systemic resource constraints.

## Michael Thimmesch

### ***The durability of revision anterior cruciate ligament reconstruction: a comparison of patients at <5 years and ≥5 years after revision***

**Authors:** Thimmesch MJ, Kurkowski SC, Keller J, Kuechly HA, Le S, Kloby M, Branam B, Utz C, Grawe B, Thiessen A

**Project Mentor:** Adam Thiessen, MD; Orthopaedic Surgery

Background: Outcomes after revision anterior cruciate ligament reconstruction (ACLR) are well documented, but durability between short- and midterm follow-up has not been well compared.

Purpose: To evaluate the durability of revision ACLR outcomes at <5 years (short-term) versus ≥5 years (midterm) after surgery. Durability was defined as maintaining good patient-reported outcomes (PROs) or without requiring additional revision surgery. Secondary aims included comparisons by sex, graft type, and mechanism of rerupture.

Methods: A retrospective chart review with prospective PRO collection was performed in 53 knees undergoing revision ACLR. Outcomes included International Knee Documentation Committee, Knee Injury and Osteoarthritis Outcome Score (KOOS), Marx activity rating scale, ACL–Return to Sport after Injury scale, pain, satisfaction, return to sport, and rerupture rates. Statistical analyses included Mann-Whitney U, chi-square, Fisher exact tests, and odds ratios.

Results: Mean follow-up was  $5.29 \pm 2.96$  years (range, 2.0-20.5 years). No significant differences were found between short- and midterm groups except lower satisfaction (4.0/5 vs 2.5/5, respectively;  $P = .014$ ). Outcomes did not differ by traumatic versus atraumatic reinjury mechanism ( $P > .05$ ). Autograft patients were younger and had higher KOOS Activities of Daily Living scores than allograft patients, although no other differences were found ( $P > .05$ ).

Conclusion: Revision ACLR demonstrated durable outcomes from short- to midterm follow-up, with generally similar results regardless of sex, graft choice, or reinjury mechanism.

## Dominique Tlomak

### ***Outcomes in pediatric AML patients receiving allogeneic hematopoietic cell transplantation corresponding to cycles of pre-transplant chemotherapy***

**Authors:** Tlomak DH, Graff ZT.

**Project Mentor:** Zachary Graff, MD; Pediatrics

Acute myeloid leukemia (AML) is a relatively rare disease making up 15-20% of childhood leukemias, however mortality in children with AML is disproportionately large. Current standard of care is to induce a complete remission (CR) with intensive cytotoxic chemotherapy, followed by bone marrow transplant (BMT). Historically patients have three cycles of chemotherapy before transplant. Alternative rapid BMT timing involves transplant as soon as a CR is attained. We hypothesize that pediatric high-risk AML patients in first complete remission (CR1) who proceed on rapid BMT timing have improved overall survival (OS) and leukemia-free survival (LFS) compared to historical BMT timing patients due to less toxicity going into the transplant. Retrospectively comparing AML patients in our study population that underwent transplant after 1-2 cycles of chemotherapy (rapid BMT timing) vs. 3 or more cycles of chemotherapy (historical BMT timing), both OS and LFS were higher at 1 year and 2 years post BMT for patients who underwent rapid BMT timing. This trend persisted when comparing only the patient population that achieved CR1 after one cycle of chemotherapy, followed by the patient population that achieved MRD negativity after one cycle of chemotherapy, however more statistical power is needed to substantiate these observations. Studying outcomes of pediatric AML patients after subsequent transplants could elucidate further improvements to clinical practice such that these patients receive the highest quality of care while reducing toxic effects of AML treatment.

## **Natalia Tovar**

### ***Utility of transient elastography in Fontan associated liver disease***

**Authors:** Tovar N, Gumm A, Yan K, Schmidt, R.

**Project Mentor:** Alexis Gumm, MD; Pediatrics

The Fontan operation corrects single ventricle congenital heart disease. The procedure universally results in sequelae known as Fontan-associated liver disease (FALD), characterized by liver stiffness. Fibroscan© (transient elastography) is employed to quantify liver stiffness as a measure of liver congestion. This study investigated the unknown normal versus abnormal liver stiffness measurements (LSMs) in this unique population.

This retrospective chart review identified 26 patients who were status-post Fontan procedure and had completed a Fibroscan© from 2020-2025 via the Children's Wisconsin's EPIC EHR.

The mean Fontan Baffle Pressure was  $13.79 \pm 3.41$  (n=19), similar to the mean free hepatic venous pressure:  $13.67 \pm 3.22$  (n=18). The mean hepatic venous wedge pressure gradient was  $14.31 \pm 2.90$  mmHg (n=13), resulting in a mean hepatic venous pressure gradient  $1 \pm 0.64$  mmHg (n=13). The mean LSM (kPa) was  $18.70 \pm 9.06$ , and the mean CAP score was  $202.62 \pm 61.01$ . LSMs did not correlate with age (p=0.55), Fontan baffle pressure (p=0.12), or NYHA scores (p=0.41), and age did not correlate with Fontan baffle pressure (p=0.85).

While unable to identify new LSM "normals" for this population, we confirm all Fontan patients had LSMs >7 kPa, the normal cutoff for stage 1 fibrosis in other forms of liver disease; therefore, traditional LSM cutoffs may not be appropriate for those with single ventricle physiology. Studies with larger cohorts are needed to identify normal ranges for Fibroscans© in this population and to determine correlations with other demographics.

## **Kelvin Tran**

### ***Beyond pregnancy and HIV/STI prevention: A case for comprehensive sex education and the inclusion of topics surrounding violence, gender/sexuality, and relationships***

**Authors:** Tran KD; Weiss LM; Bock JM

**Project Mentor:** Jonathan Bock, MD; Otolaryngology

Comprehensive sexuality education (CSE) is commonly evaluated through its effects on pregnancy and HIV/STI prevention and sexual risk reduction. However, emerging literature suggests that broader school-based CSE curricula may also support adolescent development in lesser considered areas such as gender identity, consent, communication, relationship skills, personal safety, and violence prevention.

This review builds on Goldfarb and Lieberman's systematic review of three decades of literature published worldwide by narrowing the focus to U.S.-based literature from 2010-2026. We examined the literature while focusing on specific components of CSE and their association with outcomes beyond traditional sexual health measures. Thirty articles were selected for final analysis and categorized by primary focus: violence, gender/sexuality, relationships, or all three domains.

Results suggest that different CSE components are associated with distinct but complementary benefits.

Gender/sexuality-focused articles most often cited improved appreciation for gender identity; violence-focused articles most often cited improvements related to sexual abuse and personal safety; and relationship-focused articles most often cited improved knowledge and understanding consent and increased interpersonal communication. Articles addressing all three domains most frequently reported improvements in healthy sexual practices. These findings support the use of standardized, medically accurate, and developmentally appropriate CSE that extends beyond abstinence and disease prevention to address interconnected aspects of adolescent health, safety, identity, and relationships.

## **Shreyans Udani**

### ***Evaluating the Impact of Burnout Interventions on Physician Well-Being and Patient Satisfaction: A Systematized Review***

**Authors:** Udani SA, Alford B, Sinson G

**Project Mentor:** Grant Sinson, MD; Neurosurgery

**Introduction:** Physician burnout has become an increasingly important problem in the modern era of medicine. The externalities of physician burnout and decreased physician well-being have negative implications upon physicians, patients, and the broader systems involved in medical care. Many interventions to reduce physician burnout have been trialed, however it is not well understood what impact such interventions may have on patients. If particular interventions exist that improve physician well-being and improve the patient experience, adoption of such interventions may become more likely.

**Study Aims:** This study will investigate the relationship between intervention types and their impact upon physician burnout as well as patient satisfaction in order to determine which interventions may improve the experience for both physicians and patients.

**Methods:** A systematized review was completed, which sought any US study in which an intervention to reduce physician burnout was implemented. The included studies contained subsequent data with respect to post-intervention physician burnout and patient satisfaction measures.

**Results:** A total of 484 articles were collected through a peer-reviewed search. Interventions across all studies were labeled as 'Organizational' or 'Individual' based on the scope of the intervention. Interventions were then categorized into intervention types based on the nature of the intervention. Individual-directed intervention types were Mindfulness and Communication Skills. Organization-directed intervention types were Social Physician Engagement, Patient-centered Skills, Workflow, Reduction of EHR Burden, and Chronic Disease Management.

**Conclusion:** Intervention types that were associated with reduced physician burnout and improved patient satisfaction were Communication (and patient-centered) Skills and Social Physician Engagement.

## **Shreyans Udani**

### ***Evaluating the impact of burnout interventions on physician well-being and patient satisfaction: a scoping review***

**Authors:** Udani SA, Alford B, Sinson G

**Project Mentor:** Grant Sinson, MD; Neurosurgery

**Introduction:** Physician burnout has become an increasingly important problem to solve in the modern era of medicine. The externalities of physician burnout and decreased physician well-being have negative implications upon physicians, patients, and the broader systems involved in medical care. Many interventions to reduce physician burnout have been trialed, however it is not well understood what impact such interventions may be having on the associated patient populations. If particular interventions exist that not only improve physician well-being, but also improve the patient experience, adoption of such interventions may become more likely.

**Study Aims:** This study will investigate the relationship between particular intervention types and their impact upon physician burnout as well as patient satisfaction in order to determine which intervention, if any, may improve the experience for both physicians and patients.

**Methods:** A systematized review was completed, which sought any US study in which an intervention to reduce physician burnout was implemented. The included studies contained subsequent data with respect to post-intervention physician burnout and patient satisfaction measures.

**Results:** A total of 484 articles were collected through a peer-reviewed search. Interventions across all studies were labeled as "Organizational" or "Individual" based on the scope of the intervention. Interventions were then categorized into intervention types based on the nature of the intervention. Individual-directed intervention types were Mindfulness and Communication Skills. Organization-directed intervention types were Social Physician Engagement, Patient-centered Skills, Workflow, Reduction of EHR Burden, and Chronic Disease Management.

**Conclusion:** Intervention types that were associated with reduced physician burnout and improved patient satisfaction were Communication (and patient-centered) Skills and Social Physician Engagement.

## Elena Valentyn

### ***What contributes to progression-free survival and overall survival in patients with cervical cancer who undergo brachytherapy?***

**Authors:** Valentyn E, Small-Tom C, Erickson B, Bedi M

**Project Mentor:** Beth Erickson, MD; Radiation Oncology

The standard of care treatment of locally advanced cervical cancer is chemotherapy and external beam irradiation followed by brachytherapy. This treatment poses risks for morbidity to nearby organs such as the rectum, bowel, bladder, and vagina. National guidelines define dosimetric parameters to maximize cure and minimize morbidity. Understanding the impact of dosimetric parameters on survival outcomes is vital for future treatment of cervical cancer. We hypothesize that the HR-CTV D90 and D98 will correlate with overall and progression free survival in these patients. We conducted a retrospective review of 194 patients with locally advanced cervical cancer who underwent standard of care therapy. Key variables including demographic information, stage, brachytherapy dose and toxicity characteristics were analyzed using Kaplan-Meier and Cox proportional hazards models.

Of the 194 patients, 123 (63%) had a history of substance use disorder. The median HR D90 and D98 doses were 88 Gy and 44 Gy, respectively. Late grade 3 GU (7%) and GI (8%) toxicities were observed. Seven percent of patients were found to have local recurrence. Stage designation was significant for overall survival. For progression-free survival, stage and history of substance use were significant in the UVA; but only stage in the MVA.

Stage remains a strong predictor of PFS and OS in patients with cervical cancer. The HR-CTV D90 and D98 were not found to correlate with clinical outcomes, but there were few local failure events possibly complicating this correlation. Future analysis will investigate how increasing V200 HR-CTV relates to clinical outcomes in these patients.

## Jesse VanWart

### ***Can nucleotide scavenging prevent anti-cancer therapy-induced microvascular endothelial dysfunction?***

**Authors:** VanWart JM, Hammond ST, Nishijima Y, Terwood JD, Norwood-Toro LE, Birch EC, Hader S, Beyer AM

**Project Mentor:** Andreas Beyer, PhD; Medicine; Physiology

**Intro:** Preliminary studies from our group suggest cell-free mitochondrial DNA in the plasma of chemotherapy (CTx) patients may activate Toll-Like Receptor 9 (TLR9), leading to adverse cardiovascular effects. We hypothesized that plasma obtained from patients following CTx would contain higher levels of cell-free mitochondrial DNA compared to samples obtained prior to CTx, and post-CTx samples would increase TLR9 activation in HEK293 reporter cells that could be prevented with a nucleotide scavenging dendrimer.

**Methods:** Plasma samples from patients with hepatocellular carcinoma before and after CTx were assessed for changes in the levels of mitochondrial DNA markers D-loop and ATPase 6-8 using qPCR. TLR9 Reporter HEK293 cells and their Null line were used to assess TLR9 activation using Post-CTx plasma incubated with/without a nucleotide scavenger (PAMAM-G3). Data are presented as Mean  $\pm$  SD, statistical significance was determined via t-test (qPCR), or two-way ANOVA (HEK293 assay) \*  $P < 0.05$ .

**Results:** The difference in ATPase-6-8 was not statistically significant between pre-( $n=8$ ;  $1.34 \pm 1.25$  au) and Post-CTx ( $n=13$ ;  $3.13 \pm 2.59$  au) samples ( $p = 0.08$ ). D-Loop levels were higher in Post-CTx samples ( $n=13$ ;  $1.19 \pm 0.14$  au) than Pre-CTx ( $n=8$ ;  $1.01 \pm .17$  au;  $p = 0.02$ ). Post-CTx plasma increased TLR9 cell activation compared to null cells ( $15 \pm 11\%$ ,  $P < 0.001$ ). This was reduced with PAMAM-G3 treatment ( $-1 \pm 9\%$   $p < 0.001$ ).

**Conclusions:** These findings suggest a potential increase in plasma cell-free mitochondrial DNA from Pre- to Post-CTx. Additionally, HEK293 assays indicate that Post-CTx samples activate TLR9 and that this can be prevented with nucleotide scavenging.

## **Priscilla Vazquez, BS**

### ***MCW Co-Creation Collaborative Year 1 Program Evaluation***

**Authors:** Vazquez PA, Kambol A, Bray B, Otto C, Patitucci T

**Project Mentor:** Teresa Patituci, PhD; Cell Bio, Neuro, Anatomy (CBNA)

Background: Efforts to incorporate student perspectives into medical education have expanded, with increasing emphasis on student–faculty partnerships and co-creation. However, student involvement in curriculum development is often limited to short-term or task-specific contributions, which may restrict meaningful engagement and scalability. To address these limitations, the Co-Creation Collaborative (CCC) was developed as a student-led program with defined leadership roles, recruitment and onboarding processes, and faculty-student co-creation teams. Methods: Students are paired with faculty course directors based on curricular needs, student interest, and prior course completion. Teams engage in curriculum review, identify areas for improvement, and contribute to the development and revision of curricular materials. Following the first year of implementation, student and faculty participants completed a survey assessing perceptions, perceived skill development, and barriers to collaboration. Results: A total of 21 students and 14 faculty participated in the CCC, with survey responses obtained from 8 students and 8 faculty. Both groups reported high satisfaction and perceived value of the collaboration. Students reported greater growth across clinician-educator competencies and in perceived professional development compared to faculty. Qualitative responses highlighted bidirectional learning and contributions to curriculum development, while identifying challenges related to role clarity, communication, and program structure. Conclusion: The CCC demonstrates that structured student–faculty partnerships are feasible within a medical education setting and may support student development in academic medicine. Refinement is needed to balance flexibility with clear communication and shared understanding of partnership roles to optimize sustained collaboration.

## **Lazaro Vergara**

### ***Characterizing Households and Feasibility of a Novel Community-Led Water Lead Testing Approach to Identify Children At-Risk for Lead Poisoning in Milwaukee***

**Authors:** Vergara L, Adams S, Cross Dunham N, Taylor D, Washington DT, Nannis H, Diaz R, Hoium C, Mannan M, Weber T, Nelson D, Meurer JR, AnguzuR.

**Project Mentor:** Ronald Anguzu, PhD, MPH, MD; Institute for Health & Humanity

**Community Partner:** Community Water Services (CWS), City of Milwaukee Health Department, Coalition on Lead Emergency (COLE), Children’s Health Alliance of Wisconsin

Background: Lead exposure causes neurocognitive impairment, developmental delays, and long-term health consequences in children. In Milwaukee, socioeconomically disadvantaged neighborhoods experience disproportionate water lead exposure, contributing to health disparities. Community-led strategies may improve identification of at-risk populations, particularly children under six years, to inform preventive interventions.

Objective: This cross-sectional study assessed household water lead levels and psychometric properties of a portable device for household water lead testing in Milwaukee.

Methods: Between June and September 2024, water samples were collected from 44 households in zip codes 53205 and 53206 in Milwaukee, WI. Water lead was measured using handheld devices and validated by City of Milwaukee Health Department (MHD) testing. Elevated water lead levels were defined as >10 ppb. Surveys assessed household demographics, property characteristics, and perceived lead exposure risks. Differences by elevated water lead levels were examined using chi-square tests, and psychometric properties of the handheld device were assessed using MHD testing as the reference standard.

Results: Among 31 households with water lead results, 10% (n=3) and 3% (n=1) showed elevated water lead levels using portable devices and MHD testing, respectively. Fifty-eight percent (n=25) of households had at least one child under age six, and 66% (n=29) were renter-occupied. One-third (n=10) had confirmed lead lateral presence, which was not associated with elevated handheld or MHD lead levels. The portable device demonstrated 100% sensitivity, 93.3% specificity, 33.3% PPV, and 100% NPV.

Conclusions: Community-led household water lead testing using handheld devices was feasible, highly sensitive, and may improve the detection of elevated water lead in Milwaukee households.

## **Niki Viradia, MS, BS**

### ***Acne Vulgaris in Pediatric Patients Receiving Upadacitinib for Perianal Crohn's Disease: Incidence, Severity, and Management***

**Authors:** Viradia NK, ElKadri A

**Project Mentor:** Abdul ElKadri, MD; Pediatrics

Upadacitinib, a selective Janus kinase 1 (JAK1) inhibitor, has emerged as a promising therapy for pediatric patients with refractory perianal Crohn's Disease (CD). While its gastrointestinal efficacy has been described, cutaneous adverse effects, including acne vulgaris, remain poorly characterized in this population. We conducted a retrospective chart review of 4 pediatric patients receiving Upadacitinib at Childrens Wisconsin to evaluate the incidence, severity, management, and outcomes of acne vulgaris. Among twelve patients treated with Upadacitinib, four (33%) developed acne, ranging from mild-to-moderate to moderate-to-severe severity. Affected areas included the face, back, chest, shoulders, buttocks, and scalp. Management consisted primarily of topical therapies, with one patient receiving systemic antibiotics. Dose adjustments were required in one patient, and one discontinued therapy due to acne. Two patients achieved complete resolution, one demonstrated clinical improvement, and one was lost to follow-up. Our findings highlight that acne vulgaris is a common, generally manageable adverse effect of Upadacitinib in pediatric patients and underscore the importance of early recognition and dermatologic management to optimize treatment adherence and quality of life.

## **Lien Weiss, BS**

### ***Beyond Pregnancy and HIV/STI Prevention: A Case for Comprehensive Sex-Education and the Inclusion of Topics Surrounding Violence, Gender/Sexuality, and Relationships***

**Authors:** Weiss LM, Tran KD, Bock J

**Project Mentor:** Jonathan Bock, MD; Otolaryngology

Comprehensive sexuality education (CSE) is commonly evaluated through its effects on pregnancy and HIV/STI prevention and sexual risk reduction. However, emerging literature suggests that broader school-based CSE curricula may also support adolescent development in lesser considered areas such as gender identity, consent, communication, relationship skills, personal safety, and violence prevention.

This review builds on Goldfarb and Lieberman's systematic review of three decades of literature published worldwide by narrowing the focus to U.S.-based literature from 2010-2026. We examined the literature while focusing on specific components of CSE and their association with outcomes beyond traditional sexual health measures. Thirty articles were selected for final analysis and categorized by primary focus: violence, gender/sexuality, relationships, or all three domains.

Results suggest that different CSE components are associated with distinct but complementary benefits.

Gender/sexuality-focused articles most often cited improved appreciation for gender identity; violence-focused articles most often cited improvements related to sexual abuse and personal safety; and relationship-focused articles most often cited improved knowledge and understanding consent and increased interpersonal communication. Articles addressing all three domains most frequently reported improvements in healthy sexual practices. These findings support the use of standardized, medically accurate, and developmentally appropriate CSE that extends beyond abstinence and disease prevention to address interconnected aspects of adolescent health, safety, identity, and relationships.

## Madalynn Welch

### *Toll-like Receptor 9 mediates vascular dysfunction in the placental microvasculature in preeclampsia*

**Authors:** Welch MJ, Kozak KN, McIntosh JJ

**Project Mentor:** Jennifer J McIntosh, MS, DO; Obstetrics & Gynecology

**Background:** Preeclampsia (PreE) is a hypertensive disorder of pregnancy associated with significant maternal and fetal morbidity. Placental hypoxia and ischemia promote reactive oxygen species (ROS) generation, leading to mitochondrial dysfunction and release of cell-free mitochondrial DNA, which activates toll-like receptor 9 (TLR9) and contributes to endothelial dysfunction. This study investigated the effects of TLR9 knockdown (KD) on markers of mitochondrial function in human umbilical vein endothelial cells (HUVECs) exposed to PreE conditions.

**Methods:** HUVECs were cultured and treated with either TLR9-targeting siRNA or negative-control siRNA. RNA was extracted, converted to cDNA, and analyzed by qPCR. TLR9 KD efficiency and expression of mitochondrial function genes (TFAM, MFN2, Drp1, and FIS1) were quantified and normalized to GAPDH using the  $\Delta\Delta C_t$  method.

**Results:** TLR9 siRNA reduced TLR9 gene expression by approximately 40% compared with media controls. No significant differences were observed in endothelial nitric oxide synthase (eNOS) expression among groups. TLR9 KD increased expression of mitochondrial biogenesis and dynamics genes TFAM, MFN2, and Drp1 compared with media controls, suggesting improved mitochondrial stability and function. FIS1 expression was also increased following TLR9 KD, indicating altered mitochondrial fission dynamics. Due to the small sample size, these findings did not reach statistical significance.

**Conclusions:** TLR9 knockdown favorably altered expression of genes involved in mitochondrial maintenance and dynamics in endothelial cells under PreE conditions. Although preliminary, these findings support further investigation of TLR9 as a potential therapeutic target for mitigating endothelial dysfunction and mitochondrial injury in preeclampsia.

## Makenzie Whalen

### *CMR changes pregnancy management in ACHD patients*

**Authors:** Whalen MM, Cohen SB, Leibham S, Ginde S, Buelow MW, Bartz PJ, Gerardin JF

**Project Mentor:** Jennifer Gerardin, MD; Pediatrics

Many patients with adult congenital heart disease (ACHD) need cardiac magnetic resonance imaging (CMR) every 3-5 years. Due to gaps in care, many women are not up to date on their regular imaging. Our study aimed to look at the utility of CMR during pregnancy in ACHD patients.

This is a single center retrospective case series of fourteen pregnant patients with ACHD and their newborns who had a CMR during pregnancy between 2018-2024. We collected details on delivery plan to see if CMR affected location, timing, or type of delivery, as well as demographic data. Newborn charts were reviewed for complications.

There were 14 women who had a CMR during pregnancy with 3 having a repeat scan. Eleven women (79%) were not up to date with cardiac imaging prior to pregnancy. The CMRs lasted 25-45 minutes (average 36 minutes) and were all done without contrast. Eight women (57%) had coarctation of the aorta. For these women, a cine of the aortic arch was performed with perpendicular cine stack through any aneurysm or narrowing. The CMRs had an impact on birth planning for 11 of the women (79%).

We conclude that CMRs are effective at detecting defects that may impact pregnancy or delivery. Clinicians used the CMR results to create a birth plan, including location of delivery, timing of induction, and delivery method. However, patients should aim to have continuous follow up with an ACHD specialist and a CMR completed before getting pregnant if needed.

## **Carter White, BS**

### ***Slipped capital femoral epiphysis: seasonal variation in incidence, severity, and socioeconomic status***

**Authors:** White CJK, Liu XC, Van Valin SE

**Project Mentor:** Scott Van Valin, MD; Orthopaedic Surgery

**BACKGROUND** Slipped capital femoral epiphysis (SCFE) is a common adolescent hip disorder occurring during the pubertal growth spurt, and prior studies have demonstrated seasonal variation in incidence across regions. The relationship between seasonality, socioeconomic disadvantage, and disease severity remains incompletely characterized, particularly in Midwestern populations. This study investigated whether SCFE incidence, severity, or socioeconomic status in Wisconsin demonstrates seasonality.

**METHODS** We performed a retrospective review of children newly diagnosed with SCFE in Wisconsin between January 2012 and March 2024. Demographic and clinical variables were obtained. Monthly incidence was analyzed using 3-month rolling averages and sinusoidal regression with 12-month periodicity. Associations among ADI, BMI, and slip angle were assessed using linear regression and Spearman correlation.

**RESULTS** SCFE incidence demonstrated significant seasonality by sinusoidal regression, with higher incidence from July through January compared with February through June ( $p < 0.05$ ). Lower incidence months were associated with higher neighborhood deprivation and greater radiographic severity ( $p < 0.05$ ). ADI correlated with slip angle ( $r = 0.29$ ,  $p < 0.05$ ) and BMI ( $r = 0.33$ ,  $p < 0.05$ ), whereas BMI was not significantly associated with slip angle ( $p > 0.05$ ). Chronic slips demonstrated higher slip angles than acute presentations ( $p < 0.05$ ).

**CONCLUSIONS** SCFE incidence in Wisconsin follows a significant seasonal pattern, with lower incidence months characterized by greater socioeconomic deprivation and more severe slips at presentation. These findings suggest that social determinants of health may influence both timing of presentation and disease severity, highlighting the need for targeted public health interventions and future studies examining access to care and delay in diagnosis.

## **Diamond Williams, MS**

### ***Evaluating early outcomes of Wisconsin Works (W-2) client participation in a trauma screening intervention***

**Authors:** Williams DC, Potter T, Ruffalo L.

**Project Mentor:** Leslie Ruffalo, PhD, MS; Family & Community Medicine

**Community Partner:** Workforce Resource Inc. - Wisconsin Works

**Purpose/Background:** Job insecurity, trauma, and mental and physical health are interconnected. This study aims to determine the impact of implementation of a trauma-screening, brief intervention, and referral to treatment (TSBIRT) protocol within the workflow of Wisconsin Works (W-2) on client employment.

**Methods:** We collected quantitative data pertaining to the number of W-2 clients screened and number referred to treatment. We collected qualitative data through one-on-one semi-structured interviews with W-2 Case Managers to assess the perceived value and degree of fidelity in using the TSBIRT protocol. We used descriptive and inferential statistics to compare metrics related to employment, mental health, and resource use between W-2 clients that received TSBIRT intervention and those that did not. Qualitative data was analyzed using open coding strategies and thematic analysis.

**Results:** W-2 clients were categorized into one of three categories: 1) completed screening and accepted trauma recovery services referral (Group A), 2) completed screening and declined referral (Group B), and 3) declined screening and referral (Group C). Group A (when compared to Group B) reported double the number of potentially traumatic lifetime events with four times as many symptoms of trauma. Three years post-TSBIRT, employment rates for Groups A, B, and C were 0.50, 0.52, and 0.48, respectively. Qualitative data revealed themes related to Case Worker satisfaction and concerns with TSBIRT.

**Conclusion:** Perception of TSBIRT varied among Case Managers. The protocol allowed clients to voice their story, get connected to resources, and ensure case management considered their traumas. However, long waitlists to access services could be frustrating for both the client and Case Manager. Further research exploring the impact of access and utilization of resources post-screening is needed.

## **Sydney Wisdorf, BS**

### ***Dexmedetomidine use practices and impact on long-term neurocognitive outcomes in premature infants***

**Authors:** Wisdorf S, Cohen C, Zhang J, Yan K, Mayer B, Sprecher A

**Project Mentor:** Alicia Sprecher, MD; Pediatrics

Dexmedetomidine is used in the NICU as an analgesic, with pre-clinical studies suggesting potential neuroprotective effects. The impact of dexmedetomidine exposure on long term neurocognitive outcomes in preterm infants remains unknown. We performed a retrospective cohort study of infants born at less than 32 weeks gestation who received dexmedetomidine between 2019 and 2022 at a level IV NICU. Descriptive statistics and linear regression analyses were used to evaluate dexmedetomidine tolerance and cumulative exposure in relation to neurocognitive outcomes. We identified 136 infants who received dexmedetomidine, including 83 infants with 2-year Bayley Scales of Infant Development testing. The results demonstrated that dexmedetomidine was used for prolonged durations. Increased cumulative dexmedetomidine exposure was correlated with lower cognitive, language, and motor scores. However, concurrent neurosedative use limited to the isolation of dexmedetomidine effects. Neurocognitive harm related to cumulative dexmedetomidine cannot be excluded. Future studies are needed to isolate dexmedetomidine effects from other neurosedatives.

## **Carter Wood, BS**

### ***Prevalence and risk factors for postpartum depression in women with congenital heart disease***

**Authors:** Wood CH, Kull NJ, Cruz MO, Cohen SB

**Project Mentor:** Meredith Cruz, MD and Scott Cohen, MD, MPH; Medicine

**Background:** The prevalence of postpartum depression (PPD) in the general population is estimated to be 10 to 15%, making it a significant morbidity faced by pregnant women. However, little research has been conducted to investigate the prevalence and severity of PPD in adult congenital heart disease (ACHD) patients, despite it being known that they experience higher rates of depression and anxiety than the general population. Our study explores the prevalence of and risk factors for PPD in ACHD patients.

**Methods:** This was a single-center retrospective electronic chart review of ACHD women seen in our Heart Disease in Pregnancy Clinic between 2018 and 2024 who gave birth to a live neonate. Inclusion criteria included the completion of a postpartum PHQ-9 depression screening, age  $\geq 18$  years old, and a history of congenital heart disease. Demographic and clinical variables were collected and evaluated for significant relationships with the PHQ-9 score.

**Results:** 60 ACHD patients were identified who had a postpartum PHQ-9. Of the 60 women, 17% had elevated PHQ-9 scores compared to 7.2% of controls ( $p = 0.037$ ). Compared to women with a normal PHQ-9, women with an elevated PHQ-9 were more likely to be unemployed ( $p = 0.014$ ), have less than a college-level degree ( $p < 0.001$ ), and have a higher gravidity ( $p = 0.004$ ).

**Conclusion:** Our study demonstrates that PPD has an increased prevalence in the ACHD population when compared to the general population, and is related to education level, employment status, and gravidity. Screening practices for PPD and the ability to refer to appropriate mental health providers in a timely manner should be in place to optimize patient care.

## **Eric Yang**

### ***The impact of the covid-19 pandemic on health promotion in african american churches in the past year***

**Authors:** Yang E, Kwarteng J

**Project Mentor:** Jamila Kwarteng, PhD; Institute for Health & Humanity

**Background:** The COVID-19 pandemic disrupted resource allocation for faith-based organizations (FBOs), with some shifting resources for public health emergencies. Little is known about whether this shift in resources currently affects health promotion activities conducted by FBOs. Our aim was to examine whether COVID-19 disrupted health promotion activities in past 12 months among African American protestant churches.

**Methods:** Data was collected from Jan-Sept 2024 via mailed questionnaire or REDCap. We recruited participants through email, phone, and in-person at community events. The questionnaire assessed organizational characteristics, past health promotion and wellness activities, attitudes towards current programming, and interest in cancer-related health promotion in the next 12 months. COVID-19 disruptions were assessed through self-report of the following items: lack of volunteers, restriction of face-to-face activities, lack of participation, shift in priorities, focus on COVID-related activities, and other factors.

**Results:** A total of 20 participants from 10 churches completed the questionnaire. Mean age was 60 years, 60% were female, and ~50% had an Associate's degree or less. Mean organizational characteristics included long-term church membership (67%) and current pastor tenure (15.6 years). About half of the churches experienced disruptions due to the COVID-19. Analyses show no association between COVID-19 disruptions and the number of wellness activities held in the last 12 months ( $\beta=1.10$ ,  $p=0.30$ ).

**Conclusion:** While some African American churches experienced disruptions due to COVID-19, these disruptions did not affect health promotion in the last 12 months. Future studies will examine the impact of organizational characteristics on cancer-related health promotion in the next 12 months.

## **Heather Yenchesky, BA**

### ***Let's Talk About It: An AODA Harm Reduction Module at an Emergency Youth Shelter***

**Authors:** Yenchesky H, Hageman E, Lawrence S, Diehr S

**Project Mentor:** Sabina Diehr, MD; Family & Community Medicine

**Community Partner:** Walker's Point Youth & Family Center and Milwaukee Health Department

This project developed a youth-focused Alcohol and Other Drug Abuse harm reduction educational module for residents at Walker's Point Youth & Family Center. Walker's Point Youth & Family Center is an emergency shelter that serves the homeless and runaway youth within Milwaukee, Wisconsin. Homeless and runaway youth experience disproportionately high rates of substance use and overdose compared to the general adolescent population, highlighting the need for accessible, age-appropriate, and nonjudgemental substance use education.

The project was created in collaboration with shelter leadership, medical students involved in the Medical College of Wisconsin's Homeless Outreach in Medical Education Project, and the Milwaukee Health Department. A needs assessment with shelter staff identified a gap in available youth-oriented substance use education that incorporates harm reduction principles rather than abstinence-only messaging. A literature and curriculum review informed the development of a 25-slide interactive module covering the topics of alcohol, opioids, overdose recognition, naloxone administration, fentanyl test strips, safer drug use practices, and community resources available in Milwaukee. Interactive teaching strategies included anonymous question submission, MythBusters-style discussions, and hands-on demonstrations to encouraged engagement among shelter residents ages 11-17 with varying educational backgrounds. The final module was designed for small-group evening programming sessions at the shelter and includes a facilitator guide to support sustainability. Though implementation and formal assessment were delayed due to organizational funding instability and leadership transitions, the project established a foundation for future quality improvement research using pre- and post-session surveys to evaluate educational effectiveness and participant impact.

## Alexa Zamudio

### *Characterizing the inflammatory matrix environment of the atrioventricular valves in neonatal Marfan mice*

**Authors:** Zamudio A, Kim AJ, Kessler J, Lincoln J

**Project Mentor:** Joy Lincoln, PhD; Pediatrics

Neonatal Marfan's Syndrome (neoMFS) has a 95% mortality rate by age 2 due to severe atrioventricular (AV) valve disease and non-existent treatment. Monocytes are known to be recruited and a key driver of AV valve disease. Our goal is to identify what drives monocytic infiltration in these valves.

A mouse model of neoMFS (Fbn1C1041G/C1041G) that recapitulates the clinical features of neoMFS patients was used. At least 6 mice were used per group. Murine hearts were collected, fixed, and sectioned. Immunofluorescence was used to detect the pro-inflammatory proteins. Images were obtained on a fluorescent microscope and quantified using non-parametric t-test analysis with a statistical significance of  $p < 0.05$ .

NeoMFS mice AV valves are thickened at birth (post-natal day 0). By immunofluorescence, these valves are comprised by increased expression of Versican (i.e., a pro-inflammatory matrix component) and hyaluronic acid binding protein (i.e., a component of proteoglycan), which are clustered around CD45+ cells. CD45+ cells are predominantly CCR2+ monocytes.

We found that AV valve thickening and CCR2+ monocyte infiltration positively correlates with increased levels of inflammatory proteins. We expect that additional pro-inflammatory proteins will be found within diseased AV valves using single-cell RNA sequencing in the future. We hope to understand the matrix of immunologic and pro-inflammatory components found in the AV valves to also apply in other causes of valvular heart disease.

## Landon Zimmerman, B.S.

### *Improving Informed Consent in the Emergency Department*

**Authors:** Pavlic A, MD, Jacobson N, MD, Russell S, MD

**Project Mentor:** Annie Friedrich, PhD; Institute for Health & Humanity

Informed consent (IC) is a key tenant of the delivery of high-quality care and is necessary to ensure healthcare providers respect patients' right to autonomy. Previous quality assessment work led by Drs. Russell and Jacobson at the Medical College of Wisconsin and affiliated EDs found that current practices for obtaining consent and were extremely variable. This demonstrates a need to establish best practices that can be universally implemented to ensure that ED physicians have an ethical and implementable framework for obtaining IC for non-emergent procedures in the ED. In order to determine best practices, our ongoing question is: what is the consensus on current best practices for obtaining informed consent for non-emergent procedures in the ED and how can we translate these guidelines into meaningful practice change? My aim was to review current literature to gain a broad understanding of the best practices regarding informed consent for non-emergent procedures in the ED. To achieve this aim, I reviewed the literature on IC for non-emergent procedures in general, and best practices to obtain it in the ED. As a result, I found that there were three themes discussed: the ethical basis of IC, how to optimize current IC practices, and novel strategies to improve IC. The final key findings were the gaps that exist in the literature revolving around how to implement improvements and novel solutions and certain key definitions necessary for informed consent.

## MCW Faculty Mentors for the Scholarly Projects of the Class of 2026

Lolia Abibo, MD, MS	Sophie Dream, MD, MPH	Jennifer Knight, MD, MS
Himanshu Agrawal, MD	Lucian Durham, MD, PhD	Sara Kohlbeck, PhD, MPH
Baseer Ahmad, MD	Sunu Eapen, MD	Anai Kothari, MD, MS
Ronald Anguzu, PhD, MPH, MD	Anuoluwapo Elegbede, MD	Nathan Kugler, MD
Jamie Aranda, MD	Abdul Elkadri, MD	Razelle Kurzrock, MD
Rachel Ashworth, MD	Jonathan Ellison, MD	Jamila Kwarteng, PhD
Binod Balakrishnan, MD	Ashraf El-Meanawy, MD, MS, PhD	Leah Lalor, MD
Charlotte Ball, MD	Beth Erickson, MD	Jacquelyn Laplant, MD
Benjamin Beran, MD	Michael Fendrich, PhD	Kenneth Lee, MD
Kathryn Berlin, DO	Katherine Flynn-O'Brien, MD, MPH	Michael Levas, MD
Kirsten Beyer, PhD, MPH, MS	Julie Freed, MD, PhD	Sean Lew, MD
Andreas Beyer, PhD	Annie Friedrich, PhD	Tracey Liljestrom, MD
Jonathan Bock, MD	Jennifer Gerardin, MD	Joy Lincoln, PhD
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Casey Calkins, MD	William Hall, MD	Timothy Meier, PhD
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Matthew Chinn, MD	Ryan Hillmer, PhD	Marty Muntz, MD
Erica Chou, MD	Lara India, MD	David Nelson, PhD, MS
Scott Cohen, MD, MPH	Katie Iverson, MD, MPH	John Nettrour, MD
Denise Cook-Snyder, PhD	Nancy Jacobson, MD	Alan Nyitray, PhD
Matthew Cooper, MD	Jamie Jasti, MD	Ahmed Obeidat, MD, PhD
Chandler Cortina, MD, MS	Pinky Jha, MD	Aasim Padela, MD, MSc
Janelle Cross, PhD	Bryan Johnston, MD	Anna Palatnik, MD
Brooke Crotty, MD, MPH	Nikki Johnston, PhD	Teresa Patitucci, PhD
Meredith Cruz, MD	Christian Kastrup, PhD	Ashley Pavlic, MD, MA
Christopher Davis, MD, MPH	Tammy Kindel, MD, PhD	Jacqueline Peebles, MD
Julia Dickson-Gomez, PhD	David King, MD	Jacob Peschman, MD, MSPE
Sabina Diehr, MD	Edward Kirkpatrick, DO	Liliana Pezzin, PhD, JD

## MCW Faculty Mentors for the Scholarly Projects of the Class of 2026

Sandra Pfister, PhD	Jessica Schnell, MD	Channing Tassone, MD
Ryan Puccia, MD	Mary Elizabeth Schroeder, MD	Adam Thiessen, MD
Lindsay Puckett, MD	Priyanka Shah-Basak, PhD	Carissa Tomas, PhD
Janet Rader, MD	Sophie Shay, MD	Aoy Tomita-Mitchell, PhD
Dustin Ragan, PhD	Malika Siker, MD	Scott Van Valin, MD
Siavash Raigani, MD	Grant Sinson, MD	Raji Venkitachalam, MBBS
Christopher Roberts, PhD, MD	Kellie Snooks, DO, MPH	Karolyn Wanat, MD
Thomas Robey, MD	Taylor Sonnenberg, MD, MSGH	Bo Wang, PhD
Amanda Rogers, MD	Ryan Spellecy, PhD	Jeffrey Whittle, MD, MPH
Gretchen Roth, MD	Alicia Sprecher, MD	Peter Wolfgram, MD
Leslie Ruffalo, PhD, MS	Angela Steineck, MD, MS	Macy Wood, PhD
Kia Saeian, MD	Heather Stiff, MD	Thomas Yang, MD
Jose Salazar Osuna, MD, PhD	Melinda Stolley, PhD	Tina Yen, MD, MS
Margaret Samyn, MD, MBA	Connor Sullivan, MD	April Zehm, MD
Patrick Sanvanson, MD	Sara Swanson, PhD	Joseph Zenga, MD
Matt Scanlon, MD, MS	Wen Hui Tan, MD	

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