MCW
Milwaukee

CLASS OF 2026 SCHOLARLY PROJECTS

ABSTRACT BOOKLET

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

Scholarly Concentrations & Scholarly Project Leadership Team

Coordinators: Nadine Desmarais and Patricia Schmidt	
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

Scholarly Concentrations are a required component of the M1 and M2 year of the Discovery Curriculum. Students select an area of concentration through which they enrich and individualize their medical training, while exploring an area of interest. Students can apply to enroll in Concentrations during their M3 year, of which 37 students from the Class of 2026 participated.

Each Concentration course features a structured curriculum with monthly learning sessions (core), and an experiential component (noncore) that follows an Individual Learning Plan (ILP) guided by a faculty advisor.

Another requirement is the Scholarly Project, which runs parallel to the Concentration, though often overlaps. Each student completes a faculty-mentored Scholarly Project that meets *Glassick's Criteria for Scholarship* by the end of M3 year. Current M3 student's projects are featured here.

MCW Faculty Mentors for the Scholarly Projects of the Class of 2026

Lolia Abibo, MD, MS
Baseer Ahmad, MD
Ronald Anguzu, MD, PhD
Binod Balakrishnan, MD
Ivor J Benjamin, MD
Kirsten Beyer, PhD, MPH, MS
Andreas M Beyer, PhD
Jonathan Bock, MD, FACS
Seth Bodden, MD
Jennifer Bruening, MD
Lauren Burgunder, MD, MPH
Erwin Cabacungan, MD
Ty Carroll, MD
Thomas Carver, MD
Laura Cassidy, MS, PhD
Lubna Chaudhary, MD
Shyam S Chaurasia, MSc, PhD
Matthew Chinn, MD
Yvonne Chiu, MD
Ross F Collery, PhD
Chandler S Cortina, MD, MS
Emily Davidson, MD
Christopher Davis, MD, MPH
Antonio Devilla Salud, II, MD
Julia Dickson-Gomez, PhD
Sabina Diehr, MD
Peter N. Dietrich, MD
Bonnie Dittel, PhD
Christopher Dodgion, MD, MSPH, MBA
Jing Dong, PhD
Yilu Dong, PhD
Aaron Dora-Laskey, MD, MS
Jasmine C Dowell, MD
Michael Dwinell, PhD
Calvin Eriksen, MD
Cassie Ferguson, MD
Renee Foutz, MD
Julie K. Freed, MD, PhD
David Friedland, MD, PhD
Jessica Fritz, PhD
Guilherme Garcia, PhD
Jennifer Gerardin, MD
Aron Geurts, PhD
Matthew I. Goldblatt, MD
Kelly Graff, MD
Steven Grindel, MD
Constance Gundacker, MD, MPH
Stephanie Gunderson, MD
Ruby Gupta, MD
Keri Hainsworth, PhD
Colin Hansen, MD
Stephen Hargarten, MD, MPH
Kris Harlander Saudek, MD
Laura Hawks, MD
Thomas Heinrich, MD
Rana Higgins, MD
Brian Hilgeman, MD, AAHIVS, FACP
Ryan Hillmer, PhD
Gwendolyn Hoben, MD, PhD
Wen Hui Tan, MD
Katherine R Iverson, MD MPH
Nancy Jacobson, MD
Matthew D. Jandrisevits, PhD
Steven John, PhD, MPH
Bryan Johnston, MD
Fabrice Jotterand, PhD, MA
Caitlin Kaeppler, MD
Kristina Kaljo, PhD
Tammy Kindel, MD, PhD
David King, MD
John Kirby PhD
Jennifer M Knight, MD, MS,
Sara Kohlbeck, PhD, MPH
Antje Kroner, MD, PhD
Max O Krucoff, MD
Jacquelyn Kulinski, MD
Meagan Ladell, MD
Leah Lalor, MD
Peter LaViolette
Kenneth Lee, MD
Timothy Lenz, MD, MPH, EMT-P
Sean M Lew, MD

MCW Faculty Mentors for the Scholarly Projects of the Class of 2026

Kant Lin, MD
Sebastian Linde, PhD, MPhil, MS
Allison Linton, MD, MPH
Xue-Cheng Liu, MD, PhD
Mark Lodes, MD
Ugwuji N Maduekwe, MD, MMSc, MPH
Michael McBride, MD, MS
Kevin McGurk, MD
Jennifer McIntosh, DO, MS
Conner McMains, MD
John R Meurer, MD, MBA
Theresa Mikhailov, MD, PhD
Whitney A. Morelli, PhD
M Muska Nataliansyah, PhD, MD, MPH
John C. Neilson, MD
Lindsay Nelson, PhD, ABPP
David Nelson, PhD
Elizabeth A Nolte, MD
Ronny Otero, MD, MSHA
Julie Ruth Owen, MD, MBA
Mukoso N. Ozieh, MD, MSCR
Anna Palatnik, MD
Jahanvi Patel Kothari, DO
Teresa Patitucci, PhD
Ashley Pavlic, MD, MA
Terra Pearson MD
Wendy Peltier, MD
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Sara Pillay, PhD, ABPP
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Kelsey Ryan, MD
Matthew Scheidt, MD
Jessica Schnell, MD
Jessica Schnell, MD, MPH
Mary Elizabeth "Libby" Schroeder, MD, MS
Priyanka Shah-Basak, PhD
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Andrew Spearman, MD
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Melinda Stolley, PHD
Tracey Strombeck, OD, FAAO
Justinn Tanem, MD
Kenichiro Taniguchi, PhD
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Aditya Vedantam, MD
Rebekah Walker, PhD
Patrick Walsh, MD, MS
Karolyn Wanat, MD
Yang Wang, MD, PhD
Mei Wang, PhD
John P Wanner, MD
Joni S. Williams, MD, MPH
William Wirostko, MD
Harvey Woehlck, MD
B Tucker Woodson, MD
Joseph Zenga, MD
Jacek Zielonka, PhD

We extend our sincerest gratitude to the 146 faculty who served as mentors to the Class of 2026.

Class of 2026

Agenda

1:00pm	Welcome and Introductions: Waylon Alvarado
1:15pm	Breakout: Session 1
1:50pm	Take a break!
2:00pm	Breakout: Session 2
2:30pm	Plenary Speaker: Joseph Kerschner, MD
2:50pm	Presentation of Awards: Jamie Jasti, MD, MS

Link for Reviewers

https://forms.office.com/r/Zjw436K1Yt

Session 1 1:15-1:50pm			
Breakout Room via Zoom	**Presenter Last name**	**Presenter First Name**	**Project Title**
A	Johnson	Paige	An Online, Patient-Guided, Mental Health Tool Improves Anxiety Symptom Scores in Patients With Infertility
	Varadarajan	Vishnu	Optimizing Surgical Tray Utilization: An Ethical Imperative for Resource Stewardship and Efficiency Across Specialties
	Lucero	Elizabeth	Choroidal Hemangioma Treatment with Propranolol – A Case Study in Sturge-Weber Syndrome and Systematic Literature Review
	Tabit	Nadia	Youth Leading Youth: Co-Construction of an Adolescent Sexual and Reproductive Health Education Program
	Trotier	Daniel	Do artificial intelligence-based tools improve patient outcomes and clinical practice in meaningful ways? A cross-specialty literature review
B	Blount	Daphne	Improving Sexual Health Education in Undergraduate Medical Training: A Workshop-Based Approach to Inclusive and Competent Care
	Koxlien	Brendan	REACHing For Self-Care: Studying Medical Student Perceptions on Stress and Self-care
	Parks	Nicholas	A proof-of-concept pilot comparison of learning modalities in medical students
	Sharda	Mukul	Evaluating Patient Experience with In-Person Versus Virtual Vasectomy Consultations
	Volk	Alexander	Learning Anatomy Beyond the Lab: Student Perspectives on Plastinates, Cadavers, and Digital Models
C	Reecher	Hope	Development of acute post-operative phenomena following corpus callosotomy or hemispherotomy for pediatric drug-resistant epilepsy: characterization for family counseling
	Liu	Jessica	Needs and preferences for a physical activity program to reduce fatigue symptoms among those with Chronic Myeloid Leukemia taking TKIs
	Hollar	Ethan	Effects of Reintubation on Outcomes in the Surgical ICU
	Whitney	Laura	A Novel Abbe-Vermilion Switch Flap for Near-Total Upper Lip Reconstruction
	Young	Kevin	Characterizing Medical Management Strategies in Type B Aortic Dissection: A Single-Center Retrospective Review

Session 1 1:15-1:50pm			
Breakout Room via Zoom	**Presenter Last name**	**Presenter First Name**	**Project Title**
D	Bach	Christopher	Synthetic conditional introns as a generalizable method for conditional genetic manipulation
	O'Berry	Dakota	Impact of Social Determinants Health Identification and Intervention in an Academic Health Center
	Shammout	Nader	Case Study
	Le	Janet	Differential roles for OXPHOS inhibitors in T cell bioenergetic metabolism
	Dibbs	Anna	Thirty-year prevalence of spontaneous hemoptysis in palliated single ventricle circulation
	Morales	Sabrina	
E	Seidler	Kristin	Social Determinants of Health and Multiple Myeloma Outcomes
	Nader	Zeina	Racial Disparities in Multiple Myeloma Survival
	Schonfeld	Samuel	The Effect of Firearm Concealed Carry Legislation on Rates of Firearm-Related Violent Crime Fatalities
	Annyapu	Evanka	Parent and Caregiver Willingness for Childhood COVID-19 vaccination in peri-urban Uganda: Applying the Behavioral and Social Drivers (BeSD) Framework
	Stuth	Alexander	Respiratory Virus Co-infections in Pediatric Patients with COVID-19: prevalence and impact on disease severity
F	Brooks	Lisbeth	Comparative effectiveness of disease modifying antirheumatic drugs for patients with cardiac sarcoidosis
	Daly	Roger Hunter	Coherent Optical Detection of Middle Ear Disease
	Gebbia	Stephen	Laboratory Abnormalities During Pediatric Isotretinoin Therapy: A Retrospective Review with Expert Management Guidance
	Tillmann	Joshua	Effect of Bougie Utilization versus Stylet on First-Pass Success Rates during Endotracheal Intubation in Helicopter Emergency Medical Services (HEMS)
G	Angel-Gonzalez	Jessica	Steps Towards Health and Justice Through the Environment: Measuring the Recess Quality of Low Socioeconomic Urban Schools After Schoolyard Greening
	Daneshjoo	Sara	Combatting Physician Burnout by De-Villainizing Medical Malpractice
	Lawrence	Quentin	Provider Perspectives on Prostate Cancer Screening: Navigating Race, Guidelines, and Disparities
	McBride	Hannah	Low-Dose Aspirin Prescription for Pregnant People at Risk of Preeclampsia
	Yusuf	Hasanat	Effectiveness of Urban Faith-Based Mental Health Programming: Perspectives of Congregations

Session 2 2:00-2:30pm			
Breakout Room via Zoom	**Presenter Last name**	**Presenter First Name**	**Project Title**
J	Aguirre	Francisco	
	Gordon	Domonique	Exploring Disparities in the Enforcement of Infant Safe Sleep Policy
	Kwak	Ginger	Thinking Ahead: Thoughts, Barriers, and Opinions About End-of-Life Care and Planning Among Transgender and Gender Non-Binary Individuals; A Systematic Review
	Novak	Nicole	The Veteran Family Healthcare Unit
K	Chavarria	Melina	Family-Based Interventions and Glycemic Outcomes in Type 2 Diabetes: A Systematic 2 Review of Adult Trials and the Pediatric Evidence Gap
	Ljumani	Fiona	Early Stages of Pediatric Sepsis: Identification and Fluid Resuscitation Simulation for Medical Students
	Bollepalli	Gouri	Physician Empathy in Emergency Departments: A Retrospective Survey of Contextual Influences
	Stoltenburg	Abbey	System of Health and Wellness for Teachers and Teens (SWIFTT): workforce development model to support K-12 health and physical education teachers
M	Rezk	Misty	Surgical outcomes from Laser Interstitial Thermal Therapy (LITT) versus open craniotomy for treatment of recurrent metastatic brain tumors at Froedtert Hospital from 2020-2024
	Shah	Ipsit	From Diagnosis to Consultation to Correction: Influences on Pediatric Chest Wall Deformity Management
	Schmirler	Joshua	
	Piryani	Nikita	The Impact of Exposure to Extracranial Surgery and Anesthesia on Blood Biomarkers after Traumatic Brain Injury
P	Ruplinger	Hailey	Patient Demographics and Diagnoses of "Unnecessary" Emergency Department Visits
	Cheruvalath	Heloise	The Evaluation of Prenatal Care Needs of Rohingya Refugees in Milwaukee, WI
	Titak	Paige	Response Time of EMS to Out of Hospital Cardiac Arrest Patients in Wisconsin Based on Population Size
	Magro	Caitlin	Material Needs Security and Cardiovascular Risk Factors in Rural South Africa

Session 2 2:00-2:30pm			
Breakout Room via Zoom	**Presenter Last name**	**Presenter First Name**	**Project Title**
Q	Perry	Michael	Plastination of Bone and Coloration of Specimens: Novel Protocols for Plastination at the Medical College of Wisconsin
	Gratz	Zachary	Evaluating the Impact of a Peer Mentorship Program in Longitudinal Competency-Based Medical Education
	Ballard	Jacob	Physician Empathy in Emergency Departments: A Retrospective Survey of Contextual Influences
	Fahhoum	Madelyn	Case Study
R	Kimmen	Dillon	Impact of a Subcutaneous Insulin Pathway for Adults with DKA in the Emergency Department
	Jacoby	Kelly	The Impact of Social Deprivation of Reverse Shoulder Arthroplasty Outcomes
	Liverman	Elizabeth	Qualitative evaluation of medical student comfort level with medical student-led advance directive discussions following classroom and clinical education
	Voss	Sophie	Surgical Ligation versus Catheter-Based Device Closure of Patent Ductus Arteriosus in Premature Infants
S	Saunders	Janay	The Relationship between Social Risk Factors and Processes of Care in a Nationally Representative Sample of Adults with Type 2 Diabetes
	Mohammad	Iqra	Preventing Falls in Older Adult Patients
	Hackett	Margaret	Advancing Equity in Maternal and Child Health: Creation of a Doula Partnership
	Mojica	Lia	Adolescent and Parental Knowledge of Emergency Contraception in a Post-Dobbs Era

Leena Abu-Zahra

Delays in adjuvant therapies in head and neck cancers: Identifying population disparities and implementing solutions

Authors: Abu-Zahra L, Adams J, Friedland D, Bruening J.
Project Mentor: Jennifer Bruening, MD; Otolaryngology

Introduction
Head and neck squamous cell carcinoma (HNSCC) treatment is multimodal, often requiring surgical resection followed by post-operative radiation therapy (PORT) or chemoradiation therapy (CRT), which the NCCN recommends initiating within 6 weeks after surgery. This study aims to identify factors contributing to delays in PORT/CRT initiation for HNSCC patients at single tertiary institution and to propose interventions to address this issue.
Methods
This is a retrospective review of 202 oral cavity HNSCC patients treated with surgical excision and PORT/CRT between 1/1/2013 and 1/1/2023. Delayed patients had more than 42 days between surgery and radiation initiation. We analyzed socioeconomic factors, pathology, surgical complexity and clinical course as potential causes of delay.
Results
Of 202 patients, 76.2% (n=154) experienced delays, with a mean 60.9±24.6-days between surgery and radiation therapy. There was a significant association between larger clinical tumor size (p=0.002), completing adjuvant therapy outside of the tertiary network (p=0.011), and frequent alcohol use (p=0.043) with delays to adjuvant therapy. There was a significantly longer time between surgery and the first RT consult for delayed patients (p< 0.0001). No difference was found among patient sex, employment status, smoking history, residence zip code, surgery type, or tumor stage.
Conclusions
This analysis highlights intrinsic and systemic barriers to timely PORT for oral cavity HNSCC patients, with 76.2% experiencing delays that risk poorer outcomes. Significant factors, such as larger tumors, receiving therapy outside Froedtert, and frequent alcohol use, point to challenges in surgical recovery, care coordination and lifestyle factors. The lack of association with sex, employment, smoking, residence, surgery type, or stage narrows the focus to modifiable barriers, emphasizing the need for targeted interventions to improve equity and outcomes.

Zynab Adewusi

Genitourinary Syndrome of Menopause: Another Cause of Pelvic Pain

Authors: Zynab Adewusi, Sumana Koduri, Emily Davidson
Project Mentor: Emily Davidson, MD; Obstetrics & Gynecology

Genitourinary syndrome of menopause (GSM) is prevalent among postmenopausal women, causing urogenital symptoms like chronic pelvic pain. Estrogen deficiency contributes to GSM, and vaginal estrogen therapy is effective for many symptoms, but its impact on pelvic pain is less studied. This study investigates the effectiveness of vaginal estrogen treatment alone in alleviating chronic pelvic pain in postmenopausal women with GSM.
We reviewed charts of 243 postmenopausal women with chronic pelvic pain diagnosed with urogenital atrophy. Inclusion criteria included natural or surgical menopause and at least three months of chronic pelvic pain. Data collection spanned January 1, 2017, to January 1, 2022. Improvement was assessed using PGI-I and PGI-S scales, with a 2-point change on PGI-S indicating improvement.
Of 60 patients meeting inclusion criteria, 27% reported pelvic pain at the three-month follow-up. On the PGI-S scale, 45% described pain as mild, 19% as moderate, 10% as severe, and 4% as unchanged. PGI-I scale showed 18% slightly improved, 16% significantly improved, 14% no change, 7% very much improved, 4% unchanged, and 1% very much worsened.
While many postmenopausal women with GSM-related chronic pelvic pain reported improvement after three months of vaginal estrogen therapy, a notable proportion continued to experience pain. Vaginal estrogen may not be universally effective for pelvic pain in all GSM patients. Further research is needed to identify contributing factors and explore alternative treatments for chronic pelvic pain in GSM patients. This study highlights the need for individualized care and continued research to improve treatment strategies and patient outcomes.

Karina Alagoa Harry

Impact of Comprehensive Diabetes Self-Management Education and Support (DSME/S) on Exercise Habits, Medication Adherence and Blood Glucose Monitoring Practices in Patients with Type 2 Diabetes in Southern Nigeria.

Authors: Harry K, Abibo L, Akhidue K, Tomczyk B, Fatade E, Ogbonnaya C, Caples L, Anikpo E, Chineye S, Unachukwu C, McKinney T

Project Mentor: Lolia Abibo, MD, MS; Internal Medicine, Pediatrics

Community Partner: University of Port-Harcourt Teaching Hospital

Background:
The increasing prevalence of Type 2 Diabetes Mellitus (T2DM) in Nigeria presents a significant healthcare challenge, emphasizing the need for effective management strategies. Diabetes Self-Management Education and Support (DSME/S) programs globally have improved glycemic control by enhancing behaviors such as exercise, medication adherence, and blood glucose monitoring. This study evaluates the impact of a DSME/S program implemented in Southern Nigeria on patients' exercise habits, medication adherence, and blood glucose monitoring practices.
Methods:
A two-phase study was conducted at the University of Port Harcourt Teaching Hospital (UPTH). In Phase 1, ten healthcare professionals were trained to deliver the DSME/S program. Phase 2 involved the program's implementation with patients from the UPTH Endocrinology clinic. Baseline data showed an average HbA1c level of 8.87%. Changes in exercise, medication adherence, and blood glucose monitoring were assessed pre- and post-intervention using an Individualized Counselling Form (ICF). Statistical analyses were performed using the "exact2x2"package in RStudio.
Results:
The Wilcoxon Signed Rank Test revealed a significant increase in exercise minutes between the initial and 6-month assessments ($n = 41$, $V = 442.5$, $p = 0.0374$). However, no significant changes were observed in the proportion of subjects reporting exercise ($n = 54$, $p = 0.4545$) or medication adherence ($n = 44$, $p = 0.8388$). A significant increase in blood glucose checks per week was noted ($n = 54$, $V = 770$, $p = 0.0013$), with the median rising by 1 check per week.
Conclusions:
The DSME/S program at UPTH significantly improved self-management behaviors, particularly exercise participation and blood glucose monitoring, with medication adherence showing a non-significant improvement. Continued DSME/S interventions are essential for enhancing diabetes management in this region.

Waylon Alvarado

Decorin loss compromises retinal microvasculature

Authors: Alvarado WA, Low SW, Chaurasia SS

Project Mentor: Shyam S Chaurasia, MSc, PhD; Ophthalmology and Visual Sciences

Purpose: The purpose of this study was to determine the significance of the protein Decorin (Dcn) in the retina of a knockout murine model. We hypothesize that Dcn is necessary for retinal integrity and proper microvascular development.
Methods: This study utilized Dcn knockout mice. Mice were divided into three treatment groups: wild type (WT), heterozygous (Dcn+/-) and knock out (Dcn-/-). Eyes were enucleated at postnatal day 90 and retinas were removed to be fixed and preserved. Retinas were mounted on slides for imaging where two 20x z-stacks were obtained from each plexus of the retina. The images were ran through the program AngioTool and analyzed in GraphPad Prism.
Results: In the deep vascular plexus (DVP) of the peripheral retina, there were significant differences between WT and Dcn+/-, and WT and Dcn-/- in Vessel Percentage Area (WT vs Dcn+/- : p-value = 0.0381, WT vs Dcn-/-: p-value = 0.017), WT and Dcn-/- in Total Vessel Length (WT vs Dcn-/-: p-value = 0.0204), and between WT and Dcn-/- in Lacunarity (WT vs Dcn-/-: p-value = 0.0257).
Conclusion: Dcn plays a significant role in the development of retinal microvasculature and its loss results in aberrant microvasculature, specifically in the DVP of the peripheral retina.

Megan Amarbayan

Care Team Composition and Patient Safety Incidents in the Emergency Department

Authors: Amarbayan M, Jacobson N, Aranda J.
Project Mentor: Jamie Aranda, MD; Emergency Medicine

Background: The emergency department (ED) relies on interdisciplinary teams with attending physicians, advanced practice providers (APPs), residents, and medical students for safe, efficient care. The relationship between care team composition and patient safety outcomes remains unclear. This study aimed to quantify the number and severity of safety incidents (SIs) involving medical decision-making across ED care team configurations at a large academic center. Methods: We conducted a cross-sectional review of safety incidents reported from July to December 2022 in a large academic adult ED. Incidents were included if they involved medical decision-making by an attending physician or APP. Variables collected included team composition, Emergency Severity Index (ESI), harm score (0–9), and clinical hours worked. SI rates were calculated per 1,000 hours. Results: Among 38,360 patient encounters, 150 SIs were reported. Reasons of exclusion were: not related to ED care (n=81), not an ED provider care concern (n=21), duplicate event (n=8), outside of study period (n=2), and unable to locate safety incident (n=1). All involved attendings, either alone or with EM2s, EM3s, APPs, non-EM residents, or medical students. No events involved EM1s. The highest median harm score (7) was seen in teams with non-EM residents. Median ESI scores were ~2–3 across groups. Attendings and EM3s worked the most hours (14,965 and 6,226, respectively) and had the highest SI rates (2.47 and 2.41 per 1,000 hours). Conclusion: In conclusion, safety incidents involving medical decision making in the ED are rare but tend to involve higher-level providers such as attendings and senior residents, possibly reflecting the nature and complexity of their clinical responsibilities. While learners and APPs were involved in some cases, their involvement did not disproportionately impact the frequency or severity of events.

Jessica Angel-Gonzalez; BS

Steps Towards Health and Justice Through the Environment: Measuring the Recess Quality of Low Socioeconomic Urban Schools After Schoolyard Greening

Authors: Angel-Gonzalez J, Beyer K
Project Mentor: Kirsten Beyer, PhD, MPH, MS; Epidemiology, Institute for Health and Humanity
Community Partner: Milwaukee Public School;Reflow: Sustainable Water Solutions

Currently, approximately 17% of children in the United States are classified as obese. Physical activity is a modifiable risk factor that plays a key role in preventing obesity. Yet only 50% of the U.S youth population is meeting the guideline of at least 60 minutes of moderate to vigorous activity. Due to this schools have an opportunity - and a responsibility - to support physical activity through schoolyard quality improvements, including schoolyard greening. Our study is assessing the recess quality impact after greening. Nine public schools in Milwaukee, Wisconsin were observed using the GRF-OT which provided 24 observational fields that could be rated on a 1-to-4-point scale. Scores were added to obtain a total score for schoolyard safety, adult engagement, student behavior, transitions, and recess quality. Results showed all nine school's mean recess quality score increased from 48.0 (standard deviation (SD) = 6.9) to 58.0 (SD = 5.8), safety and structure increased from 14.0 (SD = 2.5) to 18.0 (SD = 1.1), student behavior improved from 13.0 (SD = 3.4) to 17.0 (SD = 2.5), pre- and post-greening respectively. There was no statistical change in adult engagement or transitions. Our study found the implementation of schoolyard greening was associated with statistically significant improvements in overall recess quality. After greening, schoolyards were transformed to include grassy areas, nature exploration zones, green canopies, and tot-lots. Higher-quality recess environments have been associated with increased levels of moderate to vigorous physical activity, suggesting that greenspace redevelopment could contribute to improved physical health.

Evanka Annyapu

Parent and Caregiver Willingness for Childhood COVID-19 vaccination in peri-urban Uganda: Applying the Behavioral and Social Drivers (BeSD) Framework

Authors: Annyapu E, Anguzu R, Gwinn M, Babikako HM, Loewus J, Bollepalli G, Annyapu A, John K, Kiconco A, Kabanda R, Kisakye A, Cassidy LD

Project Mentor: Laura Cassidy, MS, PhD; Institute of Health & Humanity

Introduction: Vaccinations, including those against COVID-19, are crucial public health interventions can prevent up to one-quarter of the eight million annual deaths and disabilities in children under five. However, COVID-19 vaccine coverage was relatively low in Uganda compared to high-income and neighboring Sub-Saharan Africa countries. The acceptability of routine childhood COVID-19 vaccine boosters among parents or caregivers in Uganda remains uncertain. This study examined factors associated with caregiver willingness to vaccinate their children at an urban immunization clinic in Kampala, Uganda.

Methods: We conducted a cross-sectional study among 230 caregivers with children under 59 months of age in an urban postnatal clinic in Kawempe division, Kampala, Uganda from June 2023-July 2023. The outcome was willingness to receive annual routine COVID-19 vaccination for their child. Covariates selection was informed by the WHO Behavioral and Social Drivers (BeSD) framework: (i) thoughts and feelings (risk perception, confidence in safety/benefits), (ii) social processes (norms), and (iii) practical issues (affordability). Modified Poisson regression estimated adjusted prevalence rate ratios (PRR) and 95% confidence intervals (CI). P-values <0.05 were considered statistically significant.

Results: Among 230 respondents, 83.9% reported willingness to vaccinate their children against COVID-19. Female caregivers aged 15-24 years comprised 51% of the study participants. Willingness was higher among those with moderate confidence in vaccine benefits (PRR=3.07, 95%CI 1.37-6.85, p=0.006) and very high confidence in vaccine benefits (PRR=3.11, 95%CI 1.04-1.75, p=0.005), positive family norms (PRR=1.35, 95%CI 1.04-1.75, p=0.022), and self-intention to vaccinate (PRR=2.68, 95%CI 1.18-6.07, p=0.019).

Conclusion: Addressing BeSD factors such as confidence, social norms, and caregiver intention may improve uptake of routine childhood COVID-19 vaccination in Uganda.

Precious Anyanwu

Real-World Experience with RTOG 0227 Induction for First Line Therapy of Primary CNS Lymphoma (PCNSL)

Authors: Ahmed, R; Anyanwu, P; Shah, N; Hamadani, M; Longo, W; Devata, S; Pruett, J; Connelly, J; Bovi, J; Siker, M; Schultz, C; Fenske, T

Project Mentor: Karolyn Wanat MD; Dermatology

Background: Primary Central Nervous System Lymphoma (PCNSL) is a rare, aggressive non-Hodgkin lymphoma affecting the CNS. The optimal induction regimen preceding consolidation with whole brain radiation therapy (WBRT) or autologous hematopoietic cell transplantation (auto-HCT) remains debated. Since 2017, our institution has used a modified RTOG 0227 induction regimen - consisting of high-dose methotrexate (MTX), rituximab (R), and temozolomide (TMZ) - noted for lower toxicity in older or comorbid patients.

Methods: We retrospectively reviewed newly diagnosed PCNSL patients treated from 2017-2023 with this induction followed by WBRT/TMZ or auto-HCT consolidation. Patient data, treatment details, response rates, recurrence, and survival were assessed. Objective and complete response rates (ORR, CRR), progression-free survival (PFS), and overall survival (OS) were evaluated using Kaplan-Meier analysis.

Results: Of 29 patients, most received 4 MTX and 8 TMZ cycles. Treatment-related toxicity was manageable, with 31% experiencing acute kidney injury and no treatment-related mortality. ORR was 93.1%, and CRR was 27.5%. Eighteen patients received WBRT/TMZ and 11 received auto-HCT. Two-year PFS was 83% overall (81% WBRT vs 87% auto-HCT; p=0.65) and two-year OS was 96% (94% WBRT vs 100% auto-HCT; p=0.27).

Conclusion: This real-world analysis supports the modified RTOG 0227 induction followed by either WBRT or auto-HCT as a well-tolerated and highly effective first-line treatment for PCNSL, yielding superior PFS and OS compared to prior trials, without treatment-related mortality.

Victoria Araj

Reevaluating the Need for Surgical Excision in Benign Breast Papillomas

Authors: Victoria Araj, BS, Fatima Zohra Khamissi, BS, Collin Hansen, MD, Solomon Cherian, MD, Julie Sullivan, MD, Dawn Regner, MD

Project Mentor: Colin Hansen, MD; Radiology

Benign breast lesions such as papillomas identified on percutaneous image-guided biopsy have often necessitated surgical excision for definitive management1. This approach was historically supported by earlier data suggesting that these lesions carry a notable risk of upstaging on final surgical pathology. Previous studies2,3 reported upstage rates for benign breast papillomas to "high-risk"lesions or atypia of up to 50%, and upgrade rates to malignancy as high as 33%.
However, emerging evidence now indicates a considerably lower upstage rate to malignancy from biopsy to surgical excision, suggesting that close imaging surveillance may be a more suitable alternative to immediate surgery3,4. The potential benefits of imaging follow-up over surgical intervention include avoiding unnecessary procedures with their associated risks, preserving breast cosmesis, reducing healthcare costs, and mitigating patient anxiety by clarifying that benign papillomas may not represent a high cancer risk.
The objective of this study was to compare the upstage rates in patients with benign breast papillomas diagnosed via core needle biopsy who either underwent imaging surveillance or immediate surgical excision within our institution. Additionally, this study evaluated factors that influenced the choice of surgical intervention and variables associated with upstaging upon surgical excision.

Christopher Bach, MA

Synthetic conditional introns as a generalizable method for conditional genetic manipulation

Authors: Bach CR, Grzybowski M, Geurts A.
Project Mentor: Aron Geurts, PhD; Physiology

While recent improvements in genome editing technologies have allowed for significant advancements in the capacity for research centered on the genetic basis for human disease, limitations remain in generating temporal and tissue specific conditional knockout in non-murine animal models. The Geurts lab has been developing a synthetic conditional intron (syncotron) methodology designed to circumvent some of these limitations in rat models. This artificial intron includes LoxP sites flanking the branch point, a critical molecular signal for mRNA splicing. Expression of Cre recombinase will induce excision of the branch point within the LoxP sites, leading to nonsense mutation and knockout of the gene of interest. Our initial goal was to demonstrate the broad applicability of this approach by incorporation of syncotron into human disease associated gene orthologs in rat cells, beginning with exon 3 of the HPRT gene. We hypothesized that, in the absence of Cre recombinase, integration of syncotron will not alter levels of gene expression when compared with their wild type counterparts. We observed limited efficiency of syncotron knock-in, addressed using HAT and 6-TG positive and negative selection methodology, and an unexpected alternative splice pattern within syncotron knock-in cells. These results highlight the necessity for further optimization of this technique, and for elucidation of the cause of the alternative splicing to develop updated syncotron construction parameters. Our secondary goal, therefore, is to compare syncotron with the previously published artificial intron SCON model, inserting each within the same region of the HPRT gene in rat C6 glial cells, with the hope of determining limitations and additional guidelines for synthetic intron use in conditional knockout. We hypothesize that there will be similar alternative splicing observed in the SCON knock-in model when inserted into the same site of HPRT exon 3 as was observed with syncotron knock-in.

Mara Bajic

Increased Efficiency with Use of a Mini C Arm in Emergency Department Closed Reductions

Authors: Bajic M, Meinerz C, Laprade M, Kleven A, Keeling P, Cherney S, Nolte E.
Project Mentor: Elizabeth A Nolte, MD; Orthopaedic Surgery

OBJECTIVES: The purpose of this study was to evaluate the effects of mini C-arms versus traditional radiographs on patient radiation exposure, the frequency of repeat closed reductions, and emergency department efficiency.
METHODS:
Design: Retrospective chart review.
Setting: Academic Level 1 Trauma Center.
Patient Selection Criteria: Adult patients with an isolated distal radius, bimalleolar or trimalleolar ankle fracture requiring closed reduction by the orthopaedic surgery team in a busy academic level 1 trauma center emergency department (ED) from 2013-2023 were identified. Pediatric patients, patients with pathological or non-isolated fractures, and patients who underwent reductions by a non-orthopaedic service were excluded.
Outcome Measures and Comparisons: Closed reductions in which mini C-arm imaging was utilized compared to traditional post-reduction radiographs. Total radiation exposure to the patient during the encounter (mGy), the number of repeated reductions in the ED, orthopaedic consult time, doctor visit to discharge time, and time under sedation (conscious or unconscious) were compared.
RESULTS: In total, n=199 subjects met inclusion criteria (81 ankle fractures and 118 distal radius fractures). The results showed that when a mini C-arm was utilized, there were significant decreases in radiation exposure ($p<0.001$), time from doctor visit to discharge ($p<0.001$), orthopaedic consult time ($p<0.001$), and time under sedation ($p=0.046$). The decrease in radiation exposure indicates increased patient safety. The decreased doctor visit to discharge time, orthopaedic consult time, and time under sedation indicate increased ED efficiency. The decrease in repeated reductions when mini C-arms were used suggests an improvement in the quality of patient care, as well as efficiency.
CONCLUSIONS: This study suggests that the use of a mini C-arm instead of traditional post-reduction radiographs improves ED efficiency, safety, and patient care.

Jacob Ballard

Physician Empathy in Emergency Departments: A Retrospective Survey of Contextual Influences

Authors: Ballard J, Miller A, Nickel L, Pavlic A.
Project Mentor: Ashley Pavlic, MD, MA; Emergency Medicine

Importance: Physician empathy is associated with improved patient outcomes and clinician well-being, yet its expression may be heavily influenced by situational factors, particularly in high-stress environments such as emergency departments (EDs).
Objective: To explore contextual factors that influence physician empathy in emergency department encounters.
Study Design: A retrospective qualitative survey of 35 emergency medicine residents and attending physicians at a single academic medical center. Participants described either highly empathetic or non-empathetic interactions with patients and reflected on the contributing circumstances.
Analysis: Narratives were thematically coded as empathetic, non-empathetic, or mixed. Chi-square tests were used to identify significant associations between contextual variables and type of interaction.
Results: From 35 narratives with 57.1% categorized as empathetic, 22.9% as non-empathetic, and 20.0% as mixed, significant factors associated with non-empathetic responses included high clinical acuity ($P = .003$), patient-provider expectation mismatch ($P = .0003$), perceived physician bias ($P = .01$), and irritated patient demeanor ($P = .04$). Personal connection was positively associated with empathetic responses ($P = .003$). Other variables assessed such as shift timing and patient volume were not statistically significant.
Conclusions and Relevance: These findings support a contextual model of empathy, wherein environmental and interpersonal dynamics shape physician behavior. Addressing modifiable systemic factors - such as communication strategies, health literacy, and physician training - may promote more consistent empathetic care in emergency settings.

Phuong Bao

Assessment of Anesthetic Modalities in Otologic Surgery

Authors: Bao PH, Friedland DR, Adams J, Freed JK, Khani M, Luo J.
Project Mentor: David R Friedland, MD, PhD; Otolaryngology & communication science

Objective: Otologic surgery has specific anesthetic requirements, avoiding nitrous oxide and allowing facial nerve monitoring, but lacks clear criteria for optimal anesthetic agent, often relying on anesthesiologist preference.
Study design: Retrospective review of 600 primary cochlear implant surgeries and anesthetic variables.
Setting: Tertiary academic medical center
Methods: Demographic characteristics (age, gender, race, insurance status and ZIP code) compared to regional, health system and otolaryngology clinic demographics.
Results: In 600 cochlear implant surgeries, the most common anesthesia regimen was balanced (84.3%), followed by gas (13.5%) and TIVA (2.2%). Average surgical time was 72.1 ± 18.5 minutes. Emergence from anesthesia took an average of 13.7 ± 5.4 minutes, shortest with TIVA (11.9 ± 4.6 minutes) and longest with gas (14.2 ± 5.3 minutes). Univariate analyses showed no significant correlation between anesthesia regimen and emergence time, recovery, or phase II duration. Multivariate regression indicated significantly shorter emergence times with TIVA compared to gas (coeff: -5.29, p=0.0027). Cluster analysis identified three groups based on remifentanil and gas usage. Patients in cluster 1 (low gas and high remifentanil) had longer emergence times than those in clusters 2 (low gas, low remifentanil: 16.26±5.96 vs 13.39±5.30 minutes; p=0.001) and 3 (high gas, low remifentanil: 16.26±5.96 vs 13.47±5.48 minutes; p=0.0069). Cluster 1 also had longer phase 1 recovery times compared to clusters 2 (65.33±28.87 vs 54.33±25.36 minutes; p=0.0085) and 3 (65.33±28.87 vs 56.38±20.81 minutes; p=0.0365).
Conclusion: TIVA anesthetic regimen is associated with shorter emergence time than gas and may inform anesthesia selection in otologic cases.

Ajiel Mae Basmayor

Improving Perioperative Mortality Rate Data Capture in Hawassa, Ethiopia: A Mixed-Methods Study

Authors: Basmayor AM, Fissehatsion J, Woisha B, Ergete AM, Sgro MV, Cook K, Ogunneye Q, Mellese B, Jaraczewski TJ, Dodgion C, Michael A, Beyene A, Iverson KR.
Project Mentor: Katherine R Iverson, MD MPH; Surgery

Background: Despite the progress in the use of surgical indicators such as perioperative mortality rate (POMR) in Ethiopia, gaps remain in data consistency and completeness. This mixed-methods study aims to evaluate current POMR recording and reporting practices in a tertiary hospital, identifying barriers and opportunities to strengthen the surgical data system.
Methods: Perioperative mortality was defined as death after major surgery prior to hospital discharge. POMR was compared between four data sources: 1. paper registries from the operating rooms, surgical wards, ICU, and 2. aggregate discharge information, and 3. monthly indicator reports to the health management information system (HMIS), and 4. reports on the national data collection system (DHIS2). Qualitative interviews with clinical staff and data officers were conducted to evaluate current practices in collecting POMR.
Results: The aggregate reported one-year POMR was 0.9% (56/6438) for registries, 0.9% (57/6336) for discharge information, 0.5% (33/6437) for HMIS reports, and 0.6% (35/5935) for DHIS2 reports. Qualitative interviews (n=17) reported regular tracking of perioperative deaths within surgical departments and surgical data quality checks by data officers. However, many interviewees identified the lack of an electronic system as a significant barrier to accurate, timely data collection. Other proposed solutions include implementing closer monitoring of data quality, and providing additional equipment and training for staff on data entry.
Conclusion: Explanations behind POMR discrepancies between data sources include inconsistencies in data entry, lack of consolidation of postoperative deaths from different service points, and reports generated without a mechanism to include updated registry or discharge counts. These findings, along with diverse perspectives from our interviews, highlight the need for a well-trained workforce and a digital record system to improve POMR data capture.

Callie Bednarek

Identifying Factors that Influence Healthy Eating Amid Rise in Childhood Obesity

Authors: Bednarek, C, Gundacker, C, Jhin, A, Wright, C, Strong-Rimmer, S, Zhang, J, Yan, K
Project Mentor: Constance Gundacker, MD, MPH; Pediatrics
Community Partner: Feeding America Eastern Wisconsin

Background: Childhood obesity is a growing public health concern, disproportionately affecting lower-income and non-Hispanic Black children. Food insecurity has been proposed as a contributing factor, but its relationship with childhood obesity remains unclear. This study aims to assess baseline food insecurity and obesity rates within a pediatric clinic population and identify local factors influencing healthy eating.
Methods: An anonymous survey was administered to caregivers of children aged 2-17 years at an urban pediatric outpatient clinic. The survey assessed child Body Mass Index (BMI), food insecurity (via the Hunger Vital Sign), caregiver knowledge and perceptions of healthy eating, and demographic variables. Statistical analyses included Chi-square and Fisher's exact tests to examine associations between food insecurity, caregiver education, and child BMI.
Results: Of 324 caregivers surveyed (92% response rate), 39.1% reported food insecurity, a prevalence over twice the national average. Obesity rates were also higher than national estimates, with 24.8% of children classified as obese or severely obese. Caregivers expressed strong motivation for healthy eating but cited barriers such as high food costs and limited access. Knowledge of nutrition guidelines was low, particularly among caregivers with lower education. No significant association was found between food insecurity and childhood obesity (p=0.62).
Discussion: These findings underscore disparities in food insecurity and obesity within marginalized communities. While no direct association was observed, addressing both through targeted interventions remains critical. Future efforts should focus on improving food access, nutritional education, and evaluating resource interventions' impact on health outcomes.

Sara Bertan

Bridging Dermatology Gaps: Telehealth's Role in Enhancing Skin Disease Diagnosis and Management in Bagamoyo, Tanzania

Authors: Bertan S, Mmbaga G, Juma O, Ogunneye Q, Esson M, Wanat K, Humphrey S
Project Mentor: Karolyn Wanat, MD; Dermatology

Skin diseases represent a major public health burden across Sub-Saharan Africa, including Tanzania, where access to dermatologic care is limited by a shortage of specialists and geographic barriers. Teledermatology (TD) offers a promising solution to improve healthcare delivery in underserved regions. This retrospective study evaluated diagnostic and management concordance between Tanzanian primary care clinicians and U.S. board-certified dermatologists in Bagamoyo District from 2022 to 2024. We compared concordance rates across urban and rural settings, examined changes over time, and analyzed concordance by disease category. Preliminary results reveal a total of 131 rural teleconsultations that showed 42.0% diagnostic concordance, 21.4% partial concordance, and 36.6% discordance. Management concordance was 34.3% complete, 29.8% partial, and 35.9% discordant. In 115 urban consultations, infections were the most common diagnosis (43.5%), with bacterial infections comprising 20%. Diagnostic concordance in the urban cohort improved from 53% in 2022 to 68% in 2023, while treatment concordance significantly increased over the same period (p=0.02). Although teledermatology demonstrated effectiveness in enhancing diagnostic accuracy and clinical education, a notable proportion of discordant cases highlights the ongoing need for targeted educational interventions and sustained TD implementation. Strengthening local-international collaborations will be essential to further build dermatologic capacity and improve access to quality care in Bagamoyo and similar resource-limited settings.

Arjan Bindra

Effects of Contact Sport Participation on Resting State Functional Connectivity Patterns in Adolescent Athletes

Authors: Bindra A, Cohen A, Brett B, Ristow K, McCrea M, Wang Y

Project Mentor: Yang Wang, MD, PhD; Radiology

Introduction: Adolescent contact sport athletes are repeatedly exposed to sub-concussive head impacts (RHI), raising concerns about potential disruptions to neurodevelopment. While overt concussions have known consequences, emerging evidence suggests that even asymptomatic RHI may alter brain function. This study used resting-state functional MRI (rsfMRI) to examine whether participation in contact sports affects brain connectivity and cognition over a single season.

Methods: Sixty-eight healthy adolescent athletes (45 contact sport [CS], 23 non-contact sport [NCS]) completed pre- and post-season rsfMRI and neurocognitive assessments. Functional data were acquired using multiband multi-echo (MBME) protocols and preprocessed with FSL. The primary imaging metric, fractional amplitude of low-frequency fluctuations (fALFF), captured intrinsic neural activity. Clinical tests included ImPACT, SAC, and others. Linear mixed models assessed group-by-time effects.

Results: Both groups showed increased fALFF post-season, but NCS athletes exhibited more widespread changes. CS participants showed smaller, localized increases. Significant group-by-time interactions emerged for verbal memory ($p = 0.024$), visual motor speed ($p = 0.018$), and immediate memory ($p = 0.002$), with NCS athletes improving and CS athletes declining. fALFF-memory correlations were significant in NCS ($p = 0.032$) but absent in CS ($p = 0.663$).

Discussion: Findings suggest that contact sport participation may blunt or reverse expected neurocognitive and connectivity gains in adolescents. Subclinical RHI may disrupt brain-behavior coupling and typical maturation trajectories. These results support the use of sensitive imaging tools like fALFF to detect early brain changes and highlight the need for long-term monitoring of youth athletes.

Morgan Blaser, BS

A qualitative study of traumatic injury patients' experiences undergoing trauma resuscitations

Authors: Blaser ME, Malovec AR, Bandolino A, Biesboer EA, Hamadeh Y, Khan S, Williams K, Schroeder ME

Project Mentor: Mary Elizabeth Schroeder, MD; Surgery, Medical College Physicians Administration

Abstract

Background: PTSD affects a large proportion of trauma patients, even after physical injuries have healed, leading to chronic psychological distress, impaired social functioning, and decreased quality of life. The perceived life threat, or the belief their life is in danger, that trauma patients face also contributes to an increased risk of developing PTSD. Notably absent from the literature is the trauma patient's perspective on their trauma and trauma resuscitation.

Methods: This was a qualitative study performed on trauma patients from an urban, academic, level 1 trauma center in a Midwestern study. Patients were gathered and surveyed on their experience undergoing trauma and trauma resuscitations. A thematic content analysis was performed using MAXQDA on survey responses and themes were further broken down into timeframes described by patients: prehospital, trauma bay, and post-trauma.

Results: A total of 197 patients were surveyed. The average age was 43.5 years, and most patients were male and African American. The most common mechanism of injury was motor vehicle crash followed by gunshot wound. Themes present in the prehospital time frame were vulnerability, perceived life threat, memory and positive emotions. Themes most prevalent in the trauma bay time frame were vulnerability, memory and position emotions, and in the post-trauma timeframe, the most prevalent themes were long term consequences and emotional response.

Conclusion: In the pre-hospital setting, perceived life threat was of the highest prevalence, while patients in the trauma bay feel vulnerable and lack of control during the trauma resuscitation process. Understanding the perspective of the trauma patient can help to guide trauma informed care practices to help improve mental health outcomes in the trauma patient.

Daphne Blount

Improving Sexual Health Education in Undergraduate Medical Training: A Workshop-Based Approach to Inclusive and Competent Care

Authors: Blount D, Curtis C, O'Neill C, McFadden V, Linton A.
Project Mentor: Allison Linton, MD, MPH; Obstectrics & Gynecology

Despite sexual health (SH) being a crucial aspect of patient care, medical trainees feel underprepared to discuss SH with patients due to insufficient education. Through a three-part clinical skills workshop, this project hopes to bolster SH education for medical students. The workshops discuss SH topics addressing undertreated populations: adolescents, LGBTQ+ patients, aging adults, and patients with differing abilities. Workshops combine didactics, roleplay, and clinical skills in a multimodal design. This study assessed the impact of these workshops on students' (1) confidence in communicating sexual health information, (2) comfort with taking a SH history, and (3) attitudes towards these topics

Student data from pre- and post-workshop surveys was de-identified and coded into numerical value from 1-5 reflecting confidence, comfort, and agreeability. Differences in data was statistically analyzed using Mann-Whitney and Chi-Squared tests with a p-value threshold of 0.05. Monte-Carlo approximation was used to obtain a more accurate p-value, given small sample size. The difference between pre- and post- workshop surveys reflected a statistically significant improvements some topics within each of the aforementioned categories: (1) confidence, (2) comfort, and (3) attitudes towards discussing sexual health topics.

This study found evidence that multi-modal education is an effective method for teaching SH skills. Further, this style of medical training can increase student exposure to caring for underserved populations. It can increase students' confidence and comfort in discussing SH and can reduce feelings of apprehension or intimidation while increasing feelings of importance and motivation.

Gouri Bollepalli

Validity of the Center for Epidemiologic Studies Depression Scale (CES-D) for Depression Screening in Postpartum Adolescents in Uganda

Authors: Bollepalli G, Anguzu R.
Project Mentor: Ronald Anguzu, MD, PhD; Institute for Health and Humanity
Community Partner: Child and Family Foundation of Uganda

Background: In Uganda, 25% of pregnancies occur among teenagers, and 26.9% of women experience depression during pregnancy or postpartum. Postpartum depression is likely common but often undetected in postnatal clinics. Service delivery is challenged by limited mental health providers, absence of screening practices, high patient loads, and lack of validated tools for adolescents in Kawempe, Kampala. This study assessed the psychometric properties of the CESD-20 depression screening tool in a sample of adolescent mothers at a Kampala postnatal clinic. We hypothesized CESD-20 would reliably detect depression when compared to the Mini International Neuropsychiatric Interview (MINI) as a gold standard.

Methods: This cross-sectional study was conducted at the Child and Family Foundation postnatal clinic. Adolescent mothers were consecutively screened with the CESD-20 in English or Luganda, followed by the MINI tool. A CESD-20 cut-off score ≥16 indicated probable depression. Cronbach's alpha measured internal consistency. Sensitivity, specificity, PPV, NPV, and AUROC assessed CESD-20's psychometric properties. Participants screening positive for depression, suicidality, or disability were followed up by clinic clinicians and referred to child and adolescent psychiatry. The study was approved by Institutional Review Boards of the Medical College of Wisconsin and Makerere University.

Findings: Among 227 participants, most were married (54.1%), unemployed (80.6%), and had probable depression (65.0%). CESD-20 showed internal consistency of 85.3%, sensitivity of 75%, specificity of 35.4%, PPV of 6.1%, NPV of 96.2%, and AUROC of 0.8149.

Interpretation: CESD-20 showed moderate effectiveness with good reliability, sensitivity, NPV, and acceptable AUROC. Wider use of screening tools may improve detection and treatment of postpartum depression in adolescent mothers. Future studies should consider testing CESD-20 in a single language.

Dahlia Brasuel

Impact of Renaming and Reframing on Parent Perspectives of Palliative Care Teams

Authors: Brasuel DA, Johnson ML, Balistreri KA, Newman AR, Davies WH, Rothschild CB.

Project Mentor: Charles Rothschild, MD; Pediatrics

Community Partner: Marquette University, College of Nursing and University of Wisconsin-Milwaukee Department of Psychology,

Context

Pediatric palliative care (PPC) underutilization persists despite proven benefits for children with serious illnesses and their families. Barriers include misconceptions that PPC is exclusively for end-of-life. Some suggest that renaming PPC teams may improve referrals by removing preconceptions of "Palliative Care €. Yet only a minority of community adults have heard of palliative care. Are PPC misconceptions preconceived, or are they secondary to how the service is introduced?

Objectives

To explore how program naming and framing impacts perceptions of, and enthusiasm for, PPC services among community-dwelling parents.

Methods

A sample of 406 U.S. parents was recruited via Amazon Mechanical Turk and randomly assigned to one of four conditions: survey vignettes introduced participants to either "palliative care"or the "pediatric advanced care team (PACT),"and either included or excluded explicit mention of end-of-life. Questions assessed participants' willingness to engage with the PPC/PACT team for a child with serious illness. Analysis consisted of inferential statistics and Principal Factor Analysis.

Results

There were no significant differences in reception of PPC services. Two latent factors accounted for 73.4% of total variance: Best Interest: a parent's perception that PPC services were in their child's best interest; and Parental Distress: a parent's perception of being overwhelmed when considering a PPC service for their child.

Conclusion

Parental perceptions of PPC are complex and multifactorial. In this study, neither renaming the team nor excluding mention of end-of-life impacted participants' enthusiasm for the service. Further study is needed to overcome barriers to referral, however re-scripting might not be sufficient.

Corey Briska

Acquisition of Core Competencies Through Medical College of Wisconsin's Brain Expo

Authors: Briska CA, Pillay SB.

Project Mentor: Sara Pillay, PhD, ABPP; Neuropsychology

The purpose of this project is to learn how to be a medical educator through the acquisition of core competencies. While obtaining an understanding of the proper background on medical education and stroke, information on stroke was presented to the Milwaukee community through an event titled Brain Expo. Using "Teaching as a Competency €: Competencies for Medical Educators as a framework, three competencies were demonstrated through the application of teaching the Milwaukee community. These competencies and the project's limitations were analyzed to the extent of how well they were achieved.

Lisbeth Brooks

Comparative effectiveness of disease modifying antirheumatic drugs for patients with cardiac sarcoidosis

Authors: Brooks L, Kivlin W, Mohananey D, Sabchyshyn V, Putman M
Project Mentor: Michael Putman, MD, MSCI; Medicine

Objectives
We aimed to evaluate the comparative efficacy of disease-modifying antirheumatic drugs (DMARDs) for patients with cardiac sarcoidosis.
Methods
We performed a retrospective cohort study of new users of methotrexate, mycophenolate or azathioprine for sarcoidosis using the US-based TriNetX electronic health records database from 2008 to 2023. Hazard ratios were calculated using inverse probability of treatment weighted Cox proportional hazards regressions to compare the efficacy of DMARDs with respect to delaying major adverse cardiac events among patients with cardiac sarcoidosis and preventing cardiac sarcoidosis from developing among patients with non-cardiac sarcoidosis.
Results
Among 3441 patients with sarcoidosis, 601 were defined as cardiac sarcoidosis and 2840 as non-cardiac sarcoidosis. The average age of the cohort was 52.1 years (standard deviation 11.9 years) and the majority were female (55.9%) and white (50.0%). Among patients with cardiac sarcoidosis at baseline, the risk of serious cardiac outcomes was similar for patients who initiated therapy with mycophenolate mofetil (HR 0.83, 95% CI 0.43-1.59) or azathioprine (HR 0.74, 95% CI 0.29-1.89) as compared with methotrexate. Among patients who did not have cardiac sarcoidosis at baseline, the risk of developing cardiac sarcoidosis was similar for patients who initiated therapy with mycophenolate mofetil (HR 1.11, 95% CI 0.46-2.66) and azathioprine (HR 0.54, 95% CI 0.15-1.91) as compared with methotrexate. Mycophenolate mofetil (HR 1.83, 95% CI 1.10-3.05) and azathioprine (HR 1.32, 95% CI 0.92-1.89) increased the risk of infection.
Conclusion
A strategy of methotrexate had a favorable safety profile in terms of infection risk and may be favored over azathioprine or mycophenolate mofetil for patients with sarcoidosis or cardiac sarcoidosis.

Anna Burneske

Comparison of Nutrition Screening Tools to Formal Nutrition Assessments by Registered Dietitians in Critically Ill Children

Authors: Burneske A, Zhang L, Pan A, Mikhailov T.
Project Mentor: Theresa Mikhailov, MD, PhD; Pediatrics, Critical Care

Malnourished patients have worse outcomes. Many standardized tools have been developed to screen for malnutrition in acutely ill pediatric patients. Alternatively, some institutions have developed their own tools for this purpose. Regardless of their origin, none of these tools have been validated in critically ill children. Registered dietitians (RDs) perform nutrition assessments on patients based on the results of these nutrition screenings. Virtual Pediatric Systems, LLC (VPS), a database supporting standardized data sharing for research in pediatric ICUs , developed a module which captures data for nutritional metrics. We compared pediatric nutrition screening tools with the assessments performed by RDs to determine whether nutrition screening tools accurately identify malnourished patients. We also determined which nutrition screening tools more accurately identify patients who are malnourished or at risk of becoming malnourished during their hospitalization in the PICU. We hypothesized that 1) nutrition screening tools used by participating centers will accurately identify malnourished children, and 2) standardized tools will be more accurate than those developed at single centers. We obtained de-identified data from October 2019 to March of 2023 for all patients under 18 years of age from VPS. We considered the RD's assessment to be the gold standard for determining malnutrition and compared the nutrition screening tools to the RD's assessment. Degree of agreement between nutrition screening tools and RD's assessment was determined by Cohen's kappa (K). After selecting subjects who had a complete nutrition screen and RD assessment, the final cohort contained 9891 patients. The kappa coefficient for the standardized nutrition screening tools was 0.38, which is considered "fair"agreement between the screening tool and the RD "gold standard"assessment. The standardized screening tools do not adequately assess the nutritional status of critically ill children.

Chantè Butler, BS

The Effect of COVID-19 on Breast MRI Utilization in Breast Cancer Management Across Wisconsin

Authors: Butler C, BS; Xing Y, PhD, MS; Maduekwe U, MD, MMSc, MPH, FACS, FSSO
Project Mentor: Ugwuji N Maduekwe, MD, MMSc, MPH, FACS, FSSO; Surgery

Introduction: The COVID-19 pandemic exacerbated barriers to healthcare. The objective of this study is to investigate how the pandemic affected the utilization of breast MRI in Wisconsin through the lens of patient geography and health resource allocation.
Methods: We used the Wisconsin Health Information Organization's all-payer claims database to evaluate trends in the utilization of breast MRI amongst women with newly diagnosed breast cancer from January 1, 2017 to March 31, 2022. Year of diagnosis, estrogen receptor status, age at diagnosis, prior personal history, family history, and genetic susceptibility were identified and analyzed. Patient location was categorized into a six-group model developed by the University of Wisconsin-Madison's Health Innovation Program: urban, urban advantaged, urban underserved, rural, rural advantage, and rural underserved. Multivariable logistic regression was used to examine the association between the disparities grouping and receipt of breast MRI during this period.
Results: 32,597 women were newly diagnosed with breast cancer during the five-year period with a median age of 63.5 years and 59.8% had ER positive disease. There was significant geographic variation in MRI use, with lower rates in the rural underserved areas, and higher rates in urban advantaged areas.
Conclusions: The impact of COVID-19 on healthcare utilization and the management of oncologic disease is still being examined. By stratifying based on geographic location and health resource availability, our study highlights persistent socioeconomic and geographic disparities. A more comprehensive understanding of the intersection between healthcare resource allocation and systemic stressors is essential for optimizing access to breast cancer care.

Melina Chavarria

Family-Based Interventions and Glycemic Outcomes in Type 2 Diabetes: A Systematic Review of Adult Trials and the Pediatric Evidence Gap

Authors: Chavarria M, Bermudez K, Williams J.
Project Mentor: Joni S. Williams, MD, MPH; Medicine

Objective: This systematic review aimed to assess whether family-based lifestyle coaching is more effective in achieving long-term glycemic control when initiated during childhood compared to adulthood in individuals with diagnosed type 2 diabetes mellitus (T2DM).
Methods: We searched PubMed and the Cochrane Library in April 2025 for U.S.-based randomized controlled trials (RCTs) published between 2005 and 2025. Studies were eligible if they included individuals diagnosed with T2DM, involved family-based behavioral interventions, and reported glycemic outcomes (e.g., HbA1c) at ≥12 months. Data extraction focused on study characteristics, intervention design, and clinical outcomes.
Results: Of 511 records screened, five RCTs (N = 239-506 per study) met inclusion criteria, all focused on adult populations. No eligible pediatric studies were identified. Interventions varied in delivery format and intensity but commonly included coaching, communication training, and joint goal setting. Most studies reported modest but statistically significant HbA1c improvements, though durability varied. Psychosocial outcomes such as diabetes self-efficacy and partner support were frequently enhanced, even when glycemic improvements were minimal.
Limitations: The review was limited to English-language U.S. trials and did not include a formal risk of bias assessment. Heterogeneity in interventions and outcomes also limited comparability.
Conclusions: Family-based interventions show behavioral and glycemic benefits for adults with T2DM, but no data currently support their effectiveness in pediatric patients with T2DM. This represents a critical gap in the literature. Future trials should assess early intervention strategies in youth with T2DM to inform age-specific clinical guidelines.

Heloise Cheruvalath

The Evaluation of Prenatal Care Needs of Rohingya Refugees in Milwaukee, WI

Authors: Cheruvalath H, Karra H, LaBorde TB, Perez G, Kaeppler C
Project Mentor: Caitlin Kaeppler, MD; Pediatrics

Background: Refugees experience numerous barriers to accessing healthcare. The Rohingya, a Muslim ethnic minority from Myanmar, are further hindered as they have no form of written language. Milwaukee is home to one of the largest communities of Rohingya refugees in the United States. However, little has been published regarding the unique needs and assets of this community, especially in the context of women's health.
Methods: Snowball recruitment was utilized to identify and interview 9 healthcare professionals who worked closely with Rohingya women in Milwaukee. Transcripts were analyzed by two team members using qualitative analysis.
Results: Knowledge, language, transportation, technology, and stigma were identified as the most common barriers. Language was seen as the most inhibitory. While resources have been developed to help increase knowledge around numerous health topics, women's health continues to be insufficiently represented. Rohingya women often have little background in women's health, and much of the information women obtain comes from other women in the community. While there are many workshops and informational videos in Rohingya around general health topics, not many are focused on women's health.
Conclusion: Future initiatives should focus on meeting Rohingya women's unique needs by being community-driven and by investing resources into the creative solutions already being utilized by healthcare professionals working closely with this community. Lastly, educational objectives should be focused on increasing patient comfort, provider empathy, and highlighting shared qualities between provider and patient.

Mutsa Chiromo

Relocation and Informal Settlement Upgrading: Impacts on Residents' Wellbeing and Housing Security in Kigali, Rwanda

Authors: Chiromo MM, Dickson-Gomez J.
Project Mentor: Julia Dickson-Gomez, PhD; Institute for Health and Humanity
Community Partner: Center for Development Policy, Kigali, Rwanda

According to the Kigali Masterplan 2050, over 60% of households in Kigali live in informal settlements, typically in self-constructed shelters without legal land title or basic infrastructure. These settlements are often located in high-risk areas such as steep slopes and wetlands, contributing to health and safety challenges. Many settlements are being removed to make space for modern infrastructure and planned urban development intended for former residents, and in some cases, residents of other areas. Kigali neighborhoods like Busanza and Mpazi have already undergone such changes.
This study conducted a qualitative analysis of residents' experiences in Kigali's informal settlements and in newly developed housing. The aim was to better understand how redevelopment impacts wellbeing, community continuity, and perceptions of safety, and to inform more inclusive urban planning.
Six focus group discussions were held with residents from Busanza and Mpazi, divided into tenants and landlords living in either informal settlements or formal apartments. Discussions included housing conditions, access to amenities, compensation, service access, and community ties. Discussion recordings were transcribed and translated from Kinyarwanda to English. Data was coded and analyzed using MAXQDA to identify major themes.
Results demonstrated that residents who remained in their original communities, as seen in Mpazi, reported greater satisfaction due to preserved social networks, improved infrastructure, and perceived fairness in compensation. In contrast, residents relocated to Busanza expressed dissatisfaction related to inadequate compensation, smaller housing, and social isolation. Across all groups, participants emphasized the need for more involvement in planning and decision-making.
Findings highlight the need to involve residents to align redevelopment with their needs and priorities, despite ongoing efforts.

Joy Chung

Echocardiography versus Cardiovascular Magnetic Resonance Measurements of Left Ventricle Size in Adult Congenital Heart Disease Patients with Ventricular Septal Defect Repair

Authors: Chung J, Cohen S, Yang Y, Yang K, Ginde S, Buelow M, Bartz P, Gerardin J
Project Mentor: Jennifer Gerardin, MD; Medicine, Pediatrics

BACKGROUND: Echocardiogram left ventricular (LV) linear dimensions are used to assess LV dilation and guide surgical decisions. Our study evaluated the relationship between Echo LV dimensions and cardiac magnetic resonance (CMR)-derived LV volumes in adult congenital heart disease (ACHD) patients with repaired ventricular septal defects (VSD).
Methods: A single center retrospective review from 1/1/2011-6/1/2023 was performed in ACHD patients with CMR within 6 months of echo. Echo LV end-systolic and end-diastolic diameters (LVESD, LVEDD) and CMR LV end-systolic and end-diastolic volumes (LVESV, LVEDV) were assessed. Simple regression modeling and likelihood ratio tests were used for analysis.
RESULTS: 165 ACHD patients (56% male, mean age 28±10 years) were included, with 88 (53%) having prior VSD repairs. Mean days between Echo and CMR was 85±53. Contaminant left sided valve disease was present in 43 (26%) with aortic regurgitation, 24 (15%) aortic stenosis, 19 (12%) mitral stenosis and 2 (1%) mitral valve regurgitation. Median Echo LVEDD and LVESD were 49±8 mm and 34±5 mm, respectively, both significantly larger in patients without VSD than those with VSD repairs ($p<0.001$, $p<0.010$). Median LVEDV and LVESV was 145±47 ml and 56±20 ml, with indexed volumes of 78±20 ml/m2 and 30±10 ml/m2. Mean LVEDV was significantly smaller in patients with prior VSD repair ($p=0.003$), while LVESV showed no difference. Echo linear dimensions poorly predicted CMR LV volumes in diastole ($R^2=0.260$) and systole ($R^2=0.314$), with indexed volumes also showing weak correlation to Echo diameters (diastolic $R^2=0.149$, systolic $R^2=0.178$).
CONCLUSION: Echo LV linear measurements poorly reflect LV size in patients with prior VSD repair. This highlights a clinical dilemma: some ACHD patients with severe aortic insufficiency or mitral regurgitation don't meet Echo-based indices for surgery despite enlarged LV volumes on CMR. Further studies are needed to explore clinical outcomes based on CMR volume.

Cameron Collins

The Impact of Guidelines for Monitoring Depth of Neuromuscular Blockade and Dosing of Reversal Agents on Clinical Practice

Authors: Collins CA, Lien CA, Eberle D, Reber C
Project Mentor: Jonathan Bock, MD, FACS; Otolaryngology

Despite a fount of literature describing the risks associated with residual neuromuscular blockade and the proven benefits of quantitative monitoring, consistent implementation leaves a lot to be desired. This study evaluates changes in clinical practice at Froedtert Hospital following the introduction of ASA guidelines for quantitative neuromuscular monitoring and reversal agent dosing. Patient data were retrospectively collected from July/August 2022 (pre-guideline) and January 2023 (post-guideline). Key variables assessed included frequency of quantitative monitoring, selection and dosing of reversal agents (sugammadex and neostigmine), and neuromuscular blockade depth at reversal. Implementation resulted in an 11% increase in sugammadex use, decreased neostigmine administration, slightly improved monitoring compliance, but persistent dosing inaccuracies. These findings highlight the necessity of enhanced educational initiatives, rigorous adherence to dosing protocols, and implementation of technological tools for the guidance of practice to improve patient safety and resource utilization.

Ana Mia Corujo Ramirez

Understanding community needs and increasing covid-19 testing access at Las Parcelas Suarez in Loíza, PR

Authors: Corujo Ramirez AM, Frytz A, Tarrats Irizarry G, Dominguez Vazquez GS, Delgado del Rio E, Ortiz-San Miguel M, Millán Rodríguez R, Algarín Zayas GA, Maas-Cortés L, Allende E, Hassan S, Malicki C, Nunez-Smith M, López Casillas M, Franco Z.
Project Mentor: Zeno Franco, PhD; Emergency Medicine
Community Partner: Parcelas Suarez Community Board, Puerto Rico Public Health Trust

The COVID-19 pandemic disproportionately impacted underserved and vulnerable populations across the United States. However, territories such as Puerto Rico (PR) received considerably less attention and resources. Testing and vaccination availability have increased in PR gradually given infrastructure limitations on the Island and the long-term effects of Hurricane Maria. This project focused on Loíza, a northeast coastal town located next door to the capital that is predominantly Afro-Caribbean and under resourced. During COVID-19, the municipality had one of the lowest vaccination rates and was identified as a high-risk site for disease transmission. In response, a partnership with Yale University School of Medicine, Puerto Rico Public Health Trust (PRPHT) and the Parcelas Suarez Community Board began to address COVID-19 testing barriers by implementing a COVID-19 surveillance program. Additionally, community CENSUS surveys were performed to improve emergency preparedness during crises. This work aimed to understand community needs, increase access to COVID-19 testing, local resources and improve vaccination distribution.

Megan Coughlan

Subsequent Genital Surgery after Initial Repair for Prepubertal Bladder Exstrophy, Cloacal Exstrophy and Epispadias Patients

Authors: Coughlan M, Roth E, Yan K, Zhang L, Ellison J, Groth T, Kryger J, Sheridan K, Siodlarz S
Project Mentor: Elizabeth B Roth, MD; Pediatrics

Introduction:
Surgical goals of bladder exstrophy epispadias complex (BEEC) are to (1) reconstruct the bladder and urethra to support urinary continence and (2) create functional and visually acceptable external genitalia. We hypothesized that specific patient and surgical factors are associated with risk for subsequent genital surgery.
Methods:
We queried a database of patients with epispadias, bladder exstrophy, and cloacal exstrophy from 2013 to 2023. Surgeries performed after initial repair were grouped into those that involved the external genitalia and those that did not. Subsequent surgeries to external genitalia were classified by indication as: urinary, sexual, or cosmetic.
Results:
Among 79 patients, 63% (50) underwent 93 additional surgeries after initial repair, and 20% (16) required subsequent surgeries involving the external genitalia. Indications for subsequent genital surgeries included urinary (11, 46%), sexual (8, 33%), cosmetic (3, 12.5%), or a combination (2, 8%). The most frequent procedure was orchidopexy (6, 25%), followed by repair of urethral stricture (4, 17%) and meatotomy (4, 17%). Median time to first subsequent genital surgery was 13 months from initial repair (0-37 months) and median time since initial repair was 95 months (24-135 months). Primary BEEC diagnosis, age at surgery, weight at surgery, age at revision surgery, preoperative pubic diastasis, osteotomy type, epispadias repair type and 30-day complications following initial repair were not significantly different between those who had subsequent surgery and those that did not.
Conclusions:
Within this cohort, 20% of patients required subsequent genital surgery a median of 13 months after initial repair. The most common indication for subsequent genital surgery was to improve urinary function. We did not identify specific risk factors for subsequent genital surgeries. Our findings will allow providers to better counsel patient families on expected surgical outcomes.

Claire Curtis

Improving Sexual Health Education in Undergraduate Medical Training: A Workshop-Based Approach to Inclusive and Competent Care

Authors: Blount D, Curtis C.
Project Mentor: Allison Linton, MD, MPH; Obstetrics and Gynecology

Introduction: Medical students often feel underprepared to discuss sexual and reproductive health (SRH) due to cultural taboos and limited sex education, despite its importance in patient care. This project aimed to enhance SRH education for preclinical medical students through a three-part clinical skills workshop series focused on adolescents, LGBTQ+ and adult patients, and aging adults and patients with differing abilities. Workshops included didactic lectures, small-group role play, and hands-on clinical skills. The goal was to assess whether workshops improved students' knowledge and comfort discussing SRH topics.
Methods: Participants completed voluntary pre- and post-workshop surveys assessing confidence in communicating SRH information, comfort with sexual history-taking, and perceived importance and accessibility of SRH topics. Responses were de-identified and coded on a 1-5 scale. Paired t-tests ($p<0.05$) were used to assess statistically significant changes in responses.
Results: Post-workshop survey results showed a statistically significant increase in confidence and comfort discussing SRH topics. The greatest gains were seen in areas related to LGBTQ+ care, patients of different age groups, gender dysphoria/euphoria, and sexual dysfunction. On average, students increased their self-reported scores by 1 point, shifting from "neutral" to "somewhat confident/comfortable." Students reported the highest post-workshop confidence discussing SRH with patients aged 18-40 and those experiencing sexual dysfunction.
Conclusions: Workshop-based education using lectures, role play, and clinical skills practice is an effective method for improving SRH competency among preclinical medical students. Students reported increased confidence and knowledge, particularly in caring for LGBTQ+ individuals and diverse age groups. This model promotes inclusive, empathetic care and better prepares students to serve vulnerable populations in clinical practice.

Hunter Daley II, MS

Coherent Optical Detection of Middle Ear Disease

Authors: Daly RA, Ansari S, Chun RH, Flanary VA, Ho A, Keppel K, Link R, Maksimoski MT, McCormick M, Malloy M, Martin T, Monroy GL, Peterson K, Robey TC, Saunderson ML, Shay S, Spillman DR, Sulman C, Thompson J, Boppart SA, Kerschner JE.
Project Mentor: Joseph E Kerschner, MD; Otolaryngology

Objectives: Video otoscopy utilizing optical coherence tomography (OCT) promises to improve the diagnosis and management of otitis media (OM). Integrating OCT into clinical care could improve antibiotic stewardship and enhance diagnosis by detecting bacterial biofilms to guide interventions. Herein, we investigated the impact of OCT devices on decision-making for antibiotic prescriptions or surgical recommendations in primary and specialty practices.
Methods: Seventy-five patients were recruited from primary care clinics associated with a major children's hospital and 103 patients from a tertiary referral pediatric otolaryngology clinic. Diagnosis and clinical decisions were recorded before and after OCT imaging. Patients were followed and reimaged in follow-up appointments and preoperatively when possible. Exam findings, OCT images, and clinical decisions were collected and will undergo further analysis with machine learning.
Results: In primary clinics, OCT use altered recommendations in 15% of encounters. Antibiotic prescriptions were initially planned in 55% of cases and increased to 64% after OCT use. In the specialty clinic, providers' exam findings agreed with their findings following OCT in 97% of cases. Tympanostomy tube surgery recommendations increased from 84% (84/100) to 86% (86/100) after OCT evaluation. Fifty patients received follow-up imaging, and 38 patients were imaged preoperatively.
Conclusion: This report provides an update on an ongoing clinical trial. Recruitment is complete within the primary clinics and active within the specialty clinic. OCT devices demonstrate diagnostic value by detecting middle ear effusions and biofilms. In combination with machine learning, further analysis will be conducted upon completion of this trial.

Sara Daneshjoo

Pathos Project - Combatting Physician Burnout by De-Villainizing Medical Malpractice

Authors: Daneshjoo S, Kwak GH, Edamala S, Salud AD.
Project Mentor: Antonio Devilla Salud, II, MD; Medicine

Medical malpractice litigation has held a controversial position in the medical field. While ultimately beneficial, it has been villainized for generations by physicians. That, in combination with the unrealistic expectations the medical field demands from its physicians, has bred an environment that isolates doctors when the inevitable medical error does occur. This ultimately leads to physician burnout. Medical students subconsciously adopt these beliefs early in their medical career due to their exposure to this environment. The Pathos Project, an extracurricular for M1s, hosts socratic style discussions on controversial topics surrounding physician and patient suffering. Pathos M2 facilitators believed this was the perfect environment to challenge M1's preconceived ideas on the significance of medical malpractice to better prepare them for when they practice as physicians. A new Pathos session was created surrounding medical malpractice and coping with medical errors. This session hosted a guest speaker who, a physicians themselves, filed a medical malpractice lawsuit after being a victim of a medical error. M1 student perspectives were recorded before, during and after the discussion. Significant perspective shifts were recorded and debated as shown in this paper. Topics surrounded the importance of admitting to your mistakes as a doctor, knowing how to cope with said mistakes, and how medical malpractice can act as a quality improvement tool rather than fear factor for physicians.

Joyce Nicole Dapula

Exploring the Therapeutic Potential of a CD28 Super Agonist to Induce T-regulatory Cells in Mice After Spinal Cord Injury

Authors: Dapula, JN, Kroner, A
Project Mentor: Antje Kroner, MD, PhD; Neurosurgery

Traumatic spinal cord injury (SCI) is a serious neurological condition that results in high mortality rate, poor quality of life, and heavy socioeconomic burden that affects approximately 302,000 people currently in the United States. This study investigates if administration of CD28 super agonist antibody improves functional outcomes. CD28 super agonist increases T-Regulatory cells, which modulate the immune response and promote healing. We developed an SCI mouse model by inducing damage in the thoracic spinal cord (T9) using a mechanical impactor. Two cohorts were created: cohort one received the CD28 injection day 1 post-injury while cohort two received the injection day 7 post-injury. The effects of CD28 super agonist on locomotor function were then measured through various behavioral tests: ladder walk, BMS scale, and CatWalk. Finally, the mouse spinal cord was collected and histologically analyzed to determine the effects of CD28 super agonist on lesion size. Although CD28 super agonist treated mice had significantly increased Tregs, we did not see a significant difference between the antibody and isotype control group regarding the behavioral studies nor lesion size. However, cohort two exhibited slightly improved outcomes compared to cohort one, suggesting that treatment timing may influence therapeutic efficacy. We hypothesize that early injection day could have led to excessive immunosuppression and potential promotion of fibrotic scarring, which may have counteracted the anticipated neuroprotective effects of increased Treg count. Further research is required to evaluate whether CD28 super agonist in isolation may promote healing and recovery following SCI.

Alexander Dawes

Shoulder Arthroplasty In Patients With Systemic Lupus Erythematous: What Are The Complication Risks?

Authors: Dawes AM, Slusarczyk S, Farah P, Wagner ER, Gottschalk MB, LoGiudice A, Grindel S, Graf AR.
Project Mentor: Alexander R Graf, MD; Orthopaedic Surgery

Introduction: Shoulder Arthroplasty is utilized in up to 8.4% of patients with Systemic Lupus (SLE) to address joint pathology at the shoulder, but no understanding of complication risks exists. The purpose of our study is to compare the complication rates of patients with Systemic Lupus Erythematosus undergoing shoulder arthroplasty. Methods: We reviewed the Marketscan commercial claims and Medicare supplemental databases for patients undergoing Total Shoulder Arthroplasty (TSA) from 2009-2021. The patients were divided into those with a preoperative diagnosis of SLE compared to those with no history of SLE. After primary analysis, patients were matched based on preoperative baseline characteristics and evaluated for their outcomes. Results: A total of 69,860 patients underwent arthroplasty, of those 1.2% (815) of those had a preoperative diagnosis of SLE and 98.8% (69,045) of patients with no preoperative diagnosis of SLE were analyzed. When compared to the matched cohort patients with SLE demonstrated higher rates of surgical site infection (3.5% vs 1.8%; p=0.049), subsequent trips to the emergency department (17.1% vs 13.1%; p=0.03), and revision shoulder arthroplasty (6.1% vs 3.3%; p=0.01). Conclusions: Our results suggest that patients with SLE experience perioperative complications and the need for revision shoulder arthroplasty at higher rates than the rest of the population. Significance: It is important to understand the risk profiles of patients to assist with preoperative counseling. In addition, our study outlines the need for the creation of perioperative management guidelines to help mitigate the risks of potential complications due to the complexity of performing shoulder arthroplasty in SLE patients.

Anna Dibbs, BA

Thirty-year prevalence of spontaneous hemoptysis in palliated single ventricle circulation

Authors: Dibbs AK, Zhang L, Pan AY, Spearman AD.
Project Mentor: Andrew Spearman, MD; Pediatrics

Background
Spontaneous hemoptysis is a well-recognized risk of palliated single ventricle circulation, yet published literature is limited to case reports and small case series. In this study, we sought to determine the long-term prevalence of spontaneous hemoptysis among patients with palliated single ventricle circulation at a single institution. Secondarily, we sought to characterize the clinical outcomes after spontaneous hemoptysis.
Methods
We conducted a retrospective study of patients with a history of Glenn or Fontan palliation seen from 1/1/1990-1/21/2023. Episodes of spontaneous hemoptysis were identified through two independent database screens that queried International Classification of Diseases-9/10 codes and electronic medical records for "pulmonary hemorrhage"and "hemoptysis €. Positive screens were subsequently confirmed or re-classified by manual chart review.
Results
Of 799 patients with palliated single ventricle circulation, 10.9% (87/799) screened positive for hemoptysis. Following verification with manual chart review, 3.4% (27/799) of patients with palliated single ventricle circulation had spontaneous hemoptysis. A total of 61 episodes of spontaneous hemoptysis occurred in 27 patients. Of all hemoptysis episodes, 83.6% (51/61) occurred after Fontan palliation. Of patients with hemoptysis, 51.9% (14/27) had multiple episodes of hemoptysis with recurrence at a median of 0.6 years (range 1 day - 8.5 years) after the first episode.
Conclusions
To our knowledge, this is the first study that quantifies prevalence of hemoptysis in a large cohort of patients with palliated single ventricle circulation. Overall, prevalence of spontaneous hemoptysis was low (3.4%) among patients with palliated single ventricle circulation and there was a moderate rate of recurrence (51.9%).

Ryan Dull

Photoscreening for Ocular Complications in Children with Diabetes Mellitus

Authors: Dull R, Strombeck T, Costakos D.
Project Mentor: Tracey Strombeck, OD, FAAO; Ophthalmology and Vision Sciences

Introduction: Diabetic retinopathy (DR) in children is considered rare before puberty. Studies of dilated fundus exams in children with type 1 diabetes mellitus (DM) suggest screening could begin at age 15, or five years post-diagnosis, whichever occurs later, unless risk is elevated. However, the timing and role of teleretinal screening in children remain uncertain.
Purpose/Aim: This study aims to assess the prevalence and onset of ocular pathology in pediatric DM patients and to propose a potential teleretinal screening regimen for asymptomatic children.
Methods: Children diagnosed with type 1 or type 2 DM were referred for teleretinal screening at Children's Wisconsin Eye Clinic between 2017-2023. Fundus photographs were reviewed by pediatric eye specialists. Imaging interpretations and demographic data were recorded in REDCap for statistical analysis.
Results: Among 497 participants, 660 teleretinal exams produced 1319 image interpretations. Mild DR was found in 12 children. Two had macular edema, and two had arteriovenous nicking. Incidental findings included 4 with cup-disc asymmetry, 4 with retinal hyperpigmentation, 1 with chorioretinal scarring, 1 with vessel sheathing, 4 with choroidal nevi, 2 with macular thinning, 2 with vessel tortuosity, and 3 with raised pigmented lesions. Twenty-five images were excluded for poor quality. Of all interpretations, 4.85% were abnormal: 2.12% showed DR (1.59% mild, 0.53% unspecified), 2.73% were incidental non-diabetic findings, and 1.90% were unreadable. Correlation between diabetes duration and DR was weak (r = 0.0767).
Conclusion: DR was rare (2.12%) in children regardless of diabetes duration (r = 0.0767). Incidental findings were 28.77% more common than DR. Of those with DR, 76.92% were type 1 DM patients over age 15 (one case <15). These findings support current screening guidelines and suggest earlier screening may help initiate focused care and prevent mild retinopathy progression.

Sharon Edamala

Lessons Learned: A Qualitative Study on Factors Influencing the Early Implementation of the Complexity Intervention Unit

Authors: Edamala S, Kathlyn Fletcher K, Heinrich T, Nattinger AB, Dong Y, Pezzin LE, Nataliansyah MM
Project Mentor: M Muska Nataliansyah, PhD MD MPH; Surgery

Background: Complex Intervention Units (CIU) were designed to provide high-quality, integrative, and collaborative care for patients with severe concurrent psychiatric and medical illnesses. Consequently, this population tends to have reduced quality of life, higher rates of medical service utilization, and increased mortality rates.
Objectives: When Froedtert Hospital opened its' CIU, it was necessary to understand the successes and limitations that impacted its function so that the necessary steps could be taken to improve workflow processes, team collaboration, and patient care; therefore, the following research was conducted to explore the factors influencing the CIU's success during its first few months.

Methods: Qualitative data regarding planning and early implementation of the CIU were collec
ted through direct observations in June 2023 and in-depth interviews with CIU leadership (n=8) and CIU staff (n=7) in July - August 2023. We used the Consolidated Framework for Implementation Research (CFIR) to guide the development of interview questions. Audio transcripts were coded and will be thematically analyzed to elucidate facilitators and barriers to successful CIU implementation in the early phase.
Results: We were able to identify and appreciate the factors that influenced the early CIU implementation: the importance of staff buy-in, intentionality behind the construction of a CIU, resilience of CIU leadership to ongoing adjustments, and appropriate patient admission. This may help guide recommendations for improvements and the implementation of future CIUs.

Srilatha Edara

The Clinical Impact of the Iodinated Contrast Shortage on Emergency Department Patients with Abdominal Pain

Authors: Edara S, Otero R, Timpe J, McGurk, K.

Project Mentor: Kevin McGurk, MD; Emergency Medicine

Background: Abdominal pain accounts for 5-10% of all emergency department (ED) visits and often requires computed tomography (CT) imaging to evaluate. An unanticipated supply chain disruption of ICM in May of 2022 impacted hospitals worldwide and forced clinicians to severely restrict the usage of contrast enhanced CT scans. This study seeks to characterize the clinical impact of the ICM shortage on patients presenting to the ED with abdominal pain.

Methods: Our retrospective cohort study compared adult patients presenting to EDs with abdominal pain from March 1 to April 30, 2022, and May 15 to June 15, 2022. The primary outcome was 72-hour ED return visits. Clinical and demographic data were also collected. Data analysis was conducted with Pearson's chi-square test and the Wilcoxon rank sum tests.

Results: 4,622 ED encounters were included for analysis, with 3,198 during the control period and 1,424 during the ICM shortage. Demographics between cohorts were similar, including age (median age= 41, p= 0.73) and gender (67.3% and 67.4% female, respectively, p= 0.95). Contrasted CT scans (27.9% vs. 7.8%, p<0.001) and diagnostic blood tests (80.9% vs. 77.1%, p= 0.003) were utilized more frequently during the pre-ICM shortage phase. Non-contrasted CT scan utilization increased during the ICM shortage (6.3% vs 29.1%, p<0.001). ED length of stay, hospital length of stay, mortality, and 72-hour return visits were similar between cohorts without any statistically significant differences. There was a higher admission rate during the pre-contrast shortage period (9.5% vs 7.3%, p= 0.015).

Conclusion: Contrasted CT scan use decreased during the ICM shortage but was not associated with an increase in 72-hour return visits, mortality, ED length of stay, or hospital length of stay. This suggests no significant clinical impact on patient care and has implications for ED physician use of contrasted CT scans to evaluate patients with abdominal pain.

Madeline (Hoitink) Edgerly

Barriers and Facilitators to Obstetric Care in Smaller Wisconsin Communities

Authors: Edgerly M, Ruffalo L

Project Mentor: Leslie Ruffalo, PhD, MS; Family and Community Medicine

As many rural hospitals continue to close their labor and delivery units and the gap between the demand for and supply of physicians practicing obstetrics continues to grow, this study seeks to understand the barriers and facilitators to labor and delivery in small Wisconsin communities. We conducted interviews with rural-based family medicine and OB-GYN physicians to glean their perspectives on challenges and opportunities that they face in the provision of high-quality obstetrical care and used thematic analysis techniques to generate results. We interviewed 21 physicians that currently practice or have practiced obstetrics in rural Wisconsin hospitals, consisting of eleven family medicine physicians and ten OB-GYN physicians. Key themes emphasized: 1) Patient Safety Programs and Training, 2) Staffing, and 3) Physician Involvement in Hospital Changes. Future considerations in rural obstetric care will involve hands-on education for obstetric teams, agreements with larger hospitals, and retention of a strong obstetric team committed to the community. Implementing training programs to supplement lower annual deliveries and creating a network of support among colleagues and health systems are imperative to sustain and build rural obstetric care.

Henry Eilen

The Relationship of Abdominal Oblique Strength on Pitching Biomechanics in Adolescent Baseball Pitchers.

Authors: Eilen HT, Cross JA, Kokott W, Dziuk C.
Project Mentor: Jessica Fritz; Orthopedics

Context: The pitching cycle is a highly dynamic task, and the trunk and abdominal obliques are key contributors in efficient kinetic transfer.
Objective: To determine the relationship between abdominal oblique strength and pitching biomechanics in adolescent baseball pitchers.
Design: Cross-sectional study.
Setting: Biomechanics laboratory.
Participants: Nineteen healthy right-handed high school male baseball pitchers (age = 17.1 ± 1.1 years, height = 183.7 ± 6.5 cm, mass = 83.1 ± 10.1 kg).
Main outcome measures: The main outcome was full body biomechanics captured at key points during the pitching cycle. The main variable of interest was abdominal oblique strength (glove arm and throwing arm). Kinematics and kinetics were calculated using Visual 3D motion capture software. Descriptive statistics including means and standard deviations were calculated. Shapiro-Wilk test confirmed the data were normally distributed. Scatterplots determined linear associations, so a 2-tailed Pearson correlation with Fisher option was used to examine associations between obliques strength measurements and biomechanical metrics.
Results: Three kinematic measures were identified with $p < 0.05$ and $r = 0.5$ demonstrating strong correlations with abdominal oblique strength. Maximum pelvis rotation velocity was positively correlated with throwing arm oblique strength ($r = 0.52$, $p = 0.02$). Glove arm oblique strength was positively correlated with both maximum pelvis rotation velocity and maximum torso rotation velocity ($r = 0.69$, $p = 0.001$, and $r = 0.52$, $p = 0.02$, respectively).
Conclusions: These data highlight the moderate to strong positive relationship abdominal oblique strength has on both maximal pelvic and torso rotational velocity. Training to improve the strength of the abdominal obliques may increase both maximal pelvic and trunk rotational velocity, while avoiding a significant increase upper extremity joint loading, which is important in optimizing performance and injury prevention.

Cordelia Elaiho

STRYV365 peak team Coaching: Qualitative Assessment of Student Social Emotional Learning, Life Experiences, and Program Evaluation

Authors: McGuire M, Elaiho CR, Stoltenburg A, Liverman E, Lumelsky P, Bates G, Navarrete A, Chelius T, Gundacker C, Currie B, Meurer JR.
Project Mentor: John R Meurer, MD, MBA; Institute for Health and Humanity
Community Partner: STRYV365

Exposure to adverse childhood experiences (ACEs) has effects on child and adolescent health and wellbeing. Trauma informed programing and social-emotional learning (SEL) approaches have been used to mitigate ACEs and build positive childhood experiences (PCEs). STRYV365 is a non-profit based in a large midwestern city that provides programs to students to cope with trauma and promote PCEs. The STRYV365 peak team program is a unique 10-week trauma-informed SEL curriculum using a coach-led format with emphasis on physical activity to build SEL skills, resiliency, and PCEs. The aims of this study were to qualitatively assess student's coping, self-image, life experiences, and neighborhood cohesion and to evaluate the strengths, weaknesses, and opportunities to improve peak team. 1,626 students in grades 5-9 were exposed to peak team at four diverse urban school. Student focus groups and interviews were held after their exposure to the intervention. Qualitative results showed that the coaching aspect of peak team resulted in strong connections between students and coaches. Students appreciated being active while exploring SEL concepts. Some students expressed issues with teamwork, fights, and gender alienation during peak team. Some felt anxious and uneasy during school and noted family struggles. Overall, this study suggests that peak team may work to mitigate the impact of ACEs on youth while also providing a model to other schools and programs for inclusion of physical activity and coaching into teaching SEL skills.

Jordan Eng, BS

Retrospective analysis of pediatric Rohingya-speaking patients presenting to the emergency room at Children's Hospital

Authors: Jordan Eng, BS.; Breanne Shah, MD, MPH.; Lauren Burgunder, MD, MPH.
Project Mentor: Lauren Burgunder, MD, MPH; Pediatrics

Background:
The Rohingya are one of two major populations that reside in the southeast Asian nation of Myanmar. However, they are still not recognized as an official group by the Rakhine-controlled government (1).
This lack of citizenship has led to extensive mistreatment and human rights violations against the Rohingya. Due to this abuse, many have been forced to migrate to other parts of the world. One of the major hubs that these refugees have fled to is Milwaukee, WI. Rohingya refugees face many barriers to care, but most notably is the language barrier. The Rohingya have no written language and Rohingya interpreters are often not available via traditional interpreter services over phone or video. Consequenty, this leads to significant delays in care and treatment. Although the numbers of Rohingya refugees in Milwaukee continue to grow, there is still limited research to characterize the distinct needs of these refugees.
The project's purpose is to identify trends and habits of Rohingya-speaking patients presenting to the emergency room at Children's hospital of Wisconsin. This data will then be used to better characterize the patient population and expand clinician awareness on the needs of the Rohingya.
Methodology:
This study is a data extraction and chart review. Data will be obtained by searching for eligible participants by querying a slicer dicer with inclusion/exclusion criteria and extracting clinical information for each identified participant.
A descriptive analysis will be conducted for each variable. For the secondary outcome of type of interpreter used, a univariable analysis will be conducted for each variable. A multivariable analysis will then be built based on the results of the univariable analysis.

Eniola Fatade

Evaluating the Impact of a Culturally Tailored Diabetes Self-Management Education and Support Program (DSMES) in Port Harcourt, Nigeria: A Cohort Study

Authors: Fatade E, Ogbonnaya C, Harry KA, Tomczyk B, Caples L, Akhidue K, Anikpo E, Chinenye S, Unachukwu C, Abibo L.
Project Mentor: Lolia Abibo, MD, MS; Medicine

Background: Type 2 diabetes mellitus (T2DM) is a chronic condition marked by hyperglycemia, leading to complications such as cardiovascular disease and neuropathy. In Nigeria, T2DM prevalence rose from 5.77% in 2018 to 7.0% in 2024. High care costs often lead to medication rationing and complications like hypertension and diabetic foot ulcers. A culturally tailored Diabetes Self-Management Education and Support (DSMES) program was developed at the University of Port Harcourt Teaching Hospital (UPTH) to improve self-care behaviors.
Objective: To assess the impact of the DSMES program on blood pressure (BP) control and foot check adherence in adults with T2DM.
Design: Pre-post intervention study.
Setting: University of Port Harcourt Teaching Hospital, Southern Nigeria.
Patients: Eighty-nine adults with T2DM were enrolled. Analysis included 39 for BP and 58 for foot care.
Intervention: A four-week DSMES program with group education and two individualized sessions, delivered by trained diabetes educators.
Measurements: Baseline and six-month BP and foot check data were collected using Individual Counseling Forms and analyzed with paired t-tests and the Mid-P McNemar test.
Results: Mean diastolic BP decreased significantly by 3.08 mmHg (n=39, p=0.035). Systolic BP declined by 3.67 mmHg (p=0.051). No significant change in achieving BP ≤130/80 mmHg. Foot check adherence rose from 26% to 76% (n=58, p<0.001).
Limitations: Small sample size, literacy barriers, and self-reported data may affect generalizability.
Conclusion: The DSMES program improved foot care and diastolic BP control, offering a replicable model for diabetes education in resource-limited settings.

Helen Files

Regulating resistance: Examining candidate regulatory elements of the malaria resistance gene, lrim1

Authors: Files H, De Leon Garcia L, Anderson C, Riehle M
Project Mentor: Michelle M. Riehle, PhD; Microbiology & Immunology

Introduction: The gene lrim1 is involved in mosquitoes' natural response to malaria infection, but its regulation is not well understood. The non-coding genome regulating lrim1 may play a role in mosquitoes differential susceptibility to Plasmodium; a better understanding of this natural resistance would contribute to malaria eradication efforts. Previous research has identified two candidate enhancers for lrim1, EN1 and EN2.
Aims: 1) Validate that EN1 and EN2 candidate enhancers have activity, 2) Compare EN1 and EN2 activity between Plasmodium susceptible and resistant mosquitoes, and 3) Identify the genetic variants underlying any observed differences in enhancer activity.
Methods: EN1 and EN2 were PCR amplified from mosquito genomic DNA and ligated into a luciferase vector plasmid. These plasmids were transfected into mosquito hemocyte-like cells. DualGlo luciferase assays measured enhancer activity (Aim 1) and compared activity between sequences (Aim 2). A single-nucleotide difference in a predicted TFBS was identified in EN1. Mutants were generated at this site and activity was retested using the same methods as described above (Aim 3).
Results: EN1 and EN2 displayed enhancer activity above background ($p = 0.03$). EN1 cloned from susceptible mosquitoes had higher activity than EN1 from resistant mosquitoes ($p < 0.0001$). EN2 showed no significant difference activity ($p > 0.99$). A mutation disrupting a predicted TFBS in susceptible EN1 resulted in increased enhancer activity, ($p = 0.0011$) while a mutation restoring the same predicted TFBS in resistant EN1 resulted in decreased enhancer activity, ($p = 0.0082$).
Conclusion: Variation in enhancers for lrim1 appear to play a role in the difference between malaria resistant and susceptible mosquitoes response to infection. Ultimately, work further dissecting the functional importance of non-coding genetic variation will inform future malaria control tools.

Michael Flatley

Radio-pathomic signatures predict survival outcomes of gross total tumor resections in glioblastoma patients

Authors: Michael Flatley1, Samuel Bobholz1, Savannah R. Duenweg2, Allison K. Lowman1, Aleksandra Winiarz2, Biprojit Nath2, Fitzgerald Kyereme1, Jennifer Connelly3, Dylan Coss4, Wade M. Mueller5, Mohit Agarwal1, Anjishnu Banerjee6 and Peter S. LaViolette1,7
Project Mentor: Peter LaViolette; Radiology

Glioblastoma is an aggressive primary brain tumor with poor prognosis. Maximal safe surgical resection remains the cornerstone of treatment for this highly proliferative and infiltrative tumor. We hypothesized that radio-pathomic maps of cell density and extracellular fluid (ECF), derived from autopsy-based tissue trained models could predict overall survival for glioblastoma patients with a GTR status. Radio-pathomic maps of cell density and extracellular fluid (ECF) were calculated using the T1, T1C, FLAIR and ADC images using an autopsy tissue trained model. A habitat approach of intensity binarizing maps and combining them was used, with cutoffs determined based on voxel intensities in the ECF and cellularity maps.Thresholds were applied to the cellularity and ECF maps, and the volumes for each histological label extracted in the annotated tumor regions of contrast enhancement (CE) and FLAIR hyperintensity (FH). Analysis was restricted to subjects with a GTR status from the online dataset, totaling 248 subjects. The impact of high or low volume via median split on survival was analyzed by Cox proportional hazards model and Kaplan-Meier curves. High hypercellular volume is predictive of survival, ($p = 0.02$, $HZ = 1.53$), ($p = < 0.001$, $HZ = 2.88$), and ($p = < .001$, $HZ = 1.97$) within FH, CE, and necrosis regions respectively. Additional significant phenotypes include hypocellularity in the FLAIR ($p = .026$, $HZ = 0.66$) and pseudo-palisading in contrast enhancement ($p = .003$, $HZ = 1.76$). These results suggest radio-pathomic habitat composition in both enhancing and non-enhancing glioblastoma regions impacts survival in GTR patients. Our analysis shows that non-enhancing hypercellular tumor in the FLAIR region impacts the survival outcomes GTRs.

Allison Frankmann

Trends and Independent Correlates of Risk Factor Control in US Adults with Diabetic Kidney Disease: NHANES 1999-2018

Authors: Mukoso Ozieh, MD Allison Frankmann, BA Sheyenne Tung, BS Xuemeng Wang, MS Leonard Egede, MD, MS
Project Mentor: Mukoso Ozieh, MD; Medicine

Introduction: Diabetic kidney disease (DKD) poses a significant health and financial burden on affected individuals in the United States (US). Existing literature examining trends and independent correlates of risk factor control in DKD are limited. The goals of this study are to examine trends in DKD risk factor control from 1999 to 2018 and to investigate independent correlates of risk factor control in US adults with DKD.
Methods: Using the National Health and Nutrition Exam Survey (1999-2018), we analyzed a sample of 2,479 US adults with diabetes and chronic kidney disease. The primary outcome was risk factor control, which included glycated hemoglobin, blood pressure, cholesterol, and a composite measure for all risk factors; there were two thresholds for glycemic and blood pressure control. Independent correlates included demographic variables and clinical variables, such as body mass index and comorbidities. Adjusted logistic regression models were used to examine the relationship between risk factor control and correlates.
Results: Glycemic, blood pressure, lipid control and all risk controlled increased from 1999 to 2010 before all either remaining stable or declining. Independent correlates were differentially associated with risk factor control. Being older than 65 years was associated with lipid control while being male was associated with greater odds of meeting blood pressure control. Being Hispanic was associated with worse odds of having glycemic control. Having concurrent angina was associated with greater odds of having glycemic and lipid control. Older age, male sex, a college education, and being overweight or obese were all associated with having all risk controlled.
Conclusions: Our study examined time trends and independent variables associated with risk factor control over twenty years in a nationally representative sample of adults with DKD. Our findings continue to update current knowledge and understanding of risk factor control in DKD.

Stephen Gebbia II, PharmD

Laboratory Abnormalities During Pediatric Isotretinoin Therapy: A Retrospective Review with Expert Management Guidance

Authors: Gebbia S II, Chiu Y, Gumm A, Sreedharan R, Beacher D, Lalor L.
Project Mentor: Leah Lalor, MD; Pediatric Dermatology

Background: Isotretinoin is a highly effective treatment for nodulocystic acne but is associated with laboratory abnormalities that rarely alter clinical management. Despite this, routine monitoring for hepatotoxicity, pancreatitis, and rhabdomyolysis remains common.
Objective: To assess the frequency and clinical significance of laboratory abnormalities during isotretinoin therapy in adolescents and young adults, and to inform evidence-based management recommendations.
Methods: We conducted a retrospective review of patients aged 10-24 who completed ≥1 month of isotretinoin therapy at Children's Wisconsin between November 2012 and August 2021. Laboratory data (AST, ALT, triglycerides [TG], creatine kinase [CK]), treatment changes, and systemic complications were recorded. Abnormalities were graded using CTCAE v5.0.
Results: Among 925 patients (mean age 15.5 years), 96.4% underwent post-initiation labs, and 60.1% had at least one abnormality: 88.5% were mild (grade I), 7.8% moderate (grade II), and 3.7% severe (grade III). Despite this, 95.3% of affected patients continued treatment without modification. Therapy was discontinued in 3.4% due to lab abnormalities, though most resumed isotretinoin. No cases of liver failure, rhabdomyolysis, or pancreatitis occurred.
Conclusion: Laboratory abnormalities during isotretinoin therapy are common but infrequently clinically significant. Most patients tolerate continued treatment without adverse outcomes. Mild, asymptomatic abnormalities may be monitored without dose changes, while more severe or persistent elevations warrant individualized management. These findings support more flexible, risk-based monitoring strategies to reduce unnecessary treatment interruptions.

Dom Gordon

Exploring Disparities in the Enforcement of Infant Safe Sleep Policy

Authors: Gordon D, Titus L, Krause K.
Project Mentor: Lauren L. Titus, MD; Pediatrics

Background: Adherence to infant safe sleep practices is crucial for preventing sleep-related deaths. While caregivers are often educated on these practices in clinical settings, less is known about their perspectives and experiences receiving this guidance during a child's hospitalization.
Methods: We conducted semi-structured interviews of caregivers of recently hospitalized infants to explore their understanding of safe sleep, experiences during hospitalization, and perceptions of provider communication. Transcripts were analyzed using thematic coding to identify key patterns in knowledge, implementation, and barriers.
Results: Caregivers generally reported baseline knowledge of safe sleep, shaped by pediatricians, prior education, or professional experience. Most had their infants sleep in separate bassinets or cribs at home. During hospitalization, caregivers cited environmental disruptions, such as frequent monitoring and infant illness, as barriers to maintaining safe sleep practices. While one caregiver appreciated being corrected after unintentionally co-sleeping, another could not recall receiving formal education during their stay. All participants emphasized the importance of proximity and comfort for their infant's sleep. No caregivers reported experiencing bias or discrimination during care.
Conclusions: Hospital-based safe sleep education is generally well-received when delivered with clarity and respect. However, environmental and emotional challenges may complicate adherence. These findings highlight the need for compassionate, consistent education that acknowledges caregiver stress and the realities of inpatient care.

Zack Gratz

Evaluating the Impact of a Peer Mentorship Program in Longitudinal Competency-Based Medical Education

Authors: Gratz Z, Caswell C, Kambol A, Anderson Q, Jentsch A, Abufares N, Mackman R, Mackman S, Ryan K
Project Mentor: Kelsey Ryan, MD; Pediatrics

Traditional faculty mentorship in medical education is often constrained by limited availability and specificity of advice. Peer mentorship offers a complementary model by supporting mentees' transition into medical school while promoting mentors' teaching and leadership skills. We implemented a peer mentorship program within an experiential learning course at a private Midwestern medical school to enhance students' understanding of core course components. First-year mentees were randomly assigned second- and third-year mentors. Six required sessions were embedded into course meetings across the calendar year. A pre-implementation survey (pre-1 N= 65) and two post-surveys at the end of each semester (post-1 N = 31; post-2 N = 11) assessed students' understanding of course components, as well as their perceptions of the program. Survey outcomes were compiled as a "total understanding score" (TUS). Comparing pre-1 to post-1 and post-2, understanding ($p = 0.0026$; $p = 0.001$) and development ($p = 0.0037$; $p = 0.0019$) of course competencies improved significantly. Scholarly project understanding and TUS improved significantly from pre-1 to post-1 ($p = 0.0001$, $p = 0.0005$), but not from pre-1 to post-2 ($p = 0.0739$, $p = 0.0665$). Understanding and development of individualized learning plans did not significantly improve across either interval. Consistent mentor groupings and integration into required sessions were rated most favorably among design components. Participation positively impacted students' self-assessed confidence in competency-based learning. Structured peer mentorship embedded in medical education curricula may address limitations of hierarchical models and enhance professional identity formation through longitudinal, peer-supported development.

Samuel Gray

Utility of in-hospital symptom screening for 3 month prognostication of patients with mild traumatic brain injury (mTBI)

Authors: Gray S, Amadon F, Temkin N, Darsie M, Giacino JT, Corrigan JD, Korley F, Whyte J, Stein MB & Nelson LD
Project Mentor: Lindsay Nelson, PhD, ABPP; Neurosurgery

Aims: Experts have recommended that ED providers administer an mTBI symptom checklist as part of their acute workup, however, guidelines for interpretation of these assessments are lacking. Our objective was to assess the discriminative utility of Rivermead Post-Concussion Symptoms Questionnaire (RPQ) scores, assessed in the hospital within 24 hours of injury, in predicting persistent mTBI-related symptoms at 3 months post-injury. Methods: Adults with mTBI were recruited in 3 level 1 trauma centers within 24 hours of injury (Day 1). Participants completed the RPQ at enrollment and were followed at 3 months to assess later symptom burden. Using binary logistic regression models and 5-fold internal cross-validation, we calculated a mean area under the curve (AUC) value to characterize the utility of Day 1 RPQ score in predicting persistent mTBI-related symptoms at 3 months post-injury. Sensitivity and specificity tables are reported to provide a clinically interpretable basis for these scores to be utilized in the ED setting. Results: Two hundred fifty two participants who completed a Day 1 RPQ were included in the analysis. Inverse probability weighting was used to adjust for bias in attrition (n=168 followed) and develop results that generalized to the full sample. The mean cross-validated AUC was 0.84 using Day 1 RPQ score alone to predict persistent symptoms. More complex models including those using previously validated sets of predictor variables did not outperform Day 1 RPQ alone. Conclusions: In adults being evaluated in a level 1 trauma center with mTBI, symptom burden within 24 hours of injury was robustly associated with adverse 3-month symptom outcomes. Clinical interpretation tables are provided to aid in adoption of the recommended practice of in-hospital mTBI symptom assessment. The RPQ, which can be completed in about 3 minutes, may support recognition of mTBI symptoms in the ED and risk stratification for triage into appropriate follow-up pathways.

Margaret Hackett

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Authors:
Project Mentor: ;

C. Ryan Hahn, MS

The Effect of Monofilament or Braided Filament Vaginal Cerclage Suture Types Effect on Viable Live Birth Outcomes: A Retrospective Cohort Study

Authors: Hahn CR, McIntosh, J
Project Mentor: Jennifer McIntosh, DO, MS; Obstetrics & Gynecology

One of the leading causes of child mortality and morbidity is preterm labor. Transvaginal cervical cerclages, a monofilament suture or a braided suture to close the cervix, can prevent preterm labor and pregnancy loss. Previous research [1-3] has indicated that both braided and monofilament have positive and negatives to their usage including increased risk of sepsis or chorioamnionitis, and increased difficulty with removal. This study aims to determine difference outcomes among suture types. This was a retrospective chart review of medical records from all Froedtert patients (N=315) who had cerclages placed from 2012 to 2023. Baseline demographics, cerclage placement indications, pregnancy history, pregnancy outcomes, sutures used, cerclage complications, experience level of surgeon, and other maternal or pregnancy complications were recorded.
315 patients received cerclages and delivered within the Froedtert system with 199 (63%) history indicated cerclages, 50 (16%) ultrasound indicated cerclages and 66 (21%) exam indicated cerclages. 188 (60%) cerclages led to full term deliveries, 71 (23%) deliveries <37 weeks, 17 (6%) deliveries less than 32 weeks, 21 (7%) deliveries less than 28 weeks, 8 (3%) stillbirths, and 10 (3%) pregnancy loss or miscarriage. 79 (25%) cerclages were performed by attending physicians, 153 (49%) by maternal fetal medicine fellows, 77 (25%) by resident physicians.
These results indicate that type of cerclage suture has a limited impact on viable live births. Further, fellow or resident involvement does not impact the rate of successful cerclage placement and outcomes. Pre-term labor, pregnancy complications and other factors continue to remain challenges to cervical cerclage placement and successful viable live births.

Stephen Halada

Navigating stroke care: Geospatial assessment of regional stroke center accessibility

Authors: Halada S, Beyer M, Zhou Y, Weston B
Project Mentor: Kirsten Beyer, MPH, PhD; Institute of Health & Humanity

Introduction: Reducing time between stroke onset and hospital intervention is crucial for positive outcomes in stroke patients. This study aims to utilize geographic methodology to identify regions in Wisconsin with both high stroke mortality and low physical accessibility to certified stroke centers (SCs), particularly ASCs.
Methods: Geocoded mortality records for stroke death between 2015 and 2020 were accessed from the Wisconsin Department of Health Services. Indirectly age-standardized mortality ratios (SMRs) were estimated continuously across Wisconsin using adaptive spatial filtering and mortality records at the census block group level. Drive times and mortality ratios were evaluated at the tract level alongside Rural-Urban Commuting Area (RUCA) codes. Spatial error regression modeling was used to determine RUCA classifications with the highest stroke risk independent of accessibility to stroke centers.
Results: Approximately 50%, 68%, and 78% of Wisconsin residents resided within 30, 45, and 60 minutes of an ASC, respectively. Clusters of high stroke SMRs were found in urban centers as well as rural areas irrespective of county declinations. Spatial regression modeling suggested small-town census tracts had the highest SMR irrespective of physical accessibility to care and spatial correlation. In small-town census tracts >45 minutes from the nearest ASC, the median stroke SMR was 1.12 (IQR=0.94-1.40) with 226,000 residents and 150 stroke deaths per year.
Conclusion: Small-town areas are associated with both long drive distance to ASC locations and high stroke mortality. Geographical analyses reveal apparent stroke care deserts and may inform strategic allocation of emergency medicine resources and coverage.

Ahmad Hamdan

Effects of Mucosal Decongestion on Nasal Aerodynamics: A Pilot Study

Authors: Hamdan AT, Cherobin GB, Voegels RL, Rhee JS, Garcia GJM.
Project Mentor: Guilherme Garcia, PhD; Otolaryngology and Communication Sciences

Objective: Mucosal decongestion with nasal sprays is a common treatment for nasal airway obstruction. However, the impact of mucosal decongestion on nasal aerodynamics and the physiological mechanism of nasal airflow sensation are incompletely understood. The objective of this study is to compare nasal airflow patterns in nasal airway obstruction (NAO) patients with and without mucosal decongestion and nondecongested healthy subjects.
Study Design: Cross-sectional study of a convenience sample.
Setting: Academic tertiary medical center.
Methods: Forty-five subjects were studied (15 nondecongested healthy subjects, 15 nondecongested NAO patients, and 15 decongested NAO patients). Three-dimensional models of the nasal anatomy were created from computed tomography scans. Steady-state simulations of airflow and heat transfer were conducted at 15 L/min inhalation rate using computational fluid dynamics.
Results: In the narrow side of the nose, unilateral nasal resistance was similar in decongested NAO patients and nondecongested healthy subjects, but substantially higher in nondecongested NAO patients. The vertical airflow distribution within the nasal cavity (inferior vs middle vs superior) was also similar in decongested NAO patients and nondecongested healthy subjects, but nondecongested NAO patients had substantially less middle airflow. Mucosal cooling, quantified by the surface area where heat flux exceeds 50 W/m2, was significantly higher in decongested NAO patients than in nondecongested NAO patients.
Conclusion: This pilot study suggests that mucosal decongestion improves objective measures of nasal airflow, which is consistent with improved subjective sensation of nasal patency after decongestion.

Joseph Harris

Utility of Head CT Scans Post In-Hospital Pediatric Cardiac Arrest

Authors: Harris, J., Rajzer-Wakeham, K., Scanlon, M., Wakeham, M., & Balakrishnan, B.
Project Mentor: Binod Balakrishnan, MD; Pediatrics

Introduction:
Research involving adult patients in the Intensive Care Unit (ICU) has studied the use of head CTs (HCT) post in-hospital cardiac arrest (IHCA). These studies indicate that HCTs may influence the course of treatment. Our study proposes to evaluate how HCTs are utilized post IHCA in pediatric patients.
Methods:
Hospital records were reviewed in patients (0-17 years) with IHCA who received a HCT within 96 hours of return of spontaneous circulation (ROSC). Data collected included demographics, relevant diagnoses, information regarding the IHCA, HCT indications and findings, and any changes in therapy. Interventions performed within 24 hours of the HCT were considered as response to HCT findings or if a note explicitly stated as such.

Results:
There were 208 patients evaluated who had an IHCA during the study period, with a median age 0.84 (IQR 0.15, 4.73) years. Forty patients (19%) had a HCT within 96 hours of ROSC. The three most common clinical indications for HCT were EEG change (68%), pupil change (23%), and seizure activity (20%). New HCT findings were noted in 58% of scans. Findings included cerebral edema (20%), intracranial bleed (13%), infarct/ischemia (35%), worsening of known findings (5%), and other (8%). Only 25% of patients had post-HCT interventions.
Conclusion:
Most HCTs ordered after a pediatric IHCA are associated with no change in treatment plan. Due to the inherent risks associated with HCTs and transport to get them, physicians should consider if imaging is vital to the future treatment plan.

Leah Hawksford

Gun Violence in Mexico: The Source of the Problem

Authors: Hawksford L, Hargarten S, Poland JL, Trejo AC
Project Mentor: Stephen Hargarten, MD, MPH; Emergency Medicine

Six countries, accounting for over half of the world's firearm deaths, are all located in the Americas. The saturated nature of the US gun market incentivizes manufacturers to market the flow of guns beyond its borders. Medical and public health leaders have advocated for increased understanding of and attention to the role of the US gun manufacturers in driving gun violence in other countries. This article aims to fill this gap in the literature. We apply a public health lens to describe the flow of guns that are manufactured in the US and find their way, licitly and illicitly, with a focus on Mexico, with tragic and devastating outcomes. Considering the scale of the regional firearm-fueled epidemic, we conclude that there is much more that the medical field and public health communities in the US can and must do to stop the spread of this "made in America"vector of lethal violence. We call for better policies and programs to regulate the production, sale, and transfer of these United States products.

Ryan Hodge

Effect of Labral Tear Size on Acetabular Suction Seal

Authors: Nelson J, Hodge R, McGrady L, Neilson J, Douros D, Wang M
Project Mentor: Mei Wang, PhD; Surgery
Community Partner: Marquette University, Biomechanics Laboratory

Background: The labrum's primary function is to establish a ring-shaped suction seal around the hip joint. While research is abundant on labral tears in literature, most studies focus on clinical functional outcomes and biomechanical behaviors before and after repairs or reconstructions. The purpose of this study was to determine how varying sizes of labral tears affect the sealing function of the labrum by quantifying the peak distraction force during controlled distraction test of the hip joint. Methods: Eight hemipelves from five donors (mean age 45.5 yrs, range 20-69 yrs, 2 females and 3 males) were included. The specimens were potted in dental cement with alignment of the hip joint pinned at 10° abduction and 15° flexion without prior rotation and securely fixed onto the loadcell base of a servo-hydraulic test system. Testing was initiated with a 500 N compressive load applied at a rate of 3.0 mm/s followed by decompression at a rate of 1.0 mm/s. Force and displacement were recorded until the suction seal ruptured and there was a rapid drop in force. The labrum was then progressively released off the bony acetabular rim using a scalpel and the two tests were repeated with the newly enlarged tear (ranging from 1hr to 4hr in size). Repeated measure mixed-effects analysis was used to compare the differences in energy required to disrupt the suction seal between the four tear groups and the intact control. Results: The peak distraction force was averaged (SD) at 121±38 N for the intact and decreased to 101±34 N, 82±40 N, 69±35 N, and 57±27 N for the 1-hour, 2-hour, 3-hour, and 4-hour tears respectively. The reductions from Intact were significant for 3-hour (by 43%, $p<0.02$) and 4-hour (by 53%, $p<0.001$) groups. The work required to break the suction when the labrum was intact was averaged (SD) at 620±187 mJ and decreased to 482±230 mJ, 337±188 mJ, 241±175 mJ, and 179±127 mJ for the 1-hour, 2-hour, 3-hour, and 4-hour tears respectively.

Zachariah Hoell

Hemodynamic Response Functions in Mild Cognitive Impairment: Regions of Negative Activation During Working Memory Tasks

Authors: Hoell Z, Ristow K, Cohen A, Glass Umfleet L, Pommy J, Lancaster M, Franczak M, Mason L, Obarski S, Wang Y.
Project Mentor: Yang Wang, MD, PhD; Radiology

Background: Blood-oxygen-level-dependent (BOLD) effects provide indirect measures of neuronal activity. During task performance, specific brain regions exhibit time-dependent positive and negative BOLD responses, which create a hemodynamic response function (HRF). It has been found that various pathologies including Alzheimer's disease can alter the general structure of the HRF shape, but the effects on the negative activation remain underexplored.
Objective: The study aimed to identify and characterize HRF functions of both positive and negative activations during a working memory task in adults with mild cognitive impairment (MCI) and older adult controls.
Methods: The HRF was assessed in 48 subjects (21 MCI and 27 age-matched) using functional magnetic resonance imaging during an n-back working memory task. Imaging data was preprocessed and analyzed using AFNI. Neuropsychological (NP) tests of psychomotor processing speed, memory, and language were completed by participants. ANCOVA and linear regressions were conducted to compare the MCI and controls between their HRFs and NP scores.
Results: The regions of negative activation were found to coincide with the default mode network. The MCI patients exhibited smaller regions of negative activation compared to the controls. The HRF generated from these negative regions showed significant differences in the area-under-the-curve and peak amplitude for the 1-back condition. These HRF parameters showed significant correlations with NP scores and predicted scores on psychomotor processing speed, delayed recall, and semantic fluency.
Conclusion: The differences in HRF and their correlation with NP tests in MCI patients compared to controls suggest the association of negative HRF changes with prodromal dementia.

Ethan Hollar

Effects of Reintubation on Outcomes in the Surgical ICU

Authors: Hollar E, Carver TW.
Project Mentor: Thomas Carver, MD, FACS; Surgery

Purpose: Reintubation (RI) is associated with increased risk of pneumonia, prolonged hospitalization, and mortality. While reintubation rates of 10-20% are commonly accepted, identifying risk factors may guide preventative strategies. This study evaluated the rate, risk factors, and outcomes associated with RI in a surgical intensive care unit (SICU).
Methods: A retrospective chart review was conducted of SICU patients who required mechanical ventilation (MV) between January 2019 and December 2020. Patients were excluded if they were younger than 18 years, terminally or self-extubated, died before extubation, underwent tracheostomy prior to extubation, or were managed by non-surgical services. RI was defined as unplanned intubation within 96 hours following extubation. Outcomes were compared between reintubated and successfully extubated patients.
Results: Of the 672 included patients, the RI rate was 8.3%. Reintubated patients more frequently had a history of stroke, atrial fibrillation, alcohol dependance, spinal cord injury, rib fracture, current tobacco use, longer initial ventilation, and greater fluid accumulation at extubation. Compared with successfully extubated patients, those reintubated experienced longer ventilation (260 vs 17 hours), increased tracheostomy (61% vs 2%), more ventilator associated pneumonia (29% vs 2%), higher delirium incidence (79% vs 33%), longer ICU (15 vs 2 days) and hospital stays (25 vs 10 days), and greater mortality (21% vs 1%).
Conclusions: Although the RI rate was below 10%, associated complications were significant. Improved risk stratification and targeted post-extubation interventions may reduce RI burden.

Ryan Hubbell

Improving Patient & Family Goal Setting for Children with Medical Complexity, A Quality Improvement Study

Authors: Hubbell R, Schnell J
Project Mentor: Jessica Schnell, MD; Pediatrics

Introduction: Children's Hospital of Wisconsin's Complex Care Program (CCP) is a medical service for children with medical complexity (CMC) who have multiple chronic conditions. The CCP works with families to coordinate care between families and various health resources. The CCP currently utilizes family goal-setting as one of its measurable benchmarks; however, a recent audit from an independent auditor, MetaStar, found that only 8% of goal sets they observed met the actionable items and timeframes criteria. This project aims to improve the performance of CCP family goal-setting, with the hope of enhancing audit results and care of CMC.
Study Methods: Baseline data were collected via observation of patient-provider interactions and retrospective chart review of visits over 3 months. Data collected included documentation of goal discussion and whether MetaStar criteria were met. An oral presentation was delivered to educate CCP staff on the criteria, followed by several small work groups. Chart review post-interventions recorded changes in documentation.
Results: During the initial observation period, 100% of visits included a goals discussion, 66% discussed actionable plans, 46% documented those actions, and 13% discussed a time frame. In the retrospective chart review, 348/350 visits (99%) had patient goals listed; 49/348 (14%) had a timeline for at least one goal, and 31/348 (9%) had timelines for all goals. Chart review of the first 5 weeks post-intervention revealed 68% of notes met timeliness criteria, 73% of notes had actionable items, and 61% of visits satisfied both criteria.
Conclusion: Failure to adhere to audit criteria was not due to a lack of adequate goal-setting conversations, but instead because of a misunderstanding of the criteria, inconsistency of documentation, and a lack of defined responsibility for the goal-setting conversation within the patient visit. Engaged, interactive provider education was effective in improving performance.

Kelly Jacoby

The Impact of Social Deprivation of Reverse Shoulder Arthroplasty Outcomes

Authors: Jacoby K, Andryk L, Valiquette A, Van Boxtel M, Cox E, Grindel S, Graf A.
Project Mentor: John P Wanner, MD; Orthopaedic Surgery

Background:
A patient's level of social deprivation plays a significant role in health outcomes, with higher deprivation correlated to worse postoperative recovery and healing in orthopedic injuries. This study evaluates the impact of social deprivation, as measured by the Area Deprivation Index (ADI), on patients with rotator cuff arthropathy (RCA) undergoing Reverse Shoulder Arthroplasty (RSA).
Methods:
A retrospective review was conducted on 119 patients (133 shoulders) who underwent RSA by a single surgeon at a single institution between 2005 and 2019. Patients were grouped into terciles based on ADI scores. Pre- and postoperative range of motion (ROM), pain (VAS scores), and functional outcomes (ASES, Constant-Murley, and SST scores) were compared across groups.
Results:
Patients achieved significant functional gains postoperatively regardless of social deprivation level. Preoperatively, the most socially deprived patients had lower SST scores (1.62 vs. 3.04, p=0.026) and postoperatively had reduced external rotation with the arm at the side (33° vs. 42°, p=0.044) compared to the least deprived group. However, no statistically significant differences were found in pain, survey scores, complication rates, or notching between groups.
Conclusion:
This study is limited by its retrospective design, reliance on a single surgeon and institution, and potential unmeasured confounding variables, such as access to rehabilitation or underlying comorbidities. Despite these limitations, RSA remains a safe and effective procedure for patients across all socioeconomic strata, providing comparable postoperative pain relief and functional outcomes regardless of social deprivation level.

Alyssa Jobe

An Investigation of Sex-Specific Sirtuin Expression in Response to Sphingosine-1-Phosphate in Endothelial Cells

Authors: Jobe A, Cohen KE, Bordas-Murphy H, Lindemer B, Freed JK.
Project Mentor: Julie K. Freed, MD, PhD; Anesthesiology

Introduction:
Endothelial dysfunction, manifested as a reduction in maximal dilation to flow, is observed in microvessels from patients with coronary artery disease. Sphingosine-1-phosphtate (S1P) has been shown to restore nitric oxide dependent flow-induced dilation of vessels in individuals with heart disease.
S1P increases expression of Sirtuins, NAD-dependent deacetylases that regulate transcription factors during times of stress and have been shown to display sexual dimorphism. Sex-specific S1P-induced expression changes of SIRTs in human endothelial cells represents a critical knowledge gap that may influence targeting specific SIRTs to protect the microvasculature from stress.
Methods:
Cultured sex-specific human umbilical vein endothelial cells (HUVECs) were treated with 1% FBS (control), S1P vehicle, and S1P (1 μM and 100nM, 24hrs). Total protein concentrations were determined using a BCA protein assay. SIRT 1 and SIRT 3 expression was quantified using automated capillary based western blot technology (WES system) and normalized to total protein.
Results:
Baseline expression levels of SIRT1 and SIRT3 were similar in endothelial cells from males and females. Administration of exogenous S1P (100nM) increased expression of SIRT1 in male endothelial cells by 67.1±13.7% (% change from baseline control ± SEM, n=3), which was significantly decreased compared to the response in cells from females (35.6±13.3%, $p<0.05$, Student's t-test, n=4). Treatment with S1P did not significantly increase SIRT3 expression in endothelial cells from both males and females.
Conclusion:
Together, these data suggest that while expression of SIRT1 and SIRT3 does not differ in endothelial cells from males and females, S1P-induced expression of SIRT1 is more robust in cells from males. Targeting the SIRT pathway to increase resiliency to stress in the human microvasculature may prove more beneficial in those assigned male at birth.

Gregory Johnson

Advanced Approach to RIGO Classification System: Innovative AI Framework

Authors: Johnson G., Schmidt N., Nencka A., Muftuler T., Thiessen A., Yang K., Liu X.
Project Mentor: Xue-Cheng Liu, MD, PhD; Orthopaedic Surgery

The Rigo classification system (RCS) classifies adolescent idiopathic scoliosis (AIS) with radiological parameters for treatment plans. Scoliosis classification artificial intelligence (AI) models have been developed, but none for the RCS. The objectives of this study were to develop an AI model classifying X-ray images with the RCS and compare its measurements, classification speed, and classification accuracy to human observers.

An open-source AI model from Scoliosis Tools was expanded to classify X-rays with the RCS. Twenty non-surgical, non-in-brace, PA-view X-rays of AIS patients from SpineWeb dataset 16 were measured and classified with the RCS AI model while being timed. Three human observers independently classified the X-rays, while timed, and decided the most accurate RCS classification for each X-ray. Each X-ray's RCS parameters were measured by two observers with line drawing tools. Descriptive analysis examined timing, parameters, and accuracy ($P<0.05$ significance).

The average time to output each RCS classification was 14.2 ± 5.4 seconds for the AI model, and 37.1 ± 10.7 seconds for human observers ($P< 0.0001$). There were no differences between AI model and human observer RCS parameter measurements ($P>0.05$). The AI model had 60.0% final classification accuracy, compared to the average human observer accuracy of 75.0%.

The model was faster with less accuracy than human observers because it lacked pelvic shift. Modelling pelvic shift and increased training data volume would improve next model iterations. Future iterations may decrease variability in AIS treatment planning to reduce treatment failure.

Paige Johnson, RN BS

An Online, Patient-Guided, Mental Health Tool Improves Anxiety Symptom Scores in Patients With Infertility

Authors: Stevenson Wyszewianski M, Johnson P, Hanson R, Pan A, Liegl M, Schoyer K, Bosler J, Rydze R, Neary J, Gunderson S.

Project Mentor: Stephanie Gunderson, MD; Obstetrics & Gynecology

Introduction:
Patients undergoing infertility evaluation and treatment frequently experience anxiety and depressive symptoms. However, easily available and highly accessible online mental health tools have not been previously validated in this population. The objective of this study was to assess whether an online, self-guided mental health tool, Silvercloud®, decreases anxiety and depressive symptom scores for patients experiencing infertility.
Methods:
Retrospective chart review of female patients undergoing initial infertility consultation at a single academic center was performed. Patients completed Patient Health Questionaire-9 (PHQ9) and Generalized Anxiety Disorder-7 (GAD7) screening tools and were offered enrollment in an online mental health tool, Silvercloud®, at initial infertility consultations. Baseline PHQ9 and GAD7 scores from initial consults were compared between patients who elected to engage in Silvercloud® and controls. For those who engaged in Silvercloud®, Wilcox signed rank test was used to compare PHQ9 and GAD7 scores before and after completion of Silvercloud® modules.
Results:
354 patients were included in this study. Fifty-two patients enrolled in Silvercloud®, and 32 completed at least one module. Baseline data demonstrated that patients who enrolled in Silvercloud ® had significantly higher GAD7 scores (0.5 vs 0 p=0.006).. Of those who completed at least one Silvercloud® module, PHQ9 and GAD7 scores significantly decreased after engagement (PHQ9: 8.00 vs 6.5 p<0.001) (GAD7: 12.50 vs 9.5 p=0.02).
Conclusions:
Patients experiencing infertility who utilize Silvercloud® experienced significant decreases in PHQ9 and GAD7 screening surveys, suggesting improvement in anxiety and depression symptoms.

Matea Juric

Novel NADPH Oxidase-2 Inhibitors as Potential Anti-Inflammatory and Neuroprotective Agents

Authors: Juric M, Zielonka J, Rawat V, Amaradhi R, Ganesh T.

Project Mentor: Jacek Zielonka, PhD; Biophysics

A family of seven NADPH oxidase enzymes (Nox1-5, Duox1-2) has been implicated in a variety of diseases, including inflammatory lung diseases, neurodegenerative diseases, cardiovascular diseases, and cancer. Here, we report the results of our studies aimed at developing novel brain-permeable Nox2 inhibitors with potential application as neuroprotective agents. Using cell- based assays, we identified a novel Nox2 inhibitor, TG15-132, that prevents PMA-stimulated oxygen consumption and reactive oxygen species (superoxide radical anion and hydrogen peroxide) formation upon acute treatment in differentiated HL60 cells. Long-term treatment with TG15-132 attenuates the induction of genes encoding Nox2 subunits, several inflammatory cytokines, and iNOS in differentiated THP1 cells. Moreover, TG15-132 shows a relatively long plasma half-life (5.6 h) and excellent brain permeability, with a brain-to-plasma ratio (>5-fold) in rodent models. Additionally, TG15-132 does not cause any toxic effects on vital organs or blood biomarkers of toxicity in mice upon chronic dosing for seven days. We propose that TG15-132 may be used as a Nox2 inhibitor and a potential neuroprotective agent, with possible further structural modifications to increase its potency.

Nismeta Kabilovic

The Role of Attention in Phonological Short-Term Memory in Stroke Survivors with Aphasia

Authors: Shah-Basak P, Pillay S, Hjelmeseth A, Kabilovic N, Freiberg A, Binder J
Project Mentor: Priyanka Shah, PhD; Neurology

Understanding how attention supports phonological short-term memory (pSTM) is crucial for refining verbal STM and working memory models and for improving rehabilitation in stroke survivors with aphasia (SWA). This study examined the role of attention in maintaining speech sounds (phonological information) in 18 SWA and 14 older healthy individuals using a dual-task paradigm. We hypothesized that access to attentional resources would be crucial and that increased cognitive load would impair pSTM performance in both groups. All participants were asked to maintain 1-5 syllable consonant vowel strings (set sizes) during an 8-second maintenance period while concurrently performing a visual distractor task with either high (hard) or low (easy) cognitive load. At the end of each trial, participants completed a probe recognition task to assess pSTM. Results showed that attention modulated pSTM differently across set sizes: for both SWA and healthy controls pSTM performance (d') was significantly impacted by maintenance load and its interaction with cognitive load, with impairments observed at higher set sizes under hard distractor conditions. Unexpectedly, at set size 3, performance improved under high cognitive load, suggesting a potential benefit of attentional engagement at intermediate maintenance load. These results support the conclusion that attention is essential for maintaining phonological information in STM, specifically under higher maintenance demands. However, STM performance benefits under moderate maintenance load and high cognitive load, suggesting a possible strategic shift towards attentional strategies, offering a new direction for theory and potential treatment approaches in aphasia.

Karolina Kalata

Suicide and COVID-19: Analyzing Suicidal Behaviors in Youth after COVID-19 Related Deaths in the Community

Authors: Kalata K, Kohlbeck S
Project Mentor: Sara Kohlbeck, PhD, MPH; Comprehensive Injury Center

Background:
Suicide rates in Wisconsin rose by 40% from 2000 to 2017, with teens and young adults at highest risk. The COVID-19 pandemic may have worsened mental health outcomes among youth. This study examines the relationship between neighborhood-level COVID-19 mortality and suicidal behavior among youth in Milwaukee County. We hypothesize that zip codes with higher COVID-19 death rates will also have higher rates of suicidal behaviors among individuals aged 11-24.
Methods:
Data on suicide and COVID-19 deaths were obtained from the Milwaukee County Medical Examiner's Office, while suicidal behavior data (attempts, self-harm, ideation) came from local hospital emergency departments. The study analyzed de-identified data from Milwaukee County residents between March 2020 and March 2022, filtering out repeat visits. Zip codes were categorized by socioeconomic status (SES) using Health Compass Milwaukee criteria. Statistical analyses, including bivariate linear regression and multivariate ANOVA, assessed the association between suicidal behaviors and COVID-19 mortality while controlling for SES and median age.
Results:
Among 1695 COVID-19 deaths, 836 individuals exhibited suicidal behaviors. Regression analysis showed a significant association between COVID-19 mortality and suicide rates (p=0.037). Multivariate ANOVA indicated median age as a significant factor (p=0.0424).
Conclusions:
Higher COVID-19 mortality at the zip code level was associated with increased youth suicidal behaviors. These findings underscore the pandemic's impact on youth mental health and highlight the need for targeted public health interventions in affected communities.

Taylor Kaldenberg

GENDER-EQUITY IN NUMBER OF PUBLICATIONS FOR PROMOTION

Authors: Kaldenberg T, Román M, Rogers A, Cabacungan E, Saudek K
Project Mentor: Kris Harlander Saudek, MD; Pediatrics

Background:
Despite the increased representation of women matriculating into medical school, the percentage of women in leadership positions has remained stagnant. Discrimination, workplace environment, and institutional barriers are all contributing factors to this gender-disparity. This project aimed to assess the number of publications at the time of promotion for gender differences.
Methods:
Faculty recommended for promotion to associate or full professor between 2012-2021 at MCW were included. PubMed ® was utilized to quantify the number of first, middle, and last author as well as total publications each faculty member had at the time of promotion. Faculty data were stratified by gender and academic rank. The analysis involved the Chi-Square test, Kruskal-Wallis and Dunn tests for pairwise comparisons, Mann-Whitney test, and Wilcoxon Signed-Rank test.
Results:
There were 114 faculty members with no significant gender-based difference in distribution across ranks. There were differences in total publications across four groups (AP/F, AP/M, P/F, P/M), $p = 0.002$. Further pairwise comparison revealed these differences were primarily between ranks and not genders. In examining the median number of publications by rank and gender, the only notable gender difference at the AP level was for middle author publications ($p = 0.017$). No significant differences existed between the number of publications counted from PubMed® and faculty records.
Conclusions:
In general, no significant gender-based differences in the number of publications existed at time of promotion. The next steps would include examining more subjective measures of gender-based factors that may impact promotion asymmetrically.

Fatima Zohra Khamissi

Postmortem evidence of multi-organ profibrotic phenotypes in COVID-19 patients

Authors: Khamissi, FZ, Sun Lorelle, Dai Qiang, Lai Shuping, Liegl Melodee, Pan Amy, Benjamin Ivor
Project Mentor: Ivor J Benjamin, MD; Cardiovascular Center

Background: The long-term consequences of SARS-CoV-2 infection, particularly post-acute sequelae of COVID-19 (PASC), often involve extrapulmonary complications, yet their pathophysiology remains poorly defined. While pulmonary fibrosis is well-documented, the extent and mechanism of multiorgan fibrotic remodeling are less understood.
Objective: To investigate tissue-specific and systemic markers of fibrosis and endoplasmic reticulum (ER) stress in extrapulmonary organs of COVID-19 autopsies.
Methods: We conducted autopsies on 14 individuals who died of COVID-19 and 11 controls. Histopathological and immunohistochemical analyses were performed on renal tissues, focusing on markers of fibrogenesis (trichrome, fibronectin-1, PAS) and ER stress (HSP47, GRP78). We also performed single cell RNA sequencing (scRNA-seq) on peripheral blood mononuclear cells (PBMCs) and analyzed publicly available scRNA-seq data from kidneys and lungs to identify systemic profibrotic signatures.
Results: COVID-19 cases demonstrated significant interstitial collagen deposition, mesangial matrix expansion, and elevated expression of HSP47 and fibronectin-1 in kidneys and hearts. scRNA-seq of PBMCs revealed upregulation of over 40 unfolded protein response (UPR)-related genes, particularly in macrophages and tubular cells. Multiorgan failure was significantly associated with comorbid obesity, kidney, and heart disease ($p < 0.05$).
Conclusion: Our findings reveal a robust pattern of ER stress-induced fibrotic remodeling in extrapulmonary organs of COVID-19 decedents, implicating HSP47+ macrophages as key mediators. These insights underscore the importance of targeting UPR pathways in antifibrotic strategies and highlight the systemic nature of PASC. Autopsy-based molecular profiling offers a critical path toward understanding and mitigating long-term COVID-19 complications.

Baila Khan

Impact of opt-out sexually transmitted infection screening model in 15-25 year olds in a medium-low socioeconomic status zip code in Milwaukee, WI

Authors: Khan B, Kothari JP
Project Mentor: Jahanvi Patel Kothari, DO, FAAFP; Family and Community Medicine

In 2023, the United States reported over 2.4 million combined cases of chlamydia, gonorrhea, and syphilis, highlighting a persistent public health challenge disproportionately affecting individuals aged 15-25. This quality improvement (QI) initiative evaluated an opt-out sexually transmitted infection (STI) screening model implemented at an urban community clinic serving a medium-low socioeconomic status (SES) zip code in Milwaukee, Wisconsin. Under this model, patients aged 15-25 were routinely screened for gonorrhea, chlamydia, and syphilis unless they declined.
Screening outcomes were analyzed across three implementation cycles, with outreach materials such as posters and tear-away forms introduced to promote participation and awareness. In Cycle 1, the baseline screening rate was 36.4% across 118 patient encounters. Cycle 2, which added posters and included 136 encounters, saw a modest increase to 41.1%. Cycle 3 combined posters with tear-away forms but coincided with a system-wide electronic health record (EHR) outage, during which the screening rate declined to 27.4% across 84 encounters. Across all cycles, females and adolescents aged 15-19 accounted for the majority of positive STI results, with chlamydia being the most frequently detected infection. Syphilis cases were rare and observed only in Cycle 2.
These findings suggest that opt-out STI screening is a feasible approach for reaching high-risk populations in underserved settings. Future directions include expanding the model to additional clinics, evaluating its long-term effectiveness, and refining outreach strategies to enhance patient engagement and screening uptake.

Dillon Kimmen

Impact of a Subcutaneous Insulin Pathway for Adults with DKA in the Emergency Department

Authors: Kimmen D, Aranda J, Chinn M, Jacobson N, Martin I, Nickel L, Otero R.
Project Mentor: Ronny Otero, MD, MSHA, FAAEM, FACEP; Emergency Medicine

Background: Intravenous (IV) insulin remains the standard treatment for diabetic ketoacidosis (DKA), but growing evidence supports the use of subcutaneous (SC) insulin for mild to moderate cases. SC insulin protocols may offer clinical and operational benefits, particularly in reducing intensive care unit (ICU) utilization. However, real-world data on their implementation in emergency departments remains limited.
Objective: To evaluate the safety, efficacy, and cost-effectiveness of a newly implemented SC insulin protocol for treating mild to moderate DKA in the ED.
Methods: This quasi-experimental study retrospectively compared adult patients with mild to moderate DKA treated with traditional IV insulin (pre-pathway group, n=112) and those managed with a new SC insulin protocol (pathway group, n=99) at a single academic medical center. Key outcomes included ED and hospital length of stay (LOS), treatment costs, adverse events (hypoglycemia, hypokalemia), and time to DKA resolution.
Results: No significant differences were observed in hospital LOS, ED LOS, time to resolution of acidosis, or incidence of hypoglycemia and hypokalemia between groups. However, the median hospitalization cost was notably lower in the pathway group ($15,530 vs. $18,927). Results suggest a trend toward reduced ICU utilization but are not conclusive.
Conclusion: SC insulin appears to be a safe and cost-effective alternative to IV insulin for managing mild to moderate DKA in the ED. These findings support broader implementation of SC protocols, though further prospective studies are needed to confirm reductions in ICU utilization and operational efficiencies.

Michael Kjentvet

Treating Ophthalmic Emergencies in an Academic Emergency Department: An Opportunity for Quality Improvement

Authors: Kjentvet M, Jacbson N, Balgord S, Allphin M, Aranda J, Chinn M
Project Mentor: Nancy Jacobson, MD; Emergency Medicine

Care of ophthalmic emergencies may require medications to prevent vision loss and reduce discomfort, and an abundance of ophthalmic medications (OMs) exist. Literature describing the ordering of OMs in the emergency department (ED) is sparse. Case reports describe how similar sounding OMs were prescribed, resulting in patient harm. Another study found a 9% error rate in OM prescriptions. We aim to describe the perceptions of emergency medicine (EM) residents on the safety of OM ordering in the ED and prescribing at ED discharge, to evaluate resource utilization during the ordering and prescribing process, and to determine the highest yield ophthalmic order panels and discharge SmartSets to employ.
This is a cross-sectional observational study including a survey and data from the electronic health record (EHR). EM residents were surveyed regarding their comfort with ordering and prescribing OMs. They also answered questions regarding how much time ordering and prescribing OMs takes, and how often they had to re-page an ophthalmology consultant to clarify medications. EM residents reported how error prone the ordering and prescribing of OMs is. We utilized EHR functionality to determine the frequency of ophthalmic emergencies.

91.7% of respondents report at least some discomfort ordering OMs in the ED, and 66.7% reported at least some discomfort prescribing OMs at discharge. 58.3% reported taking over three minutes to order an OM in the ED, and 58.3% reported taking over three minutes to prescribe OMs at discharge. 41.7% of respondents perceive ordering OMs as error prone, and 58.3% perceive prescribing OMs as error prone. 2.45% (n=539) of ED patients presented with an ophthalmic chief complaint. ED diagnoses were variable.

Opportunity exists for quality improvement in ordering and prescribing OMs. Educational interventions and improvements to the EHR to facilitate correct ordering and prescribing may improve patient safety.

Lydia Klatt

Illustrated Zines as Health Education Tools for Wisconsin High School Students

Authors: Klatt L, Farhan S, Patitucci T.
Project Mentor: Teresa Patitucci, PhD; Cell Biology, Neurobiology and Anatomy
Community Partner: Greenfield High School

Education on mental health and illness is integral to adolescent students' physical and emotional well-being. While medically accurate information is being constantly created, updated, and presented within the medical community, this information often does not always reach the lay population, especially adolescents, in an easily understandable and engaging way. Zines are small booklets that are short in length and convey messages through illustrations supported by relatively few words compared to traditional educational materials. The pocket-sized nature of a zine allows for low printing costs, easy distribution, and portability for the learner. Medical booklets have been created in the past but have yet to be analyzed for their efficacy in educating adolescents. The study's main objective is to determine if educational zines are useful resources to develop a better understanding of health topics for high school students in Wisconsin.

Rachel Knoebl

HAPI, Healthy and Empowered: A focus group centered around improving health literacy among women currently residing at a homeless and domestic violence center in Milwaukee

Authors: Knoebl R, McBride H, Bobholz F, Iwuagwu C, Seshan M, O'Connell M, Diehr S
Project Mentor: Sabina Diehr, MD; Family Medicine
Community Partner: Milwaukee Women's Center

Introduction: Low health literacy has serious health implications, including risk for medication errors, patient-provider miscommunication, decreased quality of care, and inability to comprehend and access available care options. These implications are exacerbated in homeless populations, who already disproportionately face healthcare barriers. This study aimed to highlight the experiences of vulnerable populations and elucidate common barriers in the context of women's health.
Methods: Women currently residing in a homeless and domestic violence shelter were invited to participate in focus groups consisting of open-ended questions about healthcare experiences, women's health knowledge, and what they wished they knew about women's health. Themes from focus group responses were derived using inductive content analysis. Demographic data was also collected.
Results: Sixteen women (age 18-64) participated; 81.3% were black/African American, 18.8% were multiracial. Education level varied, with 18.8% completing some college, 56.3% completing high school/obtaining GED, and 25% not completing high school. Seven themes were identified: (1) exposure to sex education, (2) past experiences with healthcare providers, (3) dissemination of health information, (4) suggested improvements for women's healthcare, and personal experiences regarding knowledge gaps about (5) periods and pregnancy, (6) STIs and general health screenings, (7) menopause and getting older.
Conclusions: All participants expressed a desire to know more about their bodies, with some expressing they knew nothing about periods, pregnancy or menopause until they experienced it themselves. This study emphasizes the need for comprehensive sex education and improved health literacy while highlighting the marginalization of women's health care, especially for vulnerable populations.

Mackenzie Koellermeier

Effects of Hypercalcemia on Trauma Outcomes

Authors: Koellermeier M, Carver T, Kaslow O
Project Mentor: Thomas Carver, MD, FACS; Surgery

The negative effects of hypocalcemia in trauma patients are well understood and many centers have implemented calcium replacement protocols during resuscitation. However, iatrogenic hypercalcemia can occur, and its effects on trauma outcomes are not well understood. This study aimed to evaluate intraoperative calcium levels following protocolized supplementation and determine whether hypercalcemia is associated with differences in patient outcomes.
We conducted a retrospective review of trauma patients undergoing surgery between January and December 2018. Inclusion criteria were age >18, receipt of ≥4 units of blood products within 2 hours of admission, and at least one measured ionized calcium (iCa) level. Hypercalcemia was defined as any iCa ≥1.33 mmol/L. Data collected included demographics, injury mechanism, calcium and blood product administration, and outcomes. Statistical analysis compared patients with and without hypercalcemia.
Sixty-two patients met inclusion criteria and 37 (59.7%) experienced hypercalcemia. Penetrating injuries were more common in the hypercalcemia group (73% vs 40%, p=0.02). Patients with hypercalcemia received significantly more intraoperative calcium (4g vs 2g, p=0.0006) and had higher 24-hour blood product usage (22 vs 12 units, p=0.02). There were no significant differences in 24-hour crystalloid volume (5900 mL vs 7000 mL, p=0.41) or mortality (21.6% vs 16%, p=0.74) between groups.
The incidence of hypercalcemia was common and correlated with the amount of calcium administered in the OR. While associated with greater blood product use, it was not associated with increased mortality. These findings highlight the importance of balancing hypocalcemia prevention with the risks of overcorrection during trauma resuscitation.

Thomas Kolman

Characterizing Opioid Overdose Prevention Efforts at Froedtert Hospital Emergency Department

Authors: Kolman TP, Dora-Laskey AD
Project Mentor: Aaron Dora-Laskey, M.D. M.S.; Emergency Medicine

There were 1,427 opioid-related deaths in Wisconsin in 2021. Initiating buprenorphine treatment and dispensing take-home naloxone may reduce morbidity and mortality in emergency department (ED) patients at risk of future opioid overdose. However, these initiatives have been underutilized at Froedtert Hospital. We sought to characterize Froedtert ED patients at risk of future opioid overdose and other complications of OUD to improve the quality and reach of current ED harm reduction programs, inform the development of future screening methods and interventions, and identify patterns of buprenorphine and naloxone utilization by ED providers. During the study period (January 1, 2022 to December 31, 2022), we performed a chart review and collected information about provider type (e.g., attending, resident, pharmacist), prehospital naloxone treatment, ED medical interventions, return ED visits within 30 days, and discharge diagnoses. Three patients were prescribed buprenorphine during the study period, 27 were dispensed naloxone, and 35 were prescribed naloxone. Naloxone provision was driven by EM residents, which may reflect greater resident presence at Froedtert Hospital. Patients dispensed naloxone were more likely to have Medicaid when compared to patients prescribed naloxone. Overall naloxone dispensing and prescribing are lower than expected based on ED volumes during 2022, and only three ED patients were given buprenorphine. While patients who were dispensed naloxone were similar in demographic and clinical characteristics to patients who were prescribed naloxone, these may be a function of the relatively modest number of ED patients who were provided with naloxone during the study period.

Taha Kothari

Impact of Chronic and Acute Tamsulosin Use on Intraoperative Hemodynamics in Cardiac Surgery

Authors: Plambeck C, Freed J, Canales B, Rein LE, Tarima S, Kothari T, Vandenberg M, LiaBraaten B, Hainsworth KR.
Project Mentor: Julie Freed, MD, PhD; Anesthesiology

Background: Tamsulosin is a selective α1A-adrenergic receptor antagonist that is commonly prescribed to aging male patients to help treat lower urinary tract symptoms, such as benign prostatic hyperplasia (BPH). Its use has been linked in case reports to intraoperative hypotension however its role in causing vasoplegia during cardiopulmonary bypass (CPB) remains unclear.
Objective: To evaluate if preoperative administration of tamsulosin is associated with increased vasopressor requirements during CPB in male patients undergoing cardiac surgery.
Methods: A retrospective chart review was conducted on 153 male patients (aged 40-90) who underwent coronary artery bypass grafting or valve replacement at Froedtert Hospital between April 2021 and May 2022. Patients were then grouped based on their tamsulosin use: chronic (≥8 days), acute (≤7 days), or no use. Vasopressor administration was measured in norepinephrine equivalents (NEE) across six 30-minute perioperative epochs. Linear mixed-effects models were adjusted for known vasoplegia risk factors and used to assess associations.
Results: Patients who were both acute and chronic tamsulosin users required significantly more vasopressor support during CPB compared to non-users. In adjusted models, chronic users had increased NEE requirements during CPB epochs 2-4 ($p < 0.05$) while acute users demonstrated increased support across all CPB epochs 1-4 ($p < 0.05$). In addition, mean arterial pressure and ASA status were shown to be significant predictors.
Conclusion: Preoperative use of tamsulosin is associated with increased intraoperative vasopressor requirements during cardiopulmonary bypass.

Brendan Koxlien

REACHing For Self-Care: Studying Medical Student Perceptions on Stress and Self-care

Authors: Koxlien B, Ferguson C, Devarati S, Ark T, Tubbs A
Project Mentor: Cassie Ferguson, MD; Pediatrics

Medical students experience high rates of distress and often struggle to engage in self-care, despite increased institutional focus on wellbeing. While barriers to self-care are well documented, few studies have examined which modalities of self-care students find most appealing. This study aimed to evaluate what students learned from a session on stress, how they intended to apply that knowledge, and the factors that influenced follow-through. Using a convergent mixed methods design, we studied a cohort of medical students at a Midwestern medical school. Qualitative data were thematically analyzed to identify patterns in learning, self-care planning, and factors affecting follow-through. The Levesque framework for healthcare access guided both survey design and analysis, including Likert scale responses. Latent profile analysis was conducted for students who followed through with their plans. Findings showed that the session normalized anxiety, promoted common humanity, and reshaped students' views of professional identity. Most students chose self-care activities focused on physical or emotional/spiritual wellbeing that could be completed independently. Some selected community-based interventions, adopted growth mindsets, or reframed their relationship with anxiety. Although student plans occasionally lacked realism, self-created goals appeared to partially overcome common barriers to self-care. Students often commented on the benefit of support from friends and family. Our results suggest that even a single session on distress in medical training can destigmatize anxiety and foster identity development. Students are most drawn to accessible, individual self-care practices. To improve wellbeing efforts, institutions should support students in setting realistic goals and building supportive social networks.

Carlene Kranjac

Dietary supplement use in cancer survivors: An overview of scientific evidence paired with an analysis of usage in African American prostate cancer survivors

Authors: Kranjac C, Tovar M, Contreras S, Awoyinka I, Stolley, M.
Project Mentor: Melinda Stolley, PhD; Medicine

Background: Cancer survivors are a growing community, with an estimated 22.5 million projected by 2030. Dietary supplement use is common among survivors, yet its effects on cancer outcomes remain unclear. This study reviews scientific evidence on dietary supplements and their effects in cancer survivorship and describes supplement use among African American prostate cancer survivors enrolled in the Men Moving Forward (MMF) lifestyle intervention.
Methods: A scientific overview identified 18 dietary supplements, classifying them by potential effects on cancer outcomes. A retrospective analysis was conducted using self-reported supplement data from MMF participants. Supplements were categorized by type and frequency; demographic data were also analyzed.
Results: Dietary supplements with potential beneficial properties include Boswellia, elderberry, green tea, lycopene, and melatonin. Harmful or risk-associated supplements include beta-carotene, fish oil and omega-3 fatty acids, and St. John's Wort. Those with unclear evidence for protective or harmful properties include alpha-tocopherol, ashwagandha, curcumin, dandelion root, folic acid, selenium, vitamin B12, vitamin D, vitamin C, and zinc. Among 114 MMF participants, 73 (64.0%) were taking at least 1 supplement prior to intervention. The most used supplements were Vitamin D (35.1%), Multivitamins and Multivitamins with Minerals (28.1%), and Omega-3 Fatty Acids (8.8%).
Conclusion: A majority of MMF participants reported supplement use, often involving those with unclear or mixed evidence regarding cancer outcomes. Understanding the prevalence and physiological impact of supplement use is critical to inform survivorship care. Developing evidence-based, culturally tailored guidance is especially important for African American prostate cancer survivors, a group disproportionately affected by cancer disparities.

Ginger Kwak

Thinking Ahead: Thoughts, Barriers, and Opinions About End-of-Life Care and Planning Among Transgender and Gender Non-Binary Individuals; A Systematic Review

Authors: Kwak GH, John SA
Project Mentor: Steven John, PhD, MPH; Wendy Peltier, MD; Medicine

Purpose: Lesbian, gay, bisexual, transgender, and queer or questioning (LGBTQ) populations continue to be an underserved demographic within healthcare despite recent cultural progression. As this population expands and ages, there is a growing concern about whether they receive adequate education and support for end-of-life (EOL) planning. Transgender and gender non-binary (TGNB) groups are particularly susceptible to being overlooked and ignored in end-of-life care decisions due to ongoing social stigma. In this systematic review, we sought to identify thoughts, barriers, and overall impressions of end-of-life care among TGNB individuals.
Methods: A search was conducted on PubMed and Web of Sciences databases using key terms including, but not limited to, advance care planning, end-of-life, palliative care, LGBTQ, sexual and gender minorities, transgender persons, queer, intersex, TNB, and Non-binary. Articles were eligible for inclusion if they focused on end-of-life care needs, experiences, and preferences related to TGNB individuals. Prominent themes were identified among the selected articles based on frequency of appearance.
Results: We identified 5 major overarching themes: fear of discrimination in long-term care (LTC) facilities, fear of loss of independence, maintaining social circles with aging, obstacles to EOL logistics, and what defines successful aging. Additional subthemes included fear of loss of identity, preference for euthanasia vs. loss of identity, participation in EOL planning and ACP/will completion, and more.
Conclusion: Through a thorough literature review, we found that psychological and social aspects were the most substantial barriers to successful EOL planning. Future work is needed to support the autonomy of TGNB individuals during end-of-life planning and care.

Andrew Labott

Barriers to Accessing Crime Victims Compensation: A Prospective Study of Injured Patients at an Urban Level I Trauma Center

Authors: Labott A, Cooper E, Tatakis A, Biesobert E, Hamadeh Y, Berry A, Brandolino A, Schroeder ME.
Project Mentor: Mary Elizabeth Schroeder, MD; Surgery

Background:
Violent injury has profound economic, health, and social impacts on survivors, yet little is known about awareness and access to the Crime Victims Compensation (CVC) program among those most affected. This study assessed CVC program knowledge, application rates, and barriers among injured patients at a Level I trauma center in Milwaukee, Wisconsin.
Methods:
A prospective cohort study enrolled adult patients (≥18 years) admitted between February and August 2024 for injuries resulting from non-accidental firearm discharge, pedestrian-motor vehicle collision, assault, or reckless injury. Data were collected from the medical record, participant surveys, and the Wisconsin Department of Justice CVC database.
Results:
Of 141 enrolled participants, only 9% were aware of the CVC program before enrollment but 50% applied for funds. Applicants were more likely to be younger, identify as Black (80% vs. 56%, $p = 0.022$), be employed (77% vs. 61%, $p = 0.034$), and have Medicaid (60% vs. 38%, $p = 0.011$). Gunshot wound survivors comprised a significantly greater proportion of applicants than non-applicants (76% vs. 37%, $p < 0.001$). Among applicants, the approval rate was 68%. Approval was significantly more likely among employed individuals (89% vs. 54%, $p = 0.011$). Common reasons for denial included child support delinquency and discomfort cooperating with law enforcement. Anticipated post-injury expenses averaged $6,768 and included relocation, childcare, and home modifications.
Conclusions:
Awareness of the CVC program is exceedingly low among violently injured patients, yet brief interventions can substantially increase application rates. Structural barriers - particularly related to employment status, financial instability, and interactions with law enforcement - limit access to CVC benefits. Community-engaged education and programmatic reforms are urgently needed to ensure that victims of violence receive timely and equitable financial support.

Quentin Lawrence

Provider Perspectives on Prostate Cancer Screening: Navigating Race, Guidelines, and Disparities

Authors: Lawrence Q, Stolley M

Project Mentor: Melinda Stolley, PHD; Medicine

Prostate cancer remains a highly prevalent cancer in the United States, with African American men disproportionately affected. Despite higher incidence and mortality rates of prostate cancer among African American men, screening guidelines vary on the role that race plays, leading to variability in clinical practice. This qualitative study investigates how primary care providers in Southeastern Wisconsin apply prostate cancer screening guidelines and interpret racial disparities in prostate cancer outcomes. Eleven providers (9 primary care physicians and 2 nurse practitioners) were interviewed in this study. Interviews were transcribed and analyzed using the "Sort and Sift, Think and Shift"methodology. Results revealed that while age and family history consistently prompted screening discussions, the role of race varied substantially among providers. Only six out of eleven providers initiated earlier screening discussions with African American patients. Providers often deprioritized prostate cancer screening compared to other preventative measures, citing the unreliability of the PSA test and difficulties with patient comprehension. Social determinants of health were widely cited as a cause for disparities, while many providers were skeptical of the genetic relevance of race in prostate cancer risk. These findings highlight the ambiguity in applying race centric guidance, contributing to potential under screening of high risk populations. Provider discretion, lack of clarity on race as a risk factor, and inconsistent use of shared decision making may exacerbate existing disparities. Efforts to clarify the role of race in guidelines, improve provider education, and promote standardized shared decision making could help reduce racial disparities in prostate cancer outcomes.

Janet Le

Differential roles for OXPHOS inhibitors in T cell bioenergetic metabolism

Authors: Dwinell MB, Poimenidou M

Project Mentor: Michael Dwinell, PhD; Microbiology and Immunology

Tumorigenesis is mediated partially by the ability of cancer cells to undergo metabolic reprogramming, leading to growing interest in therapeutic approaches targeting oxidative phosphorylation and glycolysis. Work at the Medical College of Wisconsin has pioneered selective targeting of cancer cell mitochondria by conjugating a triphenylphosphonium cation (TPP+) to biologically active anti-cancer drugs. We have previously shown that Mito-Metformin (MMe), a TPP-conjugated metformin analog, effectively targets complex I, thereby inhibiting pancreas cancer cell growth in vitro and tumor progression in vivo. While TPP increases cancer cell drug selectivity, preliminary work has indicated that MMe anti-tumor effects in vivo were associated with a concomitant increase in tumor infiltrating CD8+ cytolytic T cells (TILs). The goal of my project was to examine if MMe had direct effects on T cells that might explain increased TILs in pancreas tumors. I isolated murine peripheral blood CD4+ helper and CD8+ cytolytic T cells and used Seahorse bioenergetic metabolism and IncuCyte proliferation assays to test these effects on lymphocytes in culture. Consistent with the off-tumor effects of MMe in vivo, I measured decreased oxidative phosphorylation (OXPHOS) in helper CD4+ T cells. Interestingly, while MMe did not affect OXPHOS in CD8+ T cells, it strongly increased aerobic glycolysis, without a corresponding effect in CD4+ T cells. Furthermore, MMe had no effect on CD4+ or CD8+ T cell proliferation, in stark contrast to its potent anti-proliferative and metabolic inhibitory effect on pancreas cancer cells. This lack of T cell proliferation suggests that elevated TILs in vivo reflect active migration of cytolytic cells into the tumor. Overall, these data suggest MMe has broader on-tumor and off-tumor effects, with increased aerobic glycolysis corresponding to MMe activating effector T cells and mediating immune-protective effects.

Michael Lee

Long-Term Outcomes After Total Ankle Arthroplasty: A Systematic Review

Authors: Lee MS, Mathson L, Andrews C, Wiese D, Fritz JM, Jimenez AE, Law B.
Project Mentor: Jessica Fritz, PhD; Orthopaedic Surgery

Background: Total ankle arthroplasty (TAA) has emerged as a treatment to successfully treat ankle arthritis. However, there is a paucity of aggregate literature reporting on long-term patient-reported outcomes (PROs) after TAA. The purpose of this review is to report an aggregate of literature on minimum 10-year patient-reported outcomes after TAA.
Methods: A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. PubMed, Cochrane Central Register of Controlled Trials, and Scopus were queried in June 2024. Primary research articles were included if they reported minimum 10-year PROs or satisfaction for patients who underwent primary TAA and written in English. Survivorship was reported based on implant failure which was determined uniquely by each study.
Results: Eight studies met the inclusion criteria. A total of 595 ankles with a range of average ages from 51 to 73.7 years were included in the study with follow-up ranging from a minimum of 10 years to a minimum of 20 years. Two of the eight studies reported significant improvement in PROs following surgery. Survivorship at a minimum of 10-year follow-up ranged from 66-94.4%. Average time to implant failure ranged from 4.6-13.8 years.
Conclusion: Patients undergoing primary TAA demonstrated improved PROs at minimum 10- year follow-up. However, they demonstrated variable rates of survivorship ranging from 66-94.4%. Of those experiencing implant failure, average time to failure ranged from 4.6-13.8 years.
Level of evidence: Level IV; Systematic Review of Level IV studies

Howie Leuschen

Investigation of Asthma Protocol Progression and Outcomes in the Pediatric Intensive Care Unit

Authors: Leuschen H, Yan K, Dowell J
Project Mentor: Jasmine Dowell, MD; Pediatrics

Background: Critically ill asthma patients in the Pediatric Intensive Care Unit (PICU) enter the Asthma Protocol and receive an asthma score [1]. Patients receive continuous nebulized albuterol and IV steroids until asthma score <12. Enteral steroids are preferred due to equal efficacy, lower cost, and decreased IV fluid intake [2, 3]. Improved condition leads to intermittent albuterol, enteral steroids, and transfer out of PICU. Delays in transition to intermittent albuterol may be a barrier to progression toward discharge, resulting in increased PICU length of stay (LOS) and patient charges.
Study Methods: Single-center retrospective chart review of children aged 1-17 admitted to PICU with a primary diagnosis of asthma. Time to continuous albuterol discontinuation in eligible patients was categorized as ≤1 hour or >1 hour from eligibility. Analysis was Welch's t-test.
Results: 207 subjects met study criteria. Continuous albuterol was discontinued by ≤1 hour in 28 eligible subjects (14%) and >1 hour in 179 subjects (86%). There was significantly shorter ICU LOS in the ≤1-hour group (17 vs 22 hours, p=0.006). Time to enteral steroids was significantly lower in the ≤1-hour group (7.9 hours vs 11.0 hours; p=0.015), as was time to enteral diet (2.9 hours vs 5.6 hours; p=0.011). Median charges were significantly lower for the for ≤1 hour group ($15,404 vs $17,764, p=0.02). The ≤1 hour group had significantly lower fluid balance (16.2 mL/kg [95% CI 7.4-24.9] vs 31.2 mL/kg [95% CI 26.3-36.1], p=0.004) and PICU IV fluid intake (31.6 mL/kg [95% CI 23.0-40.1] vs 48.05 mL/kg [95% CI 42.9-53.2], p=0.0016).
Conclusion: Prompt transition to intermittent albuterol is associated with lower PICU IV fluids, encounter fluid balance, PICU LOS and encounter charges. These findings suggest adherence to Asthma Protocol guidelines may reduce charges and promote high-value care, but further study is needed to determine where improvements in the asthma protocol may be most impactful.

Preston Lewis Lewis

Noninvasive In Vivo Analysis of Ocular Disease using Zebrafish

Authors: Lewis PR, Collery RF.

Project Mentor: Ross F Collery, PhD, Assistant Professor; Department of Ophthalmology and Visual Sciences

Introduction:
Advancements in understanding human ocular diseases have been greatly enhanced by spectral domain optical coherence tomography (SD-OCT), which enables accurate, noninvasive in vivo assessment of ocular anatomy. Many human gene mutations are linked to retinal pathologies and blinding disorders. Leveraging this technology, we propose a new approach to investigating human retinal disease and refractive error using a zebrafish model.
Hypothesis:
Zebrafish genetic mutants can be used to better understand retinal disease and refractive error using in vivo OCT imaging to measure ocular metrics and assess retinal health.
Specific Aims:
We will image mutant and control zebrafish lines with mutations in genes linked to human eye disease, focusing on agk (acylglycerol kinase), which is associated with Sengers syndrome.
Aim 1: Analyze OCT data from mutants to assess refractive state, axial length:body axis ratio, and other ocular metrics normalized to invariant measures (e.g., body axis length).
Aim 2: Examine cone photoreceptor distribution, retinal lamination, and retinal cell morphology to evaluate gene loss effects on retinal integrity and development.
Methods:
OCT will be used to image anesthetized adult (>1 month) zebrafish. Age-matched wild-type controls will be imaged in parallel. Metrics will be compared using two-tailed Student's t-tests ($p<0.05$). Cone mosaic geometry will be assessed semi-automatically using Mosaic Analytics software (density, NND, ICD, FND, % six-sided Voronoi cells, VCAR). We will image sufficient retinas to achieve 80% statistical power and qualitatively assess changes in mutants.
Results:
Loss of zebrafish agk is associated with significant changes in the refractive state as well as retinal health.
Conclusion:
We expect agk zebrafish mutants to replicate phenotypes seen in human Sengers syndrome, supporting zebrafish as a model for human retinal disease and providing a roadmap for investigating other genetic eye disorders.

Jessica Liu

Needs and preferences for a physical activity program to reduce fatigue symptoms among those with Chronic Myeloid Leukemia taking TKIs

Authors: Liu J, Clohesey K, Flynn K, Atallah E, Stolley M, Morelli, W

Project Mentor: Whitney A. Morelli PhD; PM&R

BACKGROUND: To determine the needs and preferences of chronic myeloid leukemia (CML) patients taking TKIs for the development of a physical activity (PA) program intervention to mitigate fatigue. METHODS: Participants (N= 38) completed an online survey which included an assessment of barriers and facilitators to PA, preferences on PA program features, and self-reported PA and fatigue. Summary statistics are reported for participant characteristics and program needs and preferences. Open-ended questions were analyzed using thematic content analysis. RESULTS: On average, participants were 52±14 years old, and 50% of the sample was female. Average time since diagnosis was 6 years, 8 months and average length of TKI usage was 6 years, 6 months. GLTEQ data revealed that on average, participants performed strenuous exercise 1x/week, moderate exercise 3x/week, and light exercise 4x/week. We extracted 5 key themes from participant responses 1) treatment side effects inhibit motivation to be physically active; 2) perceived lack of time; 3) psychological/confidence barriers; 4) importance of social support; 5) need for external motivators. Finally, PA program preferences included a desire to use a wearable activity tracker (84.6%), feedback on their activity level (80.8%), exercise educational materials (80%), goal setting (84%), and symptom reporting (70.8%). CONCLUSIONS: Addressable barriers to PA and actionable feedback to promote PA included participants' need for additional support with symptom burden, mental barriers, and social support. These results will be used to design a tailored physical activity program for patients with CML on TKIs to reduce fatigue and improve survivorship.

Elizabeth Liverman

Qualitative evaluation of medical student comfort level with medical student-led advance directive discussions following classroom and clinical education

Authors: Liverman E, Foutz R.
Project Mentor: Renee Foutz; Medicine

Advance care planning (ACP) is a process in which individuals consider their values and wishes to document and communicate them with their loved ones and healthcare providers. Advance
directives, such as a healthcare power of attorney can be utilized as tools for advance care planning. Due to legislation, it is crucial for Wisconsinites to establish a healthcare power of
attorney. It is also important for medical students to not only understand these legal ramifications but also develop the social tools to be able to lead these conversations. This study evaluates a volunteer program designed to give students practice leading these conversations in a student-run free clinic following ACP education by an attending physician. Previous volunteers were given optional surveys that they could complete anonymously to give feedback to the program leaders. Each survey was deidentified and stored securely. Responses were analyzed qualitatively for themes. Of the 6 volunteers asked to complete a survey, 2 were returned. These volunteers generally reported enjoying the program and feeling that it did provide them with a framework to
use in their clinical lives outside of this free clinic. They did also advocate for additional training. Similar to previous studies, students did report an increased confidence in leading ACP
discussions after going through this training. This data is limited, though, due to small sample size. Looking forward, this program hopes to continue expanding to educate more students and
improve the training process for volunteers.

Fiona Ljumani

Early Stages of Pediatric Sepsis: Identification and Fluid Resuscitation Simulation for Medical Students

Authors: Ljumani F, McDermott K, Petersen T.
Project Mentor: Tara L Petersen, MD; Pediatrics

Pediatric sepsis is a serious disease state that can lead to death with mortality rates up to 5% and severe sepsis mortality rates up to 20%. Thus, it is critical that medical students learn and solidify their knowledge, diagnostics, and treatment of sepsis within its early stages to improve patient outcomes. An identified educational gap is many students lack knowledge surrounding the specific task-based steps required to carry out time-sensitive interventions, such as a push-pull intravenous (IV) fluid bolus, which is the favored mechanism of fluid resuscitation in pediatric sepsis. Therefore, a simulation-based training was created to (1) solidify knowledge surrounding the early identification of sepsis utilizing vital signs and physical exam interpretation and (2) manage sepsis with emphasis on learning how to perform fluid resuscitation using the push-pull administration mechanism. The simulation was designed using an evidence-based template and incorporated the Kirkpatrick Levels of Evaluation, specifically Level Two (Learning) and Three (Behavior). As of now the simulation development and design stages are complete. Next steps include undergoing a pilot, including analysis of participant evaluation and feedback, within the next academic year.

Claire Lo

Clinical Changes Associated with Head Impact Exposure in Contact Sport Athletes

Authors: Lo C, Stemper B, Shah A.
Project Mentor: Brian Stemper, PhD; Joint Department of Biomedical Engineering and Neurosurgery

Traditional models emphasize a single, high magnitude impact as the primary concussion mechanism. Over the last decade sub-concussive impacts have become increasingly recognized as significant contributors to long-term neurological dysfunction, especially in contact sport athletes. This study investigates the relationship between repetitive sub-concussive head impacts and functional neurological changes across a single football season. Data were collected from high school and Division III collegiate American football players during the 2018 season. Head impact exposure was recorded using helmet-mounted accelerometers while clinical assessments - including ImPACT, SAC, SCAT, and BESS - were administered pre-season, mid-season, and post-season. In total, 35 athletes exhibited clinically significant declines on cognitive assessments without formal concussion diagnoses, with some showing changes at both mid- and post-season timepoints. Surprisingly, no statistically significant differences were observed in risk weighted exposure (RWE) or total impacts between those with and without declines on cognitive assessments. Pairwise comparisons between these groups suggest that timing between maximum impact and clinical assessment testing, as well as total rotational acceleration per session, were most predictive of clinical changes. In summary, this study provides evidence that meaningful cognitive changes can occur in the absence of diagnosed concussion, supporting the hypothesis that sub-concussive impact exposure contributes to neurological decline. These findings underscore the limitations of current concussion surveillance methods and call for longitudinal, intra-seasonal studies with larger cohorts and improved control groups to better define exposure thresholds and guide return-to-play protocols.

Jenna Loewus

Intimate partner Violence Typology Associated with Major Depressive Disorder Among Adolescent Mothers in the Postpartum Period in Central Uganda: A Cross-Sectional Study

Authors: Loewus J, Anguzu R
Project Mentor: Dr Ronald Anguzu, PhD; Institute for Health and Humanity
Community Partner: Child and Family Foundation, Uganda

Depression affects 26.9% of postpartum mothers, while 39.6% of women have experienced any form of intimate partner violence in Uganda. Adolescents have a higher risk for depression compared to other age groups hence the need to understand the relationship between the different IPV forms experienced by adolescent survivors in the postpartum period and Major Depressive Disorder (MDD).
In this cross-sectional study, we surveyed 200 consenting adolescents below 19 years of age attending a postnatal clinic (PNC) in Kampala, Uganda. Trained psychiatric clinical officers administered the MINIKid diagnostic tool to diagnose MDD. IPV typologies were physical, sexual, and emotional IPV. We used logistic regression analyses to test the independent association between IPV forms and depression symptoms while controlling for potential confounders. Odds ratios and 95% confidence intervals were reported.
Among 200 study participants, the mean age was 16.1 (SD=3.4) years, 6.0% (n=12) had MDD, 54.0% experienced at least one IPV form, 45.0% had emotional IPV exposure, 18.0% experienced sexual IPV, 37.5% experienced physical IPV forms. After adjusting for potential confounders, participants who experienced emotional IPV had significantly higher odds of MDD (AOR=9.8, 95%CI 5.6-14.3, p=0.014) when compared to no emotional IPV. Also, sexual IPV had significantly higher odds of MDD (AOR=8.6, 95%CI 1.1-13.9, p=0.04) when compared to no sexual IPV.
Emotional and sexual IPV were associated with MDD in our study population of adolescent mothers attending PNC in Kampala. This underscores a need to strengthen routine provider screening in PNC and linkage to mental health and violence prevention services.

Fabriana Louis-Letang

From Concept to Conference: A Seminar to Guide Medical Students Through the Steps of Medical Education Research

Authors: Louis-Letang F, Miller N, Parks N, Tubbs A, Rosiejka A, Kaljo K PhD

Project Mentor: Seth Bodden, MD; Family Medicine

Summary statement:
This project serves to help medical students feel more confident regarding the research process and its execution. It informed on the process of generating & finding ideas, developing those ideas into feasible projects, pursuing a faculty mentor to advocate, on filing and completing an IRB proposal and dissemination of research.
Problem statement:
The current medical school curriculum has outstanding gaps in educating students regarding navigating the research process and finding opportunities which can be discouraging to potential prospective students with interest in spearheading projects. Conducting effective research is paramount to competing and achieving for competitive residencies.
Methods:
A group of 54 first- year medical students within the Clinical Education pathway made up the experimental group. Methods included a compilation of pre-surveying to gauge understanding of the process, a seminar session led by Dr. Kaljo with interactive small group discussions to inform on key steps and post-surveying to evaluate growth and initiative. Lastly, students were asked to fill out post session feedback to help reflect on future modifications.
Results & Limitations:
From the 54 students surveyed before and after the session, only 48 responded. From the pre-survey data, over 50% of the students reported confidence prior to the session in constructing their own research ideas but did not feel confident in the IRB and dissemination process. The post surveys revealed that over 90% reported an increase in comprehension of IRB proposals and dissemination. Most students report the need for more and separate future workshops for IRB and abstract writing.
Signficance:
Our seminar provides medical students with the training to confidently brainstorm
research ideas, find mentors / funding, and disseminate. By making medical education
research more accessible, we hope to enable student researchers to drive future curriculum innovation.

Elizabeth Lucero

Choroidal Hemangioma Treatment with Propranolol - A Case Study in Sturge-Weber Syndrome and Systematic Literature Review

Authors: Thareja S, Lucero E, Ramasubramanian A

Project Mentor: Aparna Ramasubramanian, MD; Pediatric Ophthalmology, Ophthalmology and Visual Sciences, Pediatrics

Purpose: To examine propranolol efficacy in treating diffuse (DCH) and circumscribed choroidal hemangiomas (CCH) and controlling intraocular pressure (IOP) in patients with Sturge-Weber syndrome (SWS).
Methods: A SWS patient case treated with propranolol for DCH is presented. Following PRISMA guidelines, we also performed a systematic review using PubMed/Web of Science, analyzing 14 studies detailing propranolol treatment outcomes for DCH, CCH, and IOP control in SWS. Demographic, clinical, treatment, and outcome data were extracted and statistically analyzed. Fisher's exact test was used to compare findings such as retinal detachment rates.
Results: We reviewed patients treated with propranolol, including 8 DCH, 18 CCH, and 16 SWS cases of IOP control. Retinal detachment rates were significantly higher in DCH compared to CCH cases. Post-propranolol, 73% of DCH and CCH cases showed subretinal fluid improvement, and in SWS patients, 94%had IOP reduction.
Conclusion: This study underscores the potential utility of propranolol beyond its traditional use in cutaneous hemangioma for treatment of CCH/DCH and IOP control.

Rehaan Machhi

Computational Detection of Proliferative Cancer Cell Subpopulations Following Short-Term Neoadjuvant Endocrine Therapy in HR+/HER2- Breast Cancer

Authors: Machhi RK, Sun Y, Jorns JM, Chaudhary LN, Chervoneva I, Rui H.
Project Mentor: Lubna Chaudhary, MD; Medicine

Hormone receptor-positive, HER2-negative breast cancer - two-thirds of cases - is treated with estrogen-blocking agents (aromatase inhibitors or tamoxifen). Suppressing ER signaling curbs proliferation and lowers recurrence, but 15-19 % relapse due to acquired resistance. Understanding the molecular basis of this resistance is essential to developing alternative, more effective therapies. Here we introduce a spatial multiplex-immunofluorescence (mIF) assay that interrogates HR+/HER2- breast tumors after short-term neoadjuvant endocrine therapy (NET). By quantifying Ki-67 and ER at single-cell resolution, the assay separates true responders from non-responders and, crucially, classifies the latter as either ER-dependent or ER-independent. Post-NET Ki-67 alone tracks endocrine resistance through a strong log-linear relationship with the post/pre Ki-67 ratio, but the combined Ki-67/ER read-out reveals the biology driving that resistance. Among seven tumors with post-NET Ki-67 >10%, three retained ER-positive proliferative foci and four switched to ER-independent foci, underscoring a dichotomous, pre-programmed adaptive pattern. ER-dependent non-responders may benefit from fulvestrant or other SERDs plus targeted partners, whereas ER-independent tumors, biologically akin to triple-negative disease, are unlikely to respond to SERDs and should be funneled to chemotherapy or alternative targeted regimens. The assay can also flag paradoxical tamoxifen agonism by detecting tamoxifen-driven Ki-67 increases, prompting early therapy change. Compared with the pathologist-scored PEPI test, this single-cell, spatial approach reduces observer variability and supplies granular insight into the residual proliferative compartment, making NET a true "window-of-opportunity"provocation test for tailoring adjuvant therapy.

Caitlin Magro

Material Needs Security and Cardiovascular Risk Factors in Rural South Africa

Authors: Walker R, Magro C, Amjad R, Hawks L, Iregbu S, Egede L
Project Mentor: Laura Hawks, MD; Rebekah Walker, PhD; Medicine

Background: The prevalence of cardiovascular disease is burgeoning in low- and middle-income countries (LMICs). In sub-Saharan Africa, the prevalence of cardiovascular risk factors is increasing, though rates of CVD diagnosis and management remain low. Awareness of the influence of social determinants of health (SDOH) on cardiovascular outcomes is growing, however, most work has focused on high-income countries. Material needs security is a measure of SDOH that may be particularly relevant for LMICs. This study investigated the relationship between material needs security and cardiovascular risk in older adults living in South Africa.
Methods: The analysis included 5059 respondents age ≥40 in the Health and Ageing in Africa survey, an observational, longitudinal cohort study administered in 2014 in Mpumalanga Province, South Africa. Linear regression models tested the association between material needs and eight cardiovascular risk factors (waist-to-hip ratio, body mass index, blood pressure, glucose, cholesterol, LDL, and triglycerides). Adjusted linear regression models controlled for sociodemographic confounders.
Results: There were significant adjusted associations found between increased material needs security and four cardiovascular risk factors, including waist-to-hip ratio (Î²=0.001; 95% CI [0.00002,0.002]), BMI (Î²=0.19; 95%CI=[0.14,0.24]), glucose (Î²=0.46; 95%CI=[0.02,0.90]), and triglycerides (Î²=0.26; 95%CI=[0.02,0.49]).
Conclusion: Increased material needs security was associated with significantly increased cardiovascular risk in older adults in rural South Africa. These findings can inform the approach to treatment and management of cardiovascular disease in South Africa and similar LMICs. Future investigations should evaluate the implementation and efficacy of interventions that recognize the role of material needs security in cardiovascular risk.

Amarpreet Mahil

Detecting Cerebrovascular Reactivity Abnormalities in Elderly Patients with Long COVID

Authors: Mahil A, Wang Y, Pommy J, Cohen A, Ristow K
Project Mentor: Yang Wang, MD, PhD; Radiology

Long COVID is a condition characterized by persistent symptoms following COVID-19, including potential impacts on the central nervous system (CNS). Cerebrovascular Reactivity (CVR), a measure of neurovascular function linked to cognitive decline, can vary widely in long COVID. This study used distribution-corrected z-scores (DisCo-Z), a subject-specific abnormalities approach, to identify extreme CVR clusters in older adults, indicating regions of abnormal neurovascular function.
The study involved 29 healthy older adults (ages 52-87) and 26 older adults with long COVID (ages 51-85), who performed breath-holding exercises to assess CVR. Brain MRIs were conducted using a Nova Medical 32-channel coil for 3T imaging. Extreme CVR clusters (>100 voxels) were identified using DisCo-Z, and the total number of clusters was compared between groups using non-parametric testing.
Results revealed significant differences in CVR patterns between groups. The control group exhibited an average of 8.62 positive clusters (higher CVR) compared to 0.59 in the COVID group ($p < 0.0001$). Conversely, the COVID group had an average of 11.19 negative clusters (impaired CVR) versus 1.138 in controls ($p < 0.0001$). Positive clusters may reflect adaptive responses, while negative clusters indicate impaired blood flow regulation.
Distinct CVR abnormalities in older adults with long COVID may underlie cognitive and neurological symptoms. These findings highlight the potential of CVR as a biomarker for cognitive decline in long COVID and underscore the need for further research into its neurovascular implications.

Audrey Makope

General Surgery Resident Robotic Training Curriculum: Evaluation Six Years after Implementation

Authors: Makope, AN, Higgins RM
Project Mentor: Rana Higgins, MD; General Surgery

Background: The surge of robotic surgery over the last decade emphasizes the need for a robotics curriculum during general surgery residency. We hypothesized that the implementation of a robotic surgery resident training curriculum would have a positive impact on the general surgery residency experience during and post-graduation.
Materials/methods: Current post-graduate year 1 through 5 residents and previously graduated residents were surveyed regarding their robotic curriculum experience during residency and post-graduation. Additionally, ACGME operative case were analyzed to determine robotic case volume and to compare two different time periods of the robotics curriculum: July 2017-June 2020 (early) and January 2022-June 2023 (late).
Results: Among current residents (n = 44), 19 (43%) responded to the survey regarding their robotic curriculum experience, and 17 (89%) were satisfied with the curriculum. Of the graduated residents (n = 33), 25 (75%) responded to the survey, of which 24 (96%) felt the curriculum prepared them for their future practice. Regarding ACGME case logs, 1,091 robotic cases were performed by current residents, compared to 352 cases between 2017 and 2020. The case averages by PGY-level significantly increased 3.1 times from the early (70.4 cases per PGY level) to the late time period (218.2 cases per PGY level) ($p = 0.024$).
Conclusions: Overall, our robotics curriculum has had a positive impact on resident training. Current and graduated residents are satisfied with the curriculum; there has also been significant growth in the operative case volume. This study suggests that a robotic training curriculum has value during residency and in clinical practice.

Alexis (Bradt) Malovec

Assessing the Impact of a Trauma-Informed Care Intervention on Staff Burnout and Perceptions of Patient Care During Trauma Resuscitations

Authors: Malovec AR, Blaser ME, Biesboer EA, Brandolino A, Hamadeh Y, Khan S, Williams K, Schroeder ME.
Project Mentor: Mary Elizabeth "Libby" Schroeder, MD, MS; Surgery

Introduction: Trauma resuscitations are high-stress encounters that can exacerbate psychological distress for patients and staff. Trauma-informed care (TIC) practices aim to reduce re-traumatization by addressing emotional needs, yet they are not routinely integrated into resuscitations. This study evaluated the impact of implementing a TIC intervention - Assurance of Safety (AoS) - on staff perceptions of care and burnout.
Methods: A quasi-experimental pre-post survey study was conducted at an urban Level I trauma center. Emergency medicine staff, nurses, and residents were surveyed before and after implementing AoS. The AoS intervention involved scripted reassurances to orient and comfort patients during resuscitations. Burnout and wellness were assessed using the Maslach Burnout Inventory (MBI) and Resident Wellness Index (RWI), while staff perceptions of TIC were measured via custom Likert-scale and open-ended survey questions.
Results: Sixty-five staff completed the pre-survey; 53 completed the post-survey. Post-intervention, perceptions that TIC was "usually" or "always" practiced increased significantly ($p = 0.01$), and more staff reported addressing patients' emotional needs ($p < 0.01$). However, depersonalization scores increased ($p = 0.04$), and personal accomplishment decreased ($p = 0.01$). Emotional exhaustion and wellness scores did not change significantly.
Conclusion: While the AoS intervention improved perceptions of TIC, it did not mitigate burnout and was associated with increased depersonalization. These findings suggest that cultural change is possible, but comprehensive, system-wide support is essential to sustaining trauma-informed practices without exacerbating burnout in high-stress environments like the trauma bay. Future TIC efforts should include institutional strategies that foster provider resilience, offer debriefing opportunities, and align clinical responsibilities with provider values

Hannah McBride

Low-Dose Aspirin Prescription for Pregnant People at Risk of Preeclampsia

Authors: McBride, H., Jaeke, E., Abuzahra S., Igbokwe, I., Mahil A., Snowden N., Davidson, E., Domeye-Klenske A., Peebles J., Palatnik A.
Project Mentor: Anna Palatnik, MD; Obstetrics and Gynecology, Maternal Fetal Medicine

Preeclampsia complicates up to 10% of pregnancies in the U.S. and leads to high maternal and neonatal morbidity. LDA is recommended by the American College of Obstetricians and Gynecologists (ACOG) for patients with ≥1 high-risk factors or ≥2 moderate risk factors to be started in the first trimester. A screening EPIC smart-phrase was developed to improve recognition of high and moderate-risk patients. Implementation of an educational intervention and use of the preeclampsia risk factors EPIC smart-phrase aims to improve physician adherence to LDA prescription practice. OB/GYN providers at Froedtert Hospital received education on current LDA prescription standards, and a new EPIC smart-phrase with high and moderate preeclampsia risk-factors. Chart review was conducted, and the cohort included patients less than 28 weeks pregnant and seeking new obstetric care visits at Froedtert OB/GYN clinic from January 2023 to February 2024. After the intervention there were 121, 173, and 132 LDA-eligible patients identified at 3,9, and 13 months respectively. LDA prescription increased from baseline 71.7% for patients with at least one high-risk factor to 83.3%, 83.7%, and 92.3% respectively. LDA prescription increased from baseline 20.5% for patients with at least two moderate-risk factors to 57.0%, 61.5%, and 61.3% respectively. This quality improvement project demonstrates the benefit of integrating a smart-phrase into first OB visits to increase LDA prescriber adherence for patients with risk factors. This is important for preventative interventions for patients with risk factors for pre-eclampsia especially moderate risk factors which often remain underrecognized.

Cordero McCall

The Role of Socioeconomic Factors in Soft Tissue Sarcoma Outcomes at a Tertiary Care Sarcoma Center

Authors: McCall, C., Cordero, J., Bedi, M., & King, D.
Project Mentor: David King, MD; Orthopaedic Surgery

Introduction:
Soft tissue sarcomas (STS) are rare mesenchymal tumors with complex management needs, particularly in advanced stages. While tumor-related factors such as size, grade, and histology are well-established prognostic indicators, socioeconomic status (SES) and access to specialized care may also influence outcomes. High-volume tertiary centers provide multidisciplinary care that may improve survival; however, barriers such as travel distance and SES-related disparities could affect treatment access and prognosis. This study examines the association of SES, travel distance, treatment patterns, and survival outcomes in STS patients treated at a high-volume tertiary center.
Methods:
This retrospective cohort study analyzed data from patients treated for primary STS at a tertiary sarcoma center over a 20-year period. Patients with metastatic disease at diagnosis or incomplete data were excluded. SES was measured using the Area Deprivation Index (ADI) and grouped as high (8-10) or low (0-7). Travel distance was estimated using the Haversine formula. Survival outcomes were assessed using Kaplan-Meier analysis; logistic regression identified predictors of wound complications.
Results:
Among 357 patients, no significant differences in overall survival, progression-free survival, or wound complications were observed between SES groups. Treatment rates were also similar. Although high-ADI patients traveled farther, distance was not associated with outcomes. Tumor grade, age, and Karnofsky Performance Status (KPS) were significant predictors of survival.
Conclusion:
Despite socioeconomic disadvantage and longer travel distances, patients received comparable treatment and achieved similar outcomes. These findings highlight the potential of high-volume tertiary centers to mitigate SES-related disparities in STS care.

Cara McCarthy

Getting SSPOT to Run: Development of a Novel Direct Observational Tool for Usage in Clinical Settings

Authors: Ladell M, Jacobson N, Yale S, McCarthy, C, Suenkens K, Venkitachalam R, Schindler C, Bordini B, Scanlon M, Nimmer M, Lerner Papautsky E
Project Mentor: Meagan Ladell, MD; Pediatrics

Introduction: Observational research often requires the development and testing of tailored tools for data collection. However, there is limited published guidance on the process. Thus, researchers often develop such tools without the benefit of lesson learned, facing challenges associated with time and access to clinical environments. We describe the development process of a data collection tool.
Methods: Informed by SEIPS (System Engineering Initiative for Patient Safety) 2.0 model, we developed a data collection tool in four phases: prototype development, nonclinical pilot testing, clinical pilot testing, and inter-observer consistency.
Results: Development took 99 hours, including 71 hours of observation and 28 hours of debriefing over 9 weeks, of which approximately 4 hours of pilot testing were in a non-clinical setting. The coffee shop served as a successful alternative sociotechnical system for pilot testing.
Discussion: The SSPOT tool was developed using the SEIPS framework, with non-clinical and clinical pilot testing to refine its design. Non-clinical testing in a coffee shop allowed for rapid iteration and helped address issues like data clutter by adding free-text fields and popup features. Clinical testing further refined the tool by capturing specific nuances of healthcare tasks. The development process highlighted the importance of a multidisciplinary team, including clinicians and human factors experts, and the value of non-clinical testing in an analogous setting. Key lessons include the need for diverse expertise, iterative testing, and the time-intensive nature of tool development.

Riley McCarty

Long-term outcome study of alveolar bone graft procedures performed at Children's Wisconsin over 11-year period

Authors: McCarty RM, McQueen, R, Ogbodu K, Qi J, Pan A, Challa SA, Shakir S, Klement K, Havlik R, Lin K, Yi C.
Project Mentor: Kant Lin, MD; Plastic Surgery

Purpose: In contrast to recently reported alveolar bone graft (ABG) success rates of 94.6%, an initial analysis of patients undergoing an ABG at Children's Wisconsin (CW) resulted in a lower success rate of 68.8% (33/48). This study aimed to investigate why the ABG success rate at CW was much lower than the reported rates in the literature. Surgical variables and other factors that may have had a negative impact on graft take were sought.

Methodology: A retrospective analysis of 270 patients who underwent an ABG from 2012 to 2023 at CW was conducted. Inclusion criteria included patients with obtainable medical records and those not lost to follow-up. Pre- and post-ABG imaging with 3D Denta scans were used to measure the alveolar cleft and bone graft volumes. These calculated volumes were then used as the criteria to determine graft success. Statistical analyses were done using Chi-squared and Fisher's exact tests for categorical variables and Mann-Whitney and Kruskal-Wallis tests for continuous variables.

Results: Forty-eight patients met inclusion criteria and were included in the study, with a mean graft age of 10.0 years old (range 7.2 - 21.5 years old). The mean age of the patients who underwent a successful ABG and did not need a regraft was 9.9 years old, with 10.4 years old being the mean age of patients who did need a regraft. Independent variables that had a significant association with the high graft failure rate at CW were the surgeons operating ($p<0.0001$), the surgical technique performed ($p<0.0001$), the cleft lip and palate type ($p=0.043$), and the cleft volume.

Conclusion: The surgeon operating, along with the source of the bone graft, had a significantly negative impact on the graft success rate. Additionally, bilateral clefts had a higher ABG failure rate than unilateral clefts. Awareness of these variables that contribute to ABG failure may allow surgeons to make technical modifications to benefit their patients.

Madison McGuire

STRYV365 peak team Coaching: Qualitative Assessment of Student Social Emotional Learning, Life Experiences, and Program Evaluation

Authors: McGuire M, Elaiho C, Stoltenburg A, Liverman E, Lumelsky P, Bates G, Navarrete A, Chelius TH, Gundacker C, Currie B, Meurer JR
Project Mentor: John R Meurer, MD, MBA; Institute for Health and Humanity
Community Partner: STRYV365

Exposure to adverse childhood experiences (ACEs) has effects on child and adolescent health and wellbeing. Trauma informed programing and social-emotional learning (SEL) approaches have been used to mitigate ACEs and build positive childhood experiences (PCEs). STRYV365 is a non-profit based in a large midwestern city that provides programs to students to cope with trauma and promote PCEs. The STRYV365 peak team program is a unique 10-week trauma-informed SEL curriculum using a coach-led format with emphasis on physical activity to build SEL skills, resiliency, and PCEs. The aims of this study were to qualitatively assess student's coping, self-image, life experiences, and neighborhood cohesion and to evaluate the strengths, weaknesses, and opportunities to improve peak team. 1,626 students in grades 5-9 were exposed to peak team at four diverse urban school. Student focus groups and interviews were held after their exposure to the intervention. Qualitative results showed that the coaching aspect of peak team resulted in strong connections between students and coaches. Students appreciated being active while exploring SEL concepts. Some students expressed issues with teamwork, fights, and gender alienation during peak team. Some felt anxious and uneasy during school and noted family struggles. Overall, this study suggests that peak team may work to mitigate the impact of ACEs on youth while also providing a model to other schools and programs for inclusion of physical activity and coaching into teaching SEL skills.

Mary Meyers

The relative impact of risk factors for homelessness, housing barriers, and healthcare barriers on mental health outcomes: a single-center study

Authors: Sun L, Meyers M, Nair A, Clearwater T, DuMez E, Nwosu C, Cairns D, Balfour M, Young S, Lundh R, Owen J.
Project Mentor: Julie Ruth Owen, MD, MBA; Psychiatry and Behavioral Medicine
Community Partner: Saturday Clinic for the Uninsured

Background: Housing and healthcare both play crucial roles in overall health. Though research has shown housing and healthcare barriers negatively impact mental health, little is known about the relative influence of each.
Objective: This study seeks to understand the relationship between housing circumstance, barriers to care, and mental health outcomes among low-income, uninsured patients seen at a Milwaukee free clinic, the Saturday Clinic for the Uninsured (SCU). This includes investigating the relative impact of risk factors for homelessness, housing barriers, and healthcare barriers on mental health outcomes.
Methods: From June to December 2023, surveys were administered to patients at SCU (n = 94). Surveys assessed patient demographics, housing and healthcare barriers, and mental health outcomes, primarily measured by the Patient Health Questionnaire-2 (PHQ-2), General Anxiety Disorder-2 (GAD-2), modified loneliness scale, and individuals' subjective mental health rating.
Results: Increased healthcare barriers were the strongest predictors of worse PHQ-2, GAD-2, loneliness, and mental health rating. Risk factors for homelessness also significantly predicted PHQ-2, GAD-2, and loneliness, but did not predict mental health rating. Increased housing barriers did not significantly predict any of the four mental health metrics. Among respondents, the most reported healthcare barriers were insurance coverage, financial issues, and transportation issues. In addition, there was significantly lower patient trust in mental healthcare providers than general medical providers, which may reflect increased stigma.
Conclusion: Compared to housing barriers, increased healthcare barriers significantly predicted worse mental health outcomes. This study emphasizes the importance of addressing healthcare barriers to improve mental health.

Noah Miller

Real-time, Brief Reflections as a Tool to Foster Professional Identity Formation in Medical Students

Authors: Miller N, Kurtz K, Hoeschen M, Vallecillo R, Minshew, L, Hilgeman, B.
Project Mentor: Brian Hilgeman, MD, AAHIVS, FACP; Internal Medicine

Purpose: Reflective Writing (RW) is the most studied evidence-based strategy to support Professional Identity Formation (PIF). Most iterations of RW involve lengthy writing assignments that are time-consuming and detached from the clinic. Real-time, Brief Reflections (RTBR) aim to eliminate these barriers by providing an easy-to-use and accessible reflection platform.
Methods: RTBR consist of short (280 character) written reflections completed by students via Qualtrics during or immediately following their days in clinic. Students were prompted to "Write a reflection about your experience with a patient."Nearly 300 M1s in their ambulatory rotation and 80 M4s in their Internal Medicine acting internship at MCW utilized this tool.
Results: Post-rotation survey results showed that most M1 and M4s agreed that RTBR were valuable (22/37, 59% and 3/5, 60%), efficient (30/37, 81% and 4/5, 80%), easy to use / familiar (33/37, 89% and 5/5, 100%), and provoked deeper thinking about patients (24/35, 69% and 4/5, 80%). Qualitative analysis showed that most reflections (54/85, 64%) displayed qualities of PIF according to Holden's definition. Deductive coding of reflections using Dr. Wald's Thematic Categories and Themes of clinical reflections showed that M1s focused on navigating how to learn in the clinical environment, and M4s focused on self-evaluation of their performance as a clinician.
Conclusions: RTBR show promise as a pedagogical tool for fostering PIF. Due to the flexibility of the reflection platform, medical education systems of all levels could adapt the reflections to fit their own unique curricular objectives.

Oliwia Mlodawska

Predictors and Diagnostic Approaches of Pediatric Foreign Body Aspiration

Authors: Mlodawska OW, Lewis MD, Friedland DR, Adams JA, Khani M, Luo J, Shay SG
Project Mentor: Sophie G Shay, MD; Department of Otolaryngology & Communication Sciences

Introduction: Foreign body aspiration (FBA) is a significant cause of pediatric morbidity and mortality. Diagnosis can be challenging, as clinical signs and chest radiographs (CXR) vary in sensitivity and specificity based on the FB's radiolucency, position, and size.
Objectives: 1) To identify patient predictors necessitating higher acuity care; 2) To characterize types of aspirated FB; 3) To assess the association between radiographic and bronchoscopy findings
Methods: A retrospective cohort study was conducted of patients aged 0-18 years evaluated for FBA at a tertiary center (2015-2023). Descriptive stats, bivariate analyses, and contingency tables were used.
Results: 128 patients were included (mean age 36.8±40.2 months, 50.8% male); FB was confirmed in 79. Common symptoms included cough (82.5%), wheezing (58.7%), and asymmetric breath sounds (42.5%). Respiratory distress ($r=0.59$, $p<0.001$) and cyanosis ($r=0.33$, $p<0.001$) were associated with PICU admission and intubation (distress: $r=0.46$, $p<0.001$; cyanosis: $r=0.24$, $p=0.007$). Organic FBs (70.9%) were more common across all ages ($X^2=13.75$, $p=0.008$). CXR was done in 93.8%, showing air trapping in 23.5%, direct FB visualization in 11.7%, and no findings in 76.4% with positive bronchoscopy. Distal FBs correlated with air trapping ($X^2=8.21$, $p=0.04$). CT was used in 12.5%, with significant correlation to bronchoscopy ($p<0.001$).
Conclusion: Clinical suspicion is key for timely FBA diagnosis. Respiratory distress and cyanosis predict need for higher acuity care. Organic FBs, especially nuts/seeds, were most common, underscoring need for clearer food safety guidelines. Low-dose CT may aid diagnosis due to strong correlation with bronchoscopy findings.

Iqra Mohammad

Preventing Falls in Older Adult Patients

Authors: Mohammad IY, Davis CS
Project Mentor: Christopher S Davis, MD, MPH; Surgery

Abstract:
Purpose of Review: Adults 65 years and older represent a rapidly growing population in the USA and worldwide. Today, 16.8% of the US population is over 65, with an estimate that 20% of Americans will be over 65 by 2030. This review analyzes the complexities involved with preventing and managing geriatric injury.
Recent Findings: Geriatric injury represents nearly 50% of all traumas, with ground-level falls and motor vehicle crashes being the most common mechanisms, resulting in predictable injury patterns. Conscientious medical and surgical management from the emergency department to discharge and beyond is paramount, as is enhancing geriatric injury prevention strategies.
Summary: The frequency of geriatric injury will only continue to increase. Improving injury prevention strategies while understanding unique considerations of geriatric injury patterns and their overall management is imperative to optimize acceptable outcomes.
Keywords: Geriatric - Older adult - Trauma Injury

Amer Mohiuddin

Fabry Disease Rat Model Develops Age- and Sex-Dependent Anterior Segment Ocular Abnormalities

Authors: Mohiuddin AM, Erdman ME, Chakka S, Al-Kirwi K, Rasper MR, Sokupa S, Low SWY, Skumatz CMB, De Stefano V, Kassem IS, Chaurasia SS

Project Mentor: Baseer Ahmad, MD; Ophthalmology

Purpose: Fabry disease is a rare X-linked lysosomal storage disease (1:5000 prevalence) caused by Î±-galactosidase A deficiency, leading to cardiovascular, renal, cerebrovascular, and ocular abnormalities, with premature mortality. Previous studies noted correlations between corneal/lens manifestations and systemic severity but did not explore their relationship to age or sex. This investigation evaluated age- and sex- related anterior segment ocular manifestations in a rat model of Fabry disease. We hypothesized that hemizygote male rats will manifest more severe ocular abnormalities as they age compared to heterozygous, wild-type, female, and young rats.

Methods: A Dark Agouti Î±-galactosidase A (Gla-m2) rat knock-out model was developed at the Transgenic Core facility of the Medical College of Wisconsin. The animals were stratified into three distinct age cohorts: Group I (8-24 weeks), Group II (25-60 weeks), and Group III (61+ weeks). Intraocular pressure (IOP) was assessed clinically using the iCare TONOLAB tonometer, corneal surface characteristics were examined with a Topcon Slit Lamp Microscope, and corneal thickness (CCT) and anterior chamber depth (ACD) were measured using an Optical Coherence Tomography (OCT) Bioptigen 2200 Imaging Platform. Statistical significance was determined at $p<0.05$.

Results: Assessment of ocular features in our rat model demonstrated significant differences in IOP, tear break-up time, corneal score, CCT, ACD, and lens score dependent on age and sex.

Conclusion: The Fabry rat model recapitulated ocular manifestations observed in individuals with Fabry disease. Notably, hemizygous male rats were disproportionately affected in all categories, especially in old age. These results underscore the importance of early diagnosis in mitigating vision-threatening outcomes. Clinical manifestations, such as cornea verticillata, were present in all cohorts, and Fabry cataracts was evident in hemizygote males and homozygous females.

Lia Mojica

Adolescent and Parental Knowledge of Emergency Contraception in a Post-Dobbs Era

Authors: Mojica L, Pickett M.

Project Mentor: Michelle Pickett, MD; Pediatric Emergency Medicine

This study seeks to capture perceptions and knowledge of emergency contraception (EC) in the context of a post Dobbs v Jackson landscape. Most studies to-date that have captured adolescent attitudes towards EC were conducted prior to the June 2022 Supreme Court decision. Participants in this study include adolescent females (ages 14-19) and their maternal parent/legal guardians surveyed as dyads in the Pediatric Emergency Department and inpatient hospitalist floors at Children's Wisconsin. Consent is required from the parent/legal guardian for an adolescent under 18 to complete the survey with consent from the parent/legal guardian waived for adolescent patients ages 18-19. Separate electronic surveys are distributed to the adolescent patient and their parent/legal guardians with the objective of eliciting their personal opinions about emergency contraception and abortion access. The majority of questions are knowledge-based questions about EC and the accessibility of reproductive care in this state. Both surveys were initially piloted with n=10 participants for comprehension before formal data collection. Given the changing legal landscape in this state, the IRB required two formal addendums in September 2024 and January 2025 to address changes to the survey content and to expand recruitment to female patients on inpatient floors. Formal data collection was initiated in March 2025 with the assistance of three medical students and is ongoing. Currently the surveys are being distributed only in English but will also be distributed in Spanish at a later date.

Erik Mueller

Sagittal Plane Kinematics Following Total Hip Arthroplasty Using Direct Anterior Approach

Authors: Mueller E, Middleton A, Dziuk C, Canseco K, Cross JA, Geissler T, Edelstein A, Fritz JM.
Project Mentor: Jessica Fritz, PhD; Orthopedic Surgery

INTRODUCTION: The direct anterior approach (DAA) for total hip arthroplasty (THA) is an effective procedure for treating advanced hip osteoarthritis. This study aims to compare sagittal plane kinematics in subjects at least 1 year after unilateral DAA. We hypothesize that hip motion will remain symmetrical but display increased range bilaterally at walking speeds 10% greater than each person's self-selected walking speed.
METHODS: Eleven participants who underwent the DAA provided informed consent for this IRB-approved study. Anatomical measurements were initially performed and reflective markers were adhered to subjects' skin at anatomical landmarks. Participants completed 10 trials of over-ground walking at self-selected and 10% increased speeds along the 30-foot-long Center for Motion Analysis walkway. Vicon's Plug-in Gait (PiG) model was used to generate kinematic data for each subject. Sagittal plane kinematics were compared using Welch's t test with significance set to $p<0.05$.
RESULTS: There were no significant differences between unaffected and affected sides throughout the gait cycle. Ankle dorsiflexion was decreased ($p<0.05$) during early load response of gait on the affected side at self-selected and increased walking speeds. At increased walking speeds, there was significantly greater ($p<0.05$) hip flexion during the load response, midswing and terminal swing of the gait cycle and greater hip extension during the midstance.
DISCUSSION: These results suggest that sagittal plane kinematics regain symmetry following DAA and display increased hip range of motion at increased walking speeds. Future studies should compare post-operative kinematics following the DAA and posterior approach to validate the impact of THA approach on clinical outcomes.

Beatrice Mumm

Correlation Between Tinnitus Severity and Life Stress

Authors: Mumm B, Friedland D, Adams J, Khani M, Luo J, Osinski K
Project Mentor: David Friedland, MD, PhD; Otolaryngology

Tinnitus is the perception of sound without an external source. It affects an estimated 740 million people worldwide, with 17% experiencing severe symptoms linked to reduced quality of life. Approximately 20% seek clinical treatment which often incorporate stress-reducing methods like cognitive behavioral therapy or meditation despite mixed evidence for psychotherapy's effectiveness. The objective of this study was to identify the association of life stress with tinnitus severity including the characteristics of the tinnitus percept and auditory function.
A retrospective cross-sectional analysis of patients having a tinnitus evaluation at Froedtert Hospital between 2011-2022 was performed. Statistical analyses included T-test, linear regression, and ordinary least squares regression.
785 patients (mean age 53.9±15.4; 52.6% male) had constant tinnitus (76%), though constancy showed no correlation with stress score or THI/TRQ. The most common sound reported was ringing (52%), followed by other sounds (39%), buzzing (25%), tonal (11%), humming (10%), and static (9%). Individuals with normal high-frequency DPOAEs were more likely to exhibit higher THI/TRQ scores compared to those with abnormal/absent results ($p<0.05$). Ordinary Least Squares regression showed a statistically significant positive correlation of tinnitus awareness, TRQ, and THI scores with HR risk score. This score is a subcategorization of the overall HR stress score and predicts the risk of health issues from stress.
In conclusion, tinnitus severity correlates with higher risk on the Holmes Rahe Inventory of stress-related illness, and normal hearing in the high frequencies as indicated by DPOAEs. These findings highlight the complexity of tinnitus and accentuate the need for further research on its psychological factors and etiology.

Zeina Nader

Racial Disparities in Multiple Myeloma Survival

Authors: Nader, Z., Dong, J., Del Cristo, M., & Arsang-Jang, S.
Project Mentor: Jing Dong; Medicine

Multiple myeloma (MM) is a rare and incurable hematological malignancy with significant racial disparities in incidence and outcomes. In the United States, over 34,000 individuals are diagnosed with MM and approximately 13,000 die from the disease annually. Notably, both incidence and mortality rates of MM are two to three times higher in non-Hispanic Black (NHB) individuals compared to non-Hispanic White (NHW) individuals, making MM the most common hematological malignancy and a leading cause of death in this racial minority group. Previous research using the SEER-Medicare linked database and a novel tapered matching approach revealed that NHB and NHW patients had comparable survival when matched for demographics and socioeconomic status (SES). However, NHB patients demonstrated significantly longer overall survival (OS) when treatment access was equalized. Given that NHB patients have an earlier average age of MM onset (65 vs. 70 years in NHWs), and the SEER-Medicare database is limited to patients aged ≥ 65 years at diagnosis, it is critical to validate these findings in younger patient populations. In this study, we utilized the TriNetX research network to investigate racial disparities in MM survival among adult patients aged 18 years and older, providing new insights into disparities across a broader age spectrum and real-world treatment settings.

Anjna Nair, BS

Implementing a cancer screening patient registry in an urban student-run free clinic: A model for preventive care tracking

Authors: Nair A, Shaw R, Kohl DM, Young SA, Schnell JL.
Project Mentor: Jessica L Schnell, MD; Pediatrics
Community Partner: The Saturday Clinic for the Uninsured

Despite national guidelines emphasizing the importance of early cancer detection, adherence to screening recommendations nationally remains below the USPSTF Healthy People 2030 goals, with 71.8% of eligible adults receiving colorectal cancer (CRC) screenings and 75.9% of eligible adults receiving breast cancer (BC) screenings. Rates are substantially lower in clinics serving uninsured or low-income populations, where 7.5% undergo CRC screenings and 35% receive BC screenings. To enhance preventive care delivery, a patient registry was developed to track age-based eligibility and cancer (CRC and BC) screening orders at an urban, student-run free clinic. Baseline screening percentages were assessed via retrospective chart review of patients seen at the clinic over a 3-year period. Process mapping was conducted to identify steps with high error potential in the cancer screening workflow. A patient registry was implemented over 15 months to track screening eligibility and improve order rates. Data collection focused on the proportion of eligible patients with proper screening orders placed.
Initial data from 2021, 2022, and 2023 showed average screening rates of 18.31% and 12.57% for CRC and BC, respectively. Following initiation of the patient registry, screening rates increased to 34.41% for CRC and 30.28% for BC between January 2024 and March 2025.
These findings suggest that dedicated identification of screening-eligible patients, regardless of chief complaint, improves screening order rates. This approach may facilitate earlier cancer detection and improved prognosis. However, while screening rates for CRC produced a statistically significant improvement, demonstrating early signs of improvement, additional refinement is needed for BC screenings to achieve significant positive change. In the future, a similar process may be applied to other chronic condition monitoring. This approach is also cost-effective and easily replicable for other student-run free clinics.

Nicole Novak

The Veteran Family Healthcare Unit

Authors: Novak N, McBride M, Orban M
Project Mentor: Michael McBride, MD, MS; Psychiatry
Community Partner: Michael Orban

It is known that a military personnel's combat experience can negatively impact themselves and their close family members. Therefore, it is necessary to learn from veteran families to determine how best to serve future families in the post-deployment period. This study was conducted to gain a better understanding of veteran family member's experiences, needs during the transition from deployment to civilian life, resources used and/or wished they had, and additional insight for other veteran families in similar circumstances. In the study, four veteran families were interviewed, and their responses were recorded to provide guidance to other veteran families. It was hypothesized that the veteran families would have similar experiences, needs, resources, and additional insight. However, the experiences, needs, resources, and insight varied. Regardless, it was concluded that providing resources via a health professional to families prior to or soon after the veteran returns home would enable future families to face their trauma with guidance and assistance. Additionally, connecting veteran family members with other veteran families would ensure they can share their stories and support each other in the post-deployment timeframe.

Julia Nowik

The Impact of Acute Pancreatitis in Patients with Liver Failure in a Single Tertiary ICU

Authors: Nowik J, Chunara F, Yang K, Pearson T, Eriksen C.
Project Mentor: Terra Pearson MD, Calvin Eriksen MD; Surgery

Intro:
Acute pancreatitis is linked to serious complications and poses a significant co-morbid risk. Specifically, post OLT patients have an increased risk of mortality due to perioperative pancreatitis and in patients with a history of pancreatitis prior to transplant. The purpose of this study is to evaluate the effect of pancreatitis on mortality ninety days pre- and post-OLT by examining medical history including cause of liver disease, social risk factors, cirrhosis complications, co-morbidities, and medications.
Methods:
A retrospective analysis of a single center institution from the Medical College of Wisconsin was conducted from 2017 to 2020. The inclusion criteria consisted of an evaluation by the Transplant Center team, patients 18 and older, documented liver disease, and a documented episode of acute pancreatitis that met the Atlanta Classification criteria. In total, n=73 met our inclusion criteria. Unless specified otherwise, all statistical tests were two-sided using SAS software, with a p-value less than 0.05 considered statistically significant.
Results:
After performing Chi-square tests, acute kidney injury ($p=0.008$), chronic kidney disease ($p < 0.001$), and diabetes mellitus ($p=0.038$) was found to be higher in patients who did not undergo transplant. Patients who underwent transplant had higher MELD scores approaching statistical significance ($p=0.051$). There is significant evidence that MELD score is related to mortality after controlling for all other variables. For every unit increase in MELD score, the odds of mortality increased by 14%.
Conclusion:
Overall, transplant patient recipients showed decreased mortality rates despite experiencing pancreatitis within ninety days before or after transplant.

Dakota O'Berry, MS

Impact of Social Determinants Health Identification and Intervention in an Academic Health Center

Authors: O'Berry D, Lodes M.
Project Mentor: Mark Lodes, MD; Internal Medicine

Introduction: Social determinants of health (SDoH) are the non-medical factors that influence health outcomes, examples include income and transportation. SDoH capture did not begin at F&MCW until 2019. One resource to address SDoH is social work (SW). At Froedtert Health, the SW team collaborates with physicians to connect patients with resources that may alleviate SDoH needs. Despite this, it remains unclear what impact SW has on the effectiveness of addressing specific SDoH needs. The purpose of this study is to identify if SW referral impacts care gap closure rates for patients with SDoH needs.
Methods: We engaged in a retrospective chart review. Patients were included if they had an F&MCW PCP-attributed positive SDOH screening between January 2019 and December 2022. Of eligible patients, we generated two random sample cohorts: one with a SW referral and one without a SW referral - to compare care gap closure rates. We ran a Chi-square test to determine the difference between the SW and non-SW cohorts with respect to SDoH need(s) identified and compliance with care gap closure. Our analysis included 250 patients with a SW referral and 500 patients without SW referral.
Results: Incidence of SDOH needs varied between cohorts: financial (50% SW vs. 14.5% non-SW), food insecurity (30% SW vs. 11.3% non-SW), housing (25% SW vs. 6.7% non-SW), and transportation (24% SW vs. 7% non-SW). Rates of care gap closure also varied between groups and were higher in the non-SW cohort: influenza vaccine (57% SW vs. 66% non-SW), mammography (45.5% SW vs. 74% non-SW), and recent AWV (70.9% SW vs. 88.1% non-SW).
Conclusions and Next Steps: Our findings show that current SW referral practices provide limited support to SDoH and care gap closure. Given the modest rate of SDoH resolution, focus of ongoing work should be principally directed to effectiveness in partnership with community agencies in resolving these social determinant needs.

Kassandra Ogbodu

Pain relief with targeted muscle reinnervation: does delay to treatment matter in a rodent amputation model?

Authors: Ogbodu, K., Mraz, G., Hoben, G.
Project Mentor: Gwendolyn Hoben, MD, PhD; Plastic Surgery

Background:
Targeted muscle reinnervation (TMR) has shown promise in reducing post-amputation pain, yet its mechanisms remain unclear, particularly in relation to timing. This study investigates how delayed TMR impacts pain modulation and neuronal regeneration in a rat amputation model.
Hypothesis:
TMR performed within 6 weeks of amputation will yield superior analgesia and reduced sensory regeneration compared to delayed interventions.
Methods:
Sprague-Dawley rats (n=16) underwent left hindlimb amputation and were randomized to receive TMR at 1, 3, 6, or 9 weeks post-injury. Pain behavior was assessed using pin (hyperalgesia), acetone (cold sensitivity), guarding, and HomeCage activity tests. Sensory and motor neuron regeneration were quantified via retrograde labeling.
Results:
Early TMR (≤6 weeks) was associated with reduced hyperalgesia and more normalized behavior patterns. However, the 8-week group displayed an unexpected decrease in noxious responses. Sensory neuron analysis revealed a paradoxical increase in dorsal root ganglia counts in later TMR groups, even compared to amputation-only controls, consistent with prior findings. In contrast, motor neuron regeneration favored earlier interventions, particularly in the 1-week group.
Conclusion:
These data suggest that the timing of TMR significantly influences both pain behavior and neuronal regeneration. Early TMR appears to mitigate sensory hyperinnervation while preserving motor integration, supporting a therapeutic window within 6 weeks post-amputation. This has meaningful implications for optimizing TMR use in chronic pain and neuroma management

Chiemerie Ogbonnaya

Assessment of a Pediatric Dermatology Curriculum for Healthcare Providers in Belize

Authors: Ogbonnaya C, Humphrey S, Ng A, Barry K, Bruess G.
Project Mentor: Stephen R. Humphrey, MD; Dermatology
Community Partner: Karl Heusner Memorial Hospital, Belize

Background: In certain settings, particularly those with limited resources, dermatologic care is frequently delivered by primary practitioners due to the shortage of trained dermatologists. This is evident in Belize, where most of the health care providers at the flagship hospital, Karl Heusner Memorial Hospital (KHMH), have no formal dermatology training, yet are tasked with diagnosing and management of pediatric patients. There is a pressing need for educational interventions tailored to local provider needs. Objective/Goal: To evaluate the effectiveness of a virtual pediatric dermatology educational module in improving knowledge and diagnostic skills among healthcare providers in Belize. Methods: A three-part virtual educational series was conducted for medical officers, final-year medical interns, and nurses at KHMH. Each session covered high-yield pediatric dermatologic conditions. A comprehensive pre-test was administered before the first session, followed by mini summative quizzes after each session and a post-test at the end. Participants were analyzed to assess improvement in knowledge and confidence. Results: Median scores increased from 2 to 3 in Session 1, 2 to 4 in Session 2, and 2 to 3 in Session 3. The proportion of participants scoring ≥4/5 increased by 23% in Session 1, 70% in Session 2, and by 26% in Session 3. Overall, 59–78% of participants demonstrated knowledge improvement across sessions. Self-reported confidence improved across all six measured domains, with the most significant gains in addressing caregiver concerns (+48%) and treating dermatologic emergencies (+32%). Conclusion: A tailored dermatology curriculum showed improvement in pediatric dermatologic knowledge among Belizean healthcare providers. Such interventions may serve as effective, low-resource tools to bridge dermatology training gaps in underserved regions.

Qausarat Ogunneye

Lessons Learned from the Implementation of Teledermatopathology in Bagamoyo, Tanzania

Authors: Ogunneye Q, Mmbaga G, Juma O, Mremi A, Magdalena D, Bertan S, Humphrey S, Wanat K.
Project Mentor: Karolyn Wanat, MD; Dermatology
Community Partner: Ifakara Institute of Health; Bagamoyo District Hospital; Kilimanjaro Christain Medical Center

There is shortage of dermatologists and dermatopathologists in Africa. Bagamoyo, Tanzania, has no dermatology or dermatopathology services. To address this, teledermatologic consults were established through a secure teledermatology platform (Africa.telederm.org) to assist clinicians at Bagamoyo District Hospital with expert opinions, diagnosis, and treatment plans. However, complex cases require pathological services. Biopsy services were implemented in June 2023 to address this gap. A teledermatopathology biopsy process will improve diagnosis accuracy, health outcomes, and clinician dermatologic knowledge. In this pilot implementation study, patient cases were submitted to Africa.telederm.org for consultation and reviewed by board-certified dermatologists at the Medical College of Wisconsin. For patients eligible for biopsy, a biopsy was sent to Kilimanjaro Christian Medical Center pathologists. Dermatologists and dermatopathologists reviewed their report and biopsy images to support the diagnosis and treatment plan. A total of 188 patients were uploaded for consults on the teledermatology platform and 20 were eligible for a biopsy, revealing a range of diagnosis, including infectious and inflammatory conditions. The need of dermatologists and pathologists is crucial in Bagamoyo for appropriate treatment. Teledermatopathology decreases costs and facilitates earlier diagnosis for patients. Establishing a structured pathway for these services is vital for sustainability.

Ndidiamaka Ojiako

Integrated Clinical Research Ensembles: A Pathway to Increased Academic Productivity

Authors: Tarima S, Meurer JR, Friedland D, Ojiako N, Anello M, Zimmerman D, McCoy R, Shaker R
Project Mentor: John R. Meurer, MD, MBA; Pediatrics

Introduction: The study objective was to evaluate whether the formation and funding of team science-guided Integrated Clinical Research Ensembles (ICREs) enhance individual faculty productivity, measured by publication and impact factor adjusted citation rates. The setting was a multi-institutional NIH Clinical and Translational Science Award-supported hub.
Methods: Monthly faculty publication and impact factor-adjusted citation rates were analyzed using data extracted from the hub-managed Faculty Collaboration Database (FCD). The FCD imports indexed publications for all faculty members across four academic institutions, drawing from PubMed and faculty curriculum vitae (CVs). A sub-study demonstrated that FCD captured more publications than either faculty CVs or Flight Tracker. Monthly publication counts were modeled using Poisson regression, fitted using generalized estimating equations to account for clustering of observed monthly publication rates of individual faculty. Publication rates were compared before and after ICRE formation and funding, and between faculty in and outside ICREs.
Results: Before joining ensemble teams, ICRE faculty had an 87% higher monthly publication rate than non-ICRE faculty. As ICREs were funded, the monthly publication rate increased an average 72% compared to baseline levels and future citation rates determined by journal impact factors increased by 150%.
Conclusions: Faculty publication and citation rates significantly increased following ICRE funding, demonstrating the potential of structured team science models to boost academic productivity and influence. Faculty inclined to participate in team science through formalized ICREs were already among the more productive faculty.

Elliott Paintsil

Trends in Urban Neighborhood Proximity to Clinics and Emergency Departments, and The Persistence of Economic Access Barriers for Racial and Ethnic Minorities: United States 2011-2019

Authors: Paintsil EE, Linde S, Egede LE,
Project Mentor: Sebastian Linde, PhD, MPhil, MS; Medicine/Health Policy & Management

Objective: This study aimed to characterize neighborhood level health care access barriers across the US, both overall and by the racial and ethnic composition of neighborhoods.
Methods: Our analyses used linear probability and standard regression models to examine neighborhood trends during the period of 2011-2019. Data included 51,623 census-tracts across 48 US states and DC. Our outcome measures include: health care access adequacy indicator measures; share uninsured residents; share of residents living in poverty; share of households without a car; and the share of residents with a disability.
Results: Between 2011 and 2019, we observed a reduction in census tracts with inadequate clinic access; and a reduction in census tracts with inadequate emergency-department access. Pertaining to economic access barriers we find that while average neighborhood poverty rates and uninsurance rates have generally decreased, the opposite trends are observed for disability rates and vehicle ownership rates. Results that further stratify trends by the majority racial and ethnic neighborhood population makeup indicate that while racial minority populations are more likely to reside within neighborhoods with closer proximity to care, these same communities have consistently disproportionately higher levels of uninsurance, poverty, lack of vehicle access and disability.
Conclusion: We find that access adequacy to clinics and EDs was improved between 2011 and 2019. However, while neighborhoods with a majority minority population were found to have the highest access adequacy based on proximity to care, the documented disparities in economic access barriers of these communities may prevent them from utilizing care even if proximate.
Keywords: Access to Care; Distance to Care; Primary Care Clinics; Emergency Departments; Racial and Ethnic Disparities.

Nicholas Parks

A PROOF-OF-CONCEPT PILOT COMPARISON OF LEARNING MODALITIES IN MEDICAL STUDENTS

Authors: Parks N, Chinn M.
Project Mentor: Matthew Chinn, MD; Emergency Medicine

Interactive learning has been shown to provide better learning in terms of test scoring and in retention as compared to traditional instructor-led lectures as well as simple non-interactive videos in medical settings1,2,3,4. First-person video lessons have also yielded better comprehension of learning tasks5. By combining these advantages, we hope to create a first-person interactive video learning tool that covers patient assessment, history taking, and in-the-moment working diagnosis thought processes. This MCW scholarly project entailed a proof-of-concept pilot study compared how participants' pre- to post-test scores changed after viewing either a classic Powerpoint lecture or a first-person video to portray an emergency scenario. 4 current medical students volunteered to participate in 1 of 4 testing conditions involving a first-person video or a Powerpoint lecture to learn the assessment, diagnosis, and treatment of a medical emergency or a trauma emergency. Results of this small study showed a slightly greater improvement in test scores using the video modality compared to the Powerpoint lectures, indicating that there may be some benefit to using first-person videos to educate students in emergency scenarios.

Michael Perry

Plastination of Bone and Coloration of Specimens: Novel Protocols for Plastination at the Medical College of Wisconsin

Authors: Perry M, Hillmer R
Project Mentor: Ryan Hillmer, PhD; Cell Biology, Neurobiology, and Anatomy

In this paper, the discipline of plastination is explored. Plastination involves production of chemically inert anatomical specimens via replacement of water and fat with a hard, durable substance, so that they can be handled without gloves for educational purposes. Medical College of Wisconsin has plastinated several different anatomic specimens such as hearts, kidneys, and other internal organs, but has yet to plastinate a specimen containing bone. The goal of this research was to develop a novel protocol to allow for plastination of whole limb specimens for educational purposes. In the study, several different techniques were identified as being possible avenues for novel protocol implementation. These techniques included using different resins to preserve specimens with bone to reduce muscle shrinkage, as well as drilling of bone to ensure acetone can penetrate the medullary cavity. There are several logistical and technical challenges with new protocols as well, such as dissection hours and the space required to properly work with these specimens. Additionally, coloring of plastinates was explored in this research. Many different techniques are recognized as being effective in the coloration of specimens, including painting, vascular injection using latex or silicone, and dyeing. A protocol for coloring was proposed, using a combination of methyl ethyl ketone, silicone and pigment, after the impregnation step. Alternative coloring protocols, such as vascular injection, were discussed but ultimately are less reasonable to adopt at this time.

Nikita Piryani

The Impact of Exposure to Extracranial Surgery and Anesthesia on Blood Biomarkers after Traumatic Brain Injury

Authors: Piryani N; Roberts CJ; Barber J; Nelson LD; Temkin NR
Project Mentor: Christopher J Roberts, MD, PhD; Anesthesiology
Community Partner: TRACK-TBI

Traumatic brain injury (TBI) triggers the release of neuronal and glial biomarkers due to axonal disruption and blood-brain barrier compromise. Prior studies suggest that extracranial surgery and anesthesia post-TBI may worsen neurological outcomes, potentially due to a secondary cerebral insult. This study aimed to evaluate whether changes in blood biomarkers support the hypothesis that extracranial surgery and anesthesia contribute to secondary brain injury following TBI. A retrospective secondary analysis of the TRACK-TBI database was conducted. Included participants presented within 24 hours of trauma, had a known Glasgow Coma Scale (GCS), and underwent head CT. Patients were stratified by injury type (uncomplicated/complicated mild TBI, moderate/severe TBI, orthopedic trauma control) and surgical status (extracranial surgery vs. no surgery). Biomarker levels of neurofilament light (NFL) and ubiquitin carboxy-terminal hydrolase L1 (UCHL-1) were measured on days 1, 3, 5, and 14. NFL concentrations increased in all groups by day 14, with the greatest rise in surgical moderate/severe TBI patients (Δ=2.60) versus non-surgical counterparts (Δ=1.20). Similarly, surgical complicated mild TBI patients showed a greater NFL increase (Δ=2.35) than non-surgical (Δ=1.90). UCHL-1 levels decreased overall but showed a delayed increase from days 5-14 in surgical moderate/severe TBI patients (Δ=0.20 vs. Δ=0.09 in non-surgical). Elevations in NFL and delayed UCHL-1 increase suggest that extracranial surgery post-TBI may contribute to secondary brain injury. These effects may stem from anesthesia, surgical stress, or polytrauma. Further studies are needed to delineate these mechanisms.

Adam Plotkin

Military Academic Enrichment Elective

Authors: Plotkin A, Rodriguez G
Project Mentor: Kenneth Lee, MD; Physical Medicine and Rehabilitation

Veterans represent a significant patient population in the United States, yet medical education inadequately prepares future physicians to address their unique healthcare needs. While initiatives like the 2011 Joining Forces program sought to integrate military-specific healthcare education into medical curricula, their impact was limited due to inconsistent implementation, lack of standardized training, and diminished institutional support. The Military Academic Enrichment Elective (MAEE) at the Medical College of Wisconsin (MCW) aims to fill this gap by equipping students with the knowledge and skills necessary to provide high-quality, veteran-centered care.

Launched in alignment with MCW's Fusion curriculum, MAEE incorporates interactive sessions covering military culture, trauma-informed care, and veteran-specific health challenges. The elective engages medical students in case-based learning, peer discussions, and simulated patient encounters with veterans to improve competency in history-taking and diagnosis. Early assessments indicate improved military health literacy, increased confidence in veteran patient interactions, and positive feedback from both students and veteran participants.

Despite challenges such as time constraints, instructor availability, and the absence of an Observed Standardized Clinical Exam (OSCE) in its first year, MAEE demonstrates a scalable model for integrating military healthcare education into medical training. Future plans include expanding to additional MCW campuses, incorporating interdisciplinary participation, and developing a standardized curriculum for broader implementation across medical institutions. By fostering a deeper understanding of veteran healthcare needs, MAEE represents a critical step toward enhancing medical education and improving health outcomes for those who have served.

Leah Poulos, MS, BS

Identifying and Mitigating Systemic and Cultural Barriers to Preventative Care in the Hmong and Myanmar Populations

Authors: Leah Poulos, Velinka Medic, Judy E. Kim, MD
Project Mentor: John Meurer, MD, MBA and William Wirostko, MD; Pediatrics and Community Health / Ophthalmology
Community Partner: Milwaukee Consortium for Hmong Health and Prevent Blindness Wisconsin

Preventative care involves life-saving measures, such as routine vision and diabetic retinopathy screenings, that facilitate early detection of disease. Significant disparities in preventative care exist for many racial and ethnic groups in the US, yet limited information exists for subgroups- specifically the Hmong and Myanmar populations. The main goal of this project was analyzing health screening and focus group data from the Milwaukee Consortium for Hmong Health with two aims: to quantify and assess the utilization of vision screening services in the Hmong and Myanmar populations and to determine cultural and systemic barriers to accessing and partaking in vision screening and ophthalmic care. Comparative and qualitative (ANOVA, t-test, 2x2 tests of independence) analysis of survey data was conducted and focus group data was analyzed for recurring themes. Significant differences existed for age and having a dilated eye exam within two years, passing the risk assessment and passing vision screening. Significant interactions between ethnicity, age and having a dilated eye exam within two years; and age, sex, and passing vision screening existed as well. Non-significant differences were observed between Hmong (n = 40) and Myanmar (n = 78) populations regarding age, sex, ophthalmic care, passing the risk assessment and vision screening. Notably, an association was observed between ethnicity and passing vision screening. Thematic analysis highlighted barriers to care, both physical (e.g., cost, transportation) and "invisible"(e.g., discrimination stemming from primary language; insurance and immigration status; religious and cultural beliefs; health literacy). These findings will provide the baseline level of vision screening utilization in the Hmong and Myanmar populations in Milwaukee, which is currently unknown, and be used to mitigate the gaps in healthcare equity experienced by them.

Breeanna Psaris

The Effects of Social Determinants of Health on Children with Bronchopulmonary Dysplasia

Authors: Psaris BM, Dowell JC.
Project Mentor: Jasmine C Dowell, MD; Pediatrics

Background: The chronic lung disease Bronchopulmonary Dysplasia (BPD) is the most common complication of prematurity. BPD is diagnosed in infants in the Neonatal Intensive Care Unit (NICU) who require respiratory support at 36 weeks corrected gestational age (cGA). We investigated associations between social determinants of health (SDoH) in the BPD population with frequency of rehospitalization in the Pediatric Critical Care Unit (PICU) within the first year of life.
Methods: We conducted a retrospective chart review of BPD patients discharged from the Children's Wisconsin (CW) NICU and rehospitalized in the CW PICU within 1-year cGA. SDoH screenings occurred in the NICU, PICU, and clinic and assessed six domains: Caregiver Health, Education, Financial Strain, Housing Stability, Transportation, and Safety. Rehospitalization duration was categorized as brief (≤72 hours) or prolonged (>72 hours).
Results: Among 244 infants diagnosed with BPD (2019-2022), 111 were rehospitalized before 1-year cGA, and 31 (28%) had at least one PICU admission, totaling 48 rehospitalizations. SDoH screening occurred in 93.5% of cases, most commonly in the NICU (95%), followed by PICU (42%) and clinic (29%). Children with positive SDoH screens had longer hospital stays when rehospitalized (median 4 vs. 3 days, p=0.016) and accounted for 72.4% of prolonged PICU rehospitalizations (RR 1.8, p=0.03).
Conclusion: Children with BPD readmitted to the PICU often have SDoH concerns, with positive screens linked to longer hospital stays. There is opportunity to improve screening consistency, as only 10% of patients with known SDoH needs were screened across all care locations. Screening occurred most consistently in the NICU, suggesting the NICU model for SDoH screening may be a helpful guide for quality improvement efforts in other healthcare setting that care for the BPD population.

Ali Qureshi

Characterization of Informal Consults between the Children's Wisconsin Emergency Department and Dermatology: A Retrospective Chart Review

Authors: Qureshi A, Goeser L, Chiu Y
Project Mentor: Yvonne Chiu, MD; Dermatology

Background
Informal "curbside"pediatric dermatology consultations - often initiated via phone with accompanying photos - are increasingly used in emergency departments (EDs), yet their clinical accuracy and documentation remain underexplored. This study evaluates the frequency, content, and diagnostic concordance of such consults at Children's Wisconsin.
Methods
A retrospective chart review was conducted of ED patients who received informal dermatology consults between January 1, 2018, and December 31, 2022. Telephone encounter data, consultation details, follow-up compliance, and diagnostic concordance were analyzed.
Results
Among 3,010 screened encounters, 413 met inclusion criteria. Most consults (94%) involved dermatology residents, with 82% discussed with attending physicians. Photographs were shared in 80% of cases. Medication guidance was provided in 69% of consults, most commonly topical corticosteroids (41%). Follow-up in dermatology clinic was recommended for 79% of patients; 75% complied, with 93% adhering to suggested timing. Diagnostic concordance between ED and dermatology clinic was 68%. Notably, 25% of patients were lost to follow-up, and 5% of consults lacked dermatology documentation.
Conclusion
Informal pediatric dermatology consultations in the ED are increasingly common and offer moderate diagnostic concordance. However, limited documentation, lack of reimbursement, and follow-up loss highlight systemic gaps in the current model. Institutional policies and structured workflows are needed to enhance quality, accountability, and patient outcomes in curbside consults. Further prospective studies are warranted to optimize informal teledermatology in emergency settings.

Ben Rackovan

The effect of radial artery catheterization on post-operative nausea and vomiting

Authors: Rackovan B, Woehlck H, Hang D
Project Mentor: Harvey Woehlck, MD; Anesthesiology

Background: Post-operative nausea and vomiting (PONV) continues to be a common complication of anesthesia. Traditionally, PONV is managed by prophylactic antiemetic drugs. However, recent studies have shown that non-pharmacological interventions can achieve similar outcomes. One of these methods is stimulation of the Pericardium 6 (PC6) acupuncture point. The PC6 point is located between the tendons of flexor carpi radialis and palmaris longus and near the radial artery. Thus, radial artery catheterization could stimulate the PC6 acupuncture point and provide an additional benefit of PONV reduction.
Hypothesis: Patients who have a radial arterial line placed will have reduced incidence of post-operative nausea and vomiting compared to patients who do not have a radial arterial line placed.
Methods: 468 participants who underwent first-time elective spinal surgery from 2019-2022 were identified. Data were collected on placement of radial arterial line, incidence of post-operative nausea and vomiting, and potential confounding factors. Participants were divided into two groups based on if they had a radial arterial line placed. Logistic regression was performed for multivariate analysis between groups.
Results: Among male patients, 11/121 (9.1%) patients with radial arterial lines experienced PONV while 12/109 (11.0%) patients without radial arterial lines experienced PONV ($p = 0.68$). Among female patients, 11/111 (9.9%) with radial arterial lines experienced PONV compared to 28/127 (22.0%) patients without arterial lines ($p = 0.03$).
Conclusion: Radial arterial lines seem to have a protective effect against PONV that is limited to female patients. This could be considered when making the decision of whether to place a radial arterial line during surgery.

Mahmudur Rahman, MS

Intramedullary Stress and Strain Correlate with Neurological Dysfunction in Degenerative Cervical Myelopathy

Authors: Rahman M, Devaraj KB, Chauhan O, Harinathan B, Yoganandan N, Vedantam A.
Project Mentor: Aditya Vedantam, MD; Neurosurgery

Introduction:
Intrinsic intramedullary stress and strain during neck motion contribute to degenerative cervical myelopathy (DCM) pathophysiology, but their relationship with neurological dysfunction remains unclear. Using patient-specific biophysical spinal cord modeling, we aimed to determine clinical correlates of intramedullary stress and strain in DCM.
Methods:
Twenty DCM patients underwent three-dimensional biophysical modeling of the cervical spine and spinal cord. von Mises stress and maximum principal strain at the maximum compression level were quantified during simulated neck flexion and extension. Pre-surgical hand and balance function were assessed, and intramedullary stress and strain were correlated with functional outcomes, adjusting for age.
Results:
The mean age was 62.7±11.6 years with 13 females and 7 males. The mean intramedullary stress and strain at the level of maximum compression during flexion was 7.6±3.7 kPa and 4.3±2.0% respectively. Increased intramedullary strain in flexion at the level of maximum compression correlated with decreased right-hand (RH) sensation (r= -0.58, p=0.014), decreased RH dexterity (r= -0.50, p=0.048), and increased RH dexterity time (r=0.52, p=0.039). Increased intramedullary stress at the level of maximum cord compression during flexion correlated with decreased RH sensation (r= -0.55, p=0.023), decreased RH dexterity (r= -0.536, p=0.032), and increased RH dexterity time (r= 0.55, p=0.026). Intramedullary stress at maximum spinal cord compression during flexion was significantly greater for patients with severe DCM (11.1± -4.4 kPa) as compared to those with mild/moderate DCM (6.7±3.0 kPa, p=0.03).
Conclusions:
Higher pre-surgical intramedullary stress and strain during neck flexion correlated with hand dysfunction and disease severity. These findings highlight the role of neck flexion in DCM pathophysiology and demonstrate the potential clinical utility of spinal cord biomechanics in diagnosis.

Huzaifa Razzaq

Evaluation of a new sleep focused nasal obstruction symptom evaluation (NOSE) tool

Authors: Sharma A, Zahir N, Woodson BT, Razzaq H, Young R
Project Mentor: B Tucker Woodson, MD; Otolaryngology

Introduction: Nasal obstruction is a common patient complaint in the sleep clinic. The nasal obstruction symptom evaluation (NOSE) scale is a validated questionnaire to assess symptoms and quality of life. However, it has weaknesses when evaluating patients in the sleep clinic because it does not differentiate awake and sleep related nasal obstruction. The goal was to compare the established NOSE scale to a modified NOSE scale that distinguishes awake and sleep related nasal obstruction.
Methods: A retrospective study was completed to compare the known NOSE scale with a revised clinical scale that separates sleep and awake related nasal symptoms (new Sleep NOSE and new Awake NOSE). 249 adult participants completed the 3 scales in a sleep clinic specializing in otolaryngologic interventions. The collected data compared median scores (Wilcoxon's signed rank test), agreement (Cohen's kappa), and correlation (Spearman correlation). Wald's test was also used to compare the scores between subgroups of insomnia and obstructive sleep apnea (OSA).
Results: The NOSE scale scores were not significantly different from the new Sleep score (p=0.4) but were significantly different from the new Awake scale (p<0.001). The new Sleep NOSE scores were also significantly higher than the Awake NOSE scores (p<.001). Patients who displayed symptoms of insomnia also tended to score higher on the Sleep NOSE scale compared to the Awake NOSE scale.
Conclusions: This study suggests that in the sleep clinic setting, patients tend to score the NOSE scale according to sleep-related obstruction symptoms. In addition, insomnia patients relate more nighttime than daytime nasal obstruction. Further studies are needed to determine if the NOSE scale needs to be revised to better encompass nasal complaints related to sleep.

Hope M Reecher

Development of acute post-operative phenomena following corpus callosotomy or hemispherotomy for pediatric drug-resistant epilepsy: characterization for family counseling

Authors: Reecher HM, Pfaffenbach K, Koop JI, Huang S, Kim I, Lew SM.
Project Mentor: Sean M Lew, MD; Neurosurgery

INTRO
Corpus callosotomy (CC) and hemispherotomy are surgical options for pediatric medically-resistant epilepsy (MRE). Disruption of the corpus callosum creates an acute disconnection syndrome encompassing numerous phenomena, not characterized in pediatric literature. Our goal was to characterize these phenomena to counsel families for post-operative expectations.
METHODS
Retrospective review was completed for pediatric patients (<18 years) with MRE who underwent callosotomy or hemispherotomy, excluding revision or extension. Postoperative phenomena included: fever (≥38.5 °C), loss of appetite (LOA) necessitating nasogastric or gastrotomy tube, worsened pre-existing hemiparesis, and altered mentation (AM). Fisher's Exact tests and logistic regression were used to determine relationships and elucidate predictive features of phenomena development, respectively.
RESULTS
Ninety-six patients were included (27 CC, 69 hemispherotomy) with a mean surgical age of 7.4 years and seizure-onset at 22.1 months. The most common phenomenon was LOA (79/96,82.3%, mean duration 8.4 days), followed by fever (66/96, 68.8%, 3.2 days) and AM (59/96,61.6%, 5.4 days). Half of patients with pre-existing hemiparesis (33/66) experienced worsening for a mean duration of 10.3 days, predominantly following hemispherotomy (29/33,87.9%). Patients with postoperative hydrocephalus were more likely to have AM (p=0.02, OR 5.8). Patients who underwent hemispherotomy were more likely to develop fever (p=0.03, OR 3.6). Among lateral and vertical hemispherotomy patients, each 1-year increase in surgical age lowered the risk of developing fever (OR 0.85).
CONCLUSION
We describe a pediatric cohort who underwent callosotomy or hemispherotomy and elucidate descriptive features of postoperative phenomena. We postulate that phenomena are secondary to individual patient variability, rather than procedural or epilepsy-specific characteristics.

Misty Rezk

Surgical outcomes from Laser Interstitial Thermal Therapy (LITT) versus open craniotomy for treatment of recurrent metastatic brain tumors at Froedtert Hospital from 2020-2024

Authors: Rezk MR, Treffy RW, O'Berry D, Tosso M, Krucoff MO
Project Mentor: Max O Krucoff, MD; Neurosurgery

Background: The mainstay of local treatment for brain metastases is stereotactic radiosurgery (SRS). When radiographic progression or recurrence of these lesions is seen after treatment, this can be due to tumor recurrence or radiation necrosis (RN), often requiring pathological tissue confirmation to differentiate. Standard of care options have been biopsy and/or open craniotomy, but a new treatment option, Laser Interstitial Thermal Therapy (LITT) has emerged for treatment of these lesions at this timepoint. LITT is a minimally invasive procedure that utilizes a laser fiber probe to achieve targeted thermal ablation of tissue. Here we compare the surgical outcomes and survival rates of patients at our institution who underwent LITT versus open craniotomy for radiographic progression after SRS between 2020 and 2024. Methods: A retrospective chart review was conducted for patients, 18 or older, who underwent LITT or open craniotomy for the treatment of recurrent brain metastases or radiation necrosis at Froedtert Hospital under a single surgeon. Descriptive statistics analyzed pathology, surgical complications, neurological deficits, extent of resection or ablation, length of hospital stay, and tumor size. Results: A total of 18 LITT and 21 open craniotomy procedures were identified (n=39). Both groups had similar complication rates without significant differences. The LITT group had a shorter length of stay (2.56 versus 4.19 days, p = 0.1149). Tumor size was significantly smaller in the LITT group (2.02 cm versus 3.0 cm, p=0.0055), but survival rates were similar between the two groups (p>0.05). Conclusions: This study suggests that both LITT and open craniotomy offer similar outcomes regarding complication and survival rates. LITT may be particularly effective for smaller tumors. Future research with larger, prospective, multi-center cohorts is needed to confirm these findings and evaluate long-term patient quality of life and functional outcomes.

Geoffrey Carl Rodriguez

Military Academic Enrichment Elective

Authors: Rodriguez GR, Plotkin AP, Hayes ML, Lee K
Project Mentor: Kenneth Lee, MD; Physical Medicine and Rehabilitation

Veterans represent a significant patient population in the United States, yet medical education inadequately prepares future physicians to address their unique healthcare needs. While initiatives like the 2011 Joining Forces program sought to integrate military-specific healthcare education into medical curricula, their impact was limited due to inconsistent implementation, lack of standardized training, and diminished institutional support. The Military Academic Enrichment Elective (MAEE) at the Medical College of Wisconsin (MCW) aims to fill this gap by equipping students with the knowledge and skills necessary to provide high-quality, veteran-centered care.

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Despite challenges such as time constraints, instructor availability, and the absence of an Observed Standardized Clinical Exam (OSCE) in its first year, MAEE demonstrates a scalable model for integrating military healthcare education into medical training. Future plans include expanding to additional MCW campuses, incorporating interdisciplinary participation, and developing a standardized curriculum for broader implementation across medical institutions. By fostering a deeper understanding of veteran healthcare needs, MAEE represents a critical step toward enhancing medical education and improving health outcomes for those who have served.

Alexander Rosiejka

Clinical Presentation and Diagnostic Patterns of Multisystem Inflammatory Syndrome in Children in a Pediatric Emergency Department

Authors: Rosiejka A, Thomas D, Nimmer M, Walsh P
Project Mentor: Patrick Walsh, MD, MS; Pediatrics

Objective: To describe emergency department (ED) evaluations of children with suspected Multisystem Inflammatory Syndrome in Children (MIS-C) and to determine differences between children eventually diagnosed with MIS-C versus alternative diagnoses. Methods: This was a retrospective review of children evaluated for MIS-C in a single pediatric ED, July 2020 to December 2022. We included children evaluated using our MIS-C order panel. We compared clinical and laboratory characteristics of children diagnosed with MIS-C to those with alternative diagnoses. We used logistic regression to determine factors associated with MIS-C diagnosis. Results: There were 792 children included in the study, of which 86 (11%) were diagnosed with MIS-C. Cases of MIS-C decreased over time. Children with MIS-C were older (median age 7.4 vs 2.9 years, $p < 0.001$) and had greater odds of cardiac (OR: 50.4, 95% CI: 27.4-96.4), mucocutaneous (OR: 3.57, 95% CI: 2.18-6.04), gastrointestinal (OR: 2.36, 95% CI: 1.36-4.36), and hematologic (OR: 8.81, 95% CI: 5.41-14.4) system involvement than those with other diagnoses. Odds of MIS-C were reduced in those with a positive viral test (OR: 0.12, 95% CI: 0.02-0.41) but alternative diagnoses made prior to the ED visit did not significantly change risk of MIS-C. Conclusions: Diagnosing MIS-C in the ED remains challenging due to overlapping features with other illnesses. Symptoms present in the MIS-C diagnostic criteria increased risk, while positive viral tests reduced risk. These results provide additional data to aid ED clinicians in risk stratification of children with suspected MIS-C.

Hailey Ruplinger

Patient Demographics and Diagnoses of "Unnecessary" Emergency Department Visits

Authors: Ruplinger H, Jacobson N, Sonnenberg T, Nickel L, Khan S, Pavlic A.
Project Mentor: Ashley Pavlic, MD, MA; Emergency Medicine

Background:
Emergency Department (ED) visits have been progressively increasing since 2021, which impacts patients, families, healthcare workers, and insurance companies in terms of burnout and cost. Limiting the number of unnecessary visits is imperative.
Objective:
The current study reviews the demographics and diagnoses of patients coming to the ED for nonemergent concerns.
Methods:
Data was collected and analyzed in a retrospective cohort study of adults 18 and older at one institution. Emergency department visits from a week in June and a week in November were filtered to include only "unnecessary visits." Each ED visit was analyzed and deemed "unnecessary" by reviewing the procedures done and medications administered during the visit. The results were compared to the "necessary"ED visits of the same timeframe.
Results:
The top diagnoses of unnecessary ED visits were generalized pain, abdominal pain, and cold or flu-like symptoms. Analysis of patient demographics for these encounters produced an average patient age of 39 (SD= 15.73), single, working full time, and living in a high index area of deprivation (ADI). Most unnecessary visits were from patients who had a primary care physician on file and had Medicare or Medicaid insurance. A majority of patients were black and non-Hispanic. When compared to the necessary ED visits, there was statistically significant difference in age, race, and employment status.
Conclusions:
Our study identified common chief complaints and demographic factors that correlate with ED encounters that do not require an ED-specific resource.

Tariq Saleh

Comparing procedural costs and early clinical outcomes of robotic extended totally extraperitoneal (eTEP) with intraperitoneal onlay mesh (IPOM) repair for midline ventral hernias

Authors: Saleh T, Kastenmeier A, Lak K, Higgins R, Goldblatt M, Tan W
Project Mentor: Wen Hui Tan, MD; Surgery

Introduction: The extended totally extraperitoneal (eTEP) repair has several theoretical advantages over the traditional intraperitoneal onlay mesh (IPOM) repair for ventral hernias, including the use of cheaper non-barrier coated mesh and avoiding complications of intraperitoneal mesh. However, one area in need of further investigation is cost and clinical comparisons following robotic eTEP with IPOM.
Methods: A retrospective matched cohort study was conducted of patients with midline ventral hernias undergoing robotic eTEP or IPOM at a single academic institution from November 2019-August 2023. Patients were matched based on age, BMI, ASA class, hernia defect size, and whether they underwent concomitant procedures. Primary outcomes included supply costs. Secondary outcomes included operative time, length of stay, complications, recurrence, and inpatient opioid utilization.
Results: 88 matched patients were included: 44 IPOM and 44 eTEP. Mean age was 57 years, BMI 35 kg/m2, and 54.5% were male. Hernia size was similar for both groups: 25 [6-73] cm2 for the IPOMs vs 40 [14-68] cm2 for eTEPs (p=0.21). There was no significant difference in total supply costs between IPOMs and eTEPs: $2338 [2021- 3249] vs $2082 [1619-3394] (p=0.5) respectively. Mean operative time was significantly lower for IPOMs 159.6±57.8 min vs 198.0±67.1 (p=0.006), while the average length of stay was significantly longer for IPOMs: 1.7±1.2 days vs 1.2±1.3days (p=0.021). Total inpatient MME utilized was greater for IPOM: 61 [36-102] vs 29 [10-64] MME (p=0.003). Postoperative complications and recurrence rate were similar; 30-day readmissions and ED visits were more frequent for IPOMs.
Conclusion: There is no difference in total supply costs between patients undergoing robotic IPOM and eTEP repairs for midline ventral hernias. Though this study did find significant differences in total inpatient MME utilized and length of stay, it is debatable whether these are clinically significant.

Christopher Salmon

Clinical Outcomes in Three Bilateral Transfemoral Amputees Treated with Osseointegrated Prostheses for the Rehabilitation of Amputees (OPRA) Implant System

Authors: Salmon C, Del Toro D, Neilson JC,
Project Mentor: John C. Neilson, MD; Orthopaedic Surgery

Transfemoral amputees are typically fitted with socket-based prostheses, but about 70% experience discomfort, pain, and other issues from ill-fitting sockets, limiting mobility and quality of life. These issues are amplified in bilateral above-knee amputations, as the ischial-bearing design of the sockets can lead to significant discomfort if the two sockets interact with each other. The Osseointegrated Prostheses for the Rehabilitation of Amputees (OPRA) system, introduced in Sweden in 1999, is well documented in unilateral (UL) amputees, but limited data exists on its use in bilateral transfemoral amputees (BL TFA). This retrospective study evaluates the clinical outcomes of three BL TFA patients who underwent osseointegration with OPRA between 2019 and 2023. All completed both Stage 1 and Stage 2 surgeries, with at least 1 year of follow-up. Data was collected from medical records, including demographics, clinical history, and postoperative outcomes. Mobility was assessed using prosthetic wear time (PWT), prosthesis use score (PUS), and functional mobility measures, including the Timed Up and Go (TUG) test and gait speed. The average follow-up period was 30.33 months(m), with improvements in prosthetic use, mobility, and functional mobility. Postoperative PWT increased to 12.33 hours/day, and PUS improved to 77.43. Patients demonstrated enhanced gait speed and TUG performance, though some experienced falls. Complications were limited to superficial infections. The OPRA system improves mobility, prosthetic use, and rehabilitation outcomes in BL TFA amputees. These findings demonstrate osseointegration as a viable alternative to conventional socket-based prostheses for BL TFA and sometimes is the only option to improve patients' mobility.

Janay Saunders

The Relationship between Social Risk Factors and Processes of Care in a Nationally Representative Sample of Adults with Type 2 Diabetes

Authors: Williams J, Saunders J, Yilin X, Bhandari S, Egede L.
Project Mentor: Joni Williams, MD, MPH; Medicine

Aim:
To assess the independent relationship between social risk factors and processes of care in adults with type 2 diabetes.
Methods:
Data from 5,066 adults with type 2 diabetes from the National Health Interview Survey between (2016-2017) were analyzed. Outcomes included six processes of care measures: Physician Visits, Eye Examinations, Foot Examinations, Blood Sugar Test, and Influenza Vaccination (all in the last 12 months); and Pneumonia Vaccination (ever). The independent variables were five social risk factors (economic instability, lack of community, lack of education access, food insecurity, lack of health care access). Logistic regression assessed the independent association between each outcome and each social risk factor.
Results:
In the fully adjusted models, lack of health care access was associated with lower odds of physician visits and influenza vaccination. Lack of education access was associated with lower odds of physician visit, blood sugar testing, and influenza and pneumonia vaccination. Food insecurity and economic instability were associated with higher odds of having physician visits and receiving foot exams, respectively.
Conclusions:
Our study showed significant associations between social risk factors and processes of care. Specifically, lack of education access and lack of health care access were significantly associated with multiple processes of care.

Maureen Schick

Social Vulnerability Index Predictive of Being ‘Left Not Seen' in the Emergency Department

Authors: Schick, M., Jacobson, N., Fumo, N., Nickel, L., Aranda, J., Mackenzie, R.
Project Mentor: Nancy Jacobson, MD; Emergency Medicine

Study Objective: This study assesses whether the Social Vulnerability Index (SVI) predicts the likelihood of being 'Left Not Seen' (LNS) in the emergency department (ED). A cohort of 73,044 patient encounters between May 1, 2022 and April 30, 2023 in an academic, urban, tertiary care ED was analyzed using logistic regression to evaluate for SVI as a predictor of LNS disposition.
Methods: Patient addresses were geocoded using ArcGIS Pro 3.3 to obtain SVI data at the census tract level. Overall SVI and its four component themes (socioeconomic status, household characteristics, racial and ethnic minority status, housing type and transportation) were analyzed for predictive value. Statistical models assessed LNS likelihood for every 0.1-unit increase in SVI.
Results: LNS patients accounted for 5.4% (3,880) of total patient encounters, with higher mean SVI scores (0.73, SD = 0.27) compared to seen patients (0.67, SD = 0.30, $p < 0.001$). Each 0.1-unit increase in SVI was predictive of a 7% increase in the likelihood of being LNS ($p < 0.01$). Among component themes, racial and ethnic minority status showed the strongest correlation, with a 13% increase in the likelihood of being LNS per 0.1-unit increase in SVI.
Conclusions: Higher SVI scores strongly predicted being LNS overall and across all themes. SVI may be used to predict a person's risk of limited access to emergency care, as represented by arriving at the ED but leaving before being seen. Integrating SVI into ED and health system workflows could aid in identifying at-risk populations, addressing systemic barriers, and improving equitable access to care.

Nathan Schimpf

Oscillatory Brain Activity During Verbal Short-Term Memory

Authors: Nathan Schimpf, Vahab Youssofzadeh, Isabelle Banke, Katrina Erickson, Candida Ustine, Jeffrey Binder, Priyanka Shah-Basak
Project Mentor: Priyanka Shah-Basak, PhD; Neurology

Background: Language relies on dynamic and rapid neural processes emerging across a large network of brain regions. A physiological mechanism that supports interregional communication across a brain network is thought to be synchronized neural oscillatory fluctuations, enabling interregional information transfer. A rich literature indicates that interregional synchronization coordinates interactions between frontotemporal regions to temporarily store multiple visual items in a specific order; however, oscillatory connectivity is not well-studied in the context of language and language-related short-term memory (STM). We focus on one linguistic process referred to as the phonological short-term memory (pSTM) to investigate oscillatory underpinnings in older healthy controls (HC). PSTM is critical for holding strings of words during conversational exchanges and comprehension of long sentences.
Aims: Determine the frequencies and neural correlates of oscillatory activity during pSTM (1) and determine physiological connectivity correlates of pSTM (2) in older healthy individuals.

Study Methods: 16 healthy participants completed a magnetoencephalography (MEG) experimental paradigm with two tasks to capture neural oscillatory activity during a task demanding pSTM compared to control tone task. MEG data were analyzed during the delay period and contrasted between pSTM and tones.
Results: We find significant spectral power differences representing pSTM processing in Theta, Alpha, and Beta frequencies broadly localized to temporoparietal, inferior frontal, and dorsal frontal regions. These regions are associated with the dorsal stream of language processing.
Conclusion: Preliminary results describe neural correlates of oscillatory activity during pSTM, supplementing future research and rehabilitation efforts.

Natalie Schmidt

Can Surface Topography Reliably Determine the Rigo Classification System?

Authors: Schmidt N, Thiessen A, Selthafner M, Liu XC.
Project Mentor: Xue-Cheng Liu, MD, PhD; Surgery

Purpose No studies have explored the reliability of the Rigo classification system using surface topography (ST), which would allow optimization without radiation exposure. This study aims to measure and compare the intra- and inter-observer reliability (Kappa values) and accuracy of the Rigo system between ST and X-ray for overall types and subtypes.
Methods X-ray and ST images of 31 adolescent idiopathic scoliosis patients were selected. Three investigators were blinded to assess images using the Rigo system, twice for each patient on different weeks, with 372 overall image readings. Afterwards, all investigators agreed upon the correct Rigo scores for finalized classifications.
Results For Rigo types, the average intra-observer Kappa value was slightly better for ST (0.77, $p<0.001$) than X-ray (0.75, $p<0.001$). For Rigo subtypes, the average intra-observer Kappa value was again slightly better for ST (0.74, $p<0.001$) than X-ray (0.65, $p<0.001$). The inter-observer reliability was expectedly lower than intra-observer, with ST (0.53, $p<0.001$) comparable to X-ray (0.54, $p<0.001$) for the type. For subtype inter-observer reliability, ST (0.43, $p<0.001$) was slightly better than X-ray (0.36, $p<0.001$). For the type, the overall accuracy of the observers was slightly lower for ST (77.96%) than X-ray (79.57%). For the subtype, the accuracy of observers was slightly higher for ST (70.97%) than X-ray (65.05%).
Conclusion ST-based Rigo system demonstrates very good intra-rater reproducibility and moderately good inter-rater reproducibility. Surface topography is comparable to X-ray for the Rigo system, and therefore can be considered a reliable alternative in clinical application.

Samuel Schonfeld

The Effect of Firearm Concealed Carry Legislation on Rates of Firearm-Related Violent Crime Fatalities

Authors: Schonfeld S, Davis C
Project Mentor: Christopher Davis, MD, MPH; Surgery

Firearms and their legislative restrictions have been a major topic of debate throughout the past couple of decades, specifically the restrictions on firearm concealed carry. Past studies demonstrated mixed results regarding a correlation between carry legislation and violent crime deaths. This study investigated the past 10 years to determine if any relationship exists between leniency of concealed carry laws and rates of firearms-related death rates. CDC WONDER database was used to obtain rates of firearms-related homicide and assault deaths in each state from 2014 - 2023. State legislation was assessed and given a number designation depending on leniency - unrestricted, permitless carry; shall-issue; may-issue; and no carry. Trends were observed and pairwise comparisons were performed to determine statistical differences between levels of legislative leniency. During the study period, all states demonstrated some level of concealed carry legislation and permitting. Rates of firearms-related homicide and assault deaths increased across all groups. Overall, shall-issue states showed the highest rates, significantly different from permitless carry and may issue states. However, only shall-issue and may-issue states differed significantly when group averages were assessed. The varied significance levels across analyses brings into question the true impact of these group differences. The increasing death rates across all groups indicate that concealed carry legislation alone is likely not a driving factor for these violent crime rates. More in-depth research is needed to determine root causes for these increasing violent crime rates and drive effective change to decrease this loss of life.

Kristin M Seidler

Social Determinants of Health and Multiple Myeloma Outcomes

Authors: Seidler, KM, Dong, J, Knight, JM
Project Mentor: Jennifer M Knight, MD, MS,; Psychiatry

Background: Multiple myeloma (MM) is the second most common hematologic malignancy, with known disparities in incidence, treatment, and outcomes across racial groups. While initial theories attributed these disparities to differences in treatment modalities or genetic mutations, studies have not been able to fully explain outcome differences. Social determinants of health (SDOH) - non-medical influences such as socioeconomic status, neighborhood safety and healthcare access - are increasingly recognized as key contributors to these disparities.
Methods: We conducted a retrospective cohort study of 4,909 patients diagnosed with MM between 2005 and 2023 at MCW/Froedtert using data extracted from the i2b2 database. Patients were identified via ICD-9 and ICD-10 codes and included if they had a documented diagnosis date and valid home address at diagnosis. A subset (n=2,788) was geocoded to link with census-tract-level SDOH variables, including poverty, unemployment, redlining, and food access. Descriptive statistics were calculated using R.
Results: Among 4,909 patients with a diagnosis date, the average age at diagnosis was 65 (IQR: 59-74), and 55.5% were male. At time of chart review, 61.6% were alive. Average survival was 39 months (IQR: 8-59). Demographics aligned with known MM patterns, providing a robust foundation for SDOH-based analysis.
Conclusions: This study establishes a large, well-characterized MM cohort with integrated neighborhood-level SDOH data. Future analysis will investigate how specific social and environmental factors influence MM survival, with the goal of identifying modifiable risk factors and informing strategies to reduce disparities and improve health equity.

Maria V. Sgro, MS

Traumatic Injuries & Economic Barriers to Care in Hawassa, Ethiopia

Authors: Sgro MV, Jaraczewski TJ, Iverson KR, Basmayor AM, Ergete A, Gemechu M, Schroeder M, Ambushe D, Dodgion CM, Tesfaye E
Project Mentor: Christopher Dodgion, MD, MSPH, MBA; Surgery
Community Partner: Hawassa University College of Medicine and Health Sciences (Hawassa, Ethiopia)

Introduction
Traumatic injuries account for over five million deaths annually, disproportionately affecting low- and middle-income countries. In Ethiopia, where nearly a quarter of the population lives below the national poverty line, financial barriers to trauma care contribute significantly to persisting health inequities. This study assessed the economic impact of trauma care in Ethiopia to guide public health strategies focused on improving access and reducing financial burdens.
Methods
A cross-sectional study was conducted from June to August 2023, administering a validated survey to adult trauma patients at Hawassa University Comprehensive Specialized Hospital. Key variables included demographics, household income and expenditures, healthcare costs, and financial coping mechanisms. Univariate and multivariate analyses were performed to assess associations and predictors of high health costs and catastrophic health expenditure.
Results
Among 97 participants, nearly 90% lacked health insurance. The median hospitalization cost was 10,428 ETB (190 USD), with medication being the largest expense (2,427 ETB, 44 USD) after admission fee (3,500 ETB). Univariate analysis showed patient residence, surgical treatment, household size, and length of stay were associated with costs. Multivariate analysis identified surgical treatment, rural residence, and length of stay as significant predictors of high costs, while residence within Sidama was protective. Half (50.5%) of participants experienced catastrophic health expenditure, with common financial coping strategies including loans (47.4%) and asset sales (40.2%).
Conclusions
This study underscores the significant financial burden of trauma care in Ethiopia, with a considerable proportion of patients experiencing catastrophic health expenditure. The findings emphasize the urgent need for targeted interventions to expand healthcare access, strengthen emergency services, and alleviate the financial burdens of care.

Ipsit Shah

From Diagnosis to Consultation to Correction: Influences on Pediatric Chest Wall Deformity Management

Authors: Shah I, Schick M, Berridge K, Swanson R, Brimeyer C, Densmore J, Hainsworth K.
Project Mentor: Keri Hainsworth, PhD; Anesthesiology

Background
Congenital chest wall deformities such as pectus excavatum (PE) and pectus carinatum (PC) are often corrected electively, yet disparities in surgical access remain underexplored. While most studies focus on postoperative outcomes, few investigate disparities along the care continuum, particularly at the points of consultation and surgical decision-making.
Objective
To evaluate demographic, clinical, and socioeconomic factors associated with (1) likelihood of surgical consultation and (2) decision to undergo corrective surgery for pediatric PE and PC.
Methods
A 10-year retrospective cohort study was conducted at a tertiary pediatric center using electronic health record data. All patients with PE or PC from 2014-2024 were identified. Demographics, comorbidities, and neighborhood-level socioeconomic status (Childhood Opportunity Index, COI) were analyzed for associations with consultation and surgery.
Results
Of 3,884 patients, 42.3% attended a surgical consultation and 8.7% underwent corrective surgery. Patients from lower COI areas, females, Black patients, and those with psychological comorbidities were significantly less likely to attend consultation ($p < 0.05$). Among those seen in clinic, surgical decisions were associated with diagnosis type (PE > PC), Haller Index, and respiratory comorbidities, but not race or sex. Hispanic patients were less likely to proceed with surgery ($p = 0.021$), and patients from very low COI areas were underrepresented among surgical cases ($p = 0.001$).
Conclusion
Disparities in pediatric chest wall deformity care primarily arise at the point of consultation, not surgical decision-making. Interventions targeting early referral, especially for underserved groups, may improve equity in access to corrective procedures.

Tessa Shankey

Influence of a Change in Post-Procedure Discharge Opioid Prescription Protocol in cTACE Patients

Authors: Shankey, TF, Skummer, PT, Perez, A, White SB, Rilling, WS, Smolock AR, Hohenwalter, EJ, Scheidt, MJ
Project Mentor: Matthew Scheidt, MD; Radiology

Purpose: To evaluate the impact of a change in discharge opioid prescription protocol after conventional transarterial chemoembolization (cTACE).
Methods: Retrospective review of cTACE patients between 5/2021-4/2024 was performed. Patients were divided into pre-protocol and post-protocol groups. Protocol change (05/2022) reflected transition from prescribing opioids for all cTACE patients to a tailored algorithm minimizing discharge opioid prescriptions. Exclusions included non-hepatic cTACE, incomplete pain and opioid prescription documentation, or follow-up less than 30d. Patient demographics, relevant oncologic history, intra-procedural details, pain scores, complications, and opioid prescriptions for 30d post-procedure were recorded. Chi-squared, Fischer's exact, Mann-Whitney U, and linear regression analyses were performed to evaluate factors impacting post-discharge opioid use.
Results: 136 patients undergoing first cTACE were reviewed (pre-protocol, n=68 and post-protocol, n=68). HCC (51/68 (75.0%) vs 44/68 (64.7%)) and NETs (9/68 (13.2%) vs 19/68 (27.9%) were the predominant malignancies treated, which were significantly different between groups (p=0.02). Protocol change resulted in significantly fewer post-procedure opioid prescriptions (28/68 (41.2%) vs 56/68 (82.4%), p<0.001) and median morphine milligram equivalents (MME) 15 (range: 0-195) vs 90 (0-480), p<0.001). There was no significant difference between groups in reported post-procedure pain after discharge (35/68 (51.5%) vs 26/68 (38.2%), p=0.12). The change in protocol did not result in significantly increased opioid prescriptions for pain after discharge (p=0.37). Opioid MME by IR was significantly lower in the post-protocol group (B=-50.1, p<0.01).
Conclusion: A revised discharge opioid prescribing practice for patients post cTACE results in significantly fewer opioid prescriptions and total MME without increased rates of reported post-procedure pain or delayed opioid prescriptions for pain.

Mukul Sharda

Evaluating Patient Experience with In-Person Versus Virtual Vasectomy Consultations

Authors: Paradzinsky MG, Sharda M, Ellison JS, Jin Y, Szabo A, Sandlow JI, Dietrich PN.
Project Mentor: Peter N. Dietrich, MD; Urologic Surgery

Introduction: Virtual consultations for vasectomy are increasing without impact on procedure completion, but current evaluation of patient experience is limited. We aimed to understand differences in patient preference and vasectomy procedure experience by consultation type.
Methods: Patients scheduling vasectomy consultation with two fellowship-trained infertility specialists at our institution between October 1, 2022 to December 31, 2023 were provided the option of an in-person or virtual visit. There was no difference in appointment availability based on consult modality. Patients were offered post-procedure surveys to assess procedural satisfaction, pain rating, preferred consult modality, and anxiolytic use. Demographic data and clinical characteristics were collected via retrospective chart review. The primary outcome was difference in post-vasectomy preference for consultation method between the in-person and virtual groups. Statistical analyses were performed using R Core Team.
Results: A total of 169 patients completed the survey following their vasectomy, of which 129 (76%) had an in-person consult while 40 (24%) had a virtual consult. Five patients who had an in-person consult reported they would have preferred to have a virtual consult. In the virtual cohort, three patients would have preferred an in-person consult. No statistical difference was observed between the groups regarding preference for alternate consult type (p=0.39). There were also no differences in pain rating or reported comfort with vas manipulation by consultation modality (p=0.21 and p=0.17, respectively).
Conclusions: Most patients still choose in-person consultations over virtual consultations for vasectomy despite equal availability to both, and patients report similar satisfaction and pain scores regardless of their consultation method. Virtual consultation can be offered without compromising patient experience.

Jerilyn Simons

A Quality Assessment of Patients Presenting to Froedtert Emergency Department with Chest Pain: Does Treatment Differ Between Sexes?

Authors: Simons J, Aranda J, Chinn M, Rubin J, Jacobson N
Project Mentor: Nancy Jacobson, MD; Emergency Medicine

Up to 8% of patients presenting to the emergency department (ED) arrive with €˜chest pain' as their chief complaint. The timely identification of ACS and acute myocardial infarction (MI) is of the utmost importance in preventing mortality and morbidity in these patients, yet MI's have been shown to be a missed diagnosis more often in women than men.
We hypothesized that diagnostic assessments and treatments would significantly differ between men and women presenting to Froedtert ED with chest pain as their chief complaint.
This was a retrospective observational project and data was collected for 5,497 patient encounters. Sex disparities in emergency care were analyzed using statistical analysis in R, including Wilcoxon rank sum test, Pearson's Chi-squared test, and Fisher's exact test. The diagnosis and treatment of males was more likely than females to include chest x-rays (p=0.006), troponin (p<0.001), pain medications (p=0.003), and aspirin (p<0.001). Men were also more likely to be assigned a higher ESI (emergency severity index) acuity (p<0.001) and were more likely to be admitted to the hospital (p<0.001). The men in the study had a median age of 53, while women had a median age of 46 (p<0.001).
In conclusion, the care of men and women differs in triage acuity assessment, diagnostic testing, treatment of pain, and treatment for ACS with aspirin when presenting to Froedtert ED with chest pain. However, women were also younger on average and assigned a lower acuity rating in triage.

Samantha Sinopole

Short-Term Heat Exposure Enhances Autophagic Flux in Endothelial Cells

Authors: Sinopole SP, Hughes WE, Beyer AM
Project Mentor: Andreas M Beyer, PhD; Medicine

Microvascular dysfunction is linked to numerous chronic organ system pathologies including many neurodegenerative and metabolic disorders. The mechanisms contributing to microvascular dysfunction are multi-factorial, with previous evidence from our lab suggesting autophagic flux, a key process of cellular proliferation involving the recycling of old or damaged organelles, is essential for maintenance of normal microvascular physiological function. Induction of autophagic flux maintains normal microvascular physiological function in cardiovascular disease states. Previous evidence has demonstrated the powerful cardiovascular benefits of exercise; one mechanism by which exercise is protective against vascular dysfunction is through intermittent exposure to endothelial shear stress. However, many populations are not able to meet national physical activity guidelines, necessitating alternative interventions. Heat therapy has emerged as a promising non-pharmacologic alternative, offering cardiovascular benefits that partially mimic exercise, via elevations in core temperature and changes in shear stress, which may be mediated by autophagy. The purpose of this study was to examine the effects of short-term heat exposure on markers of autophagic flux within endothelial cells. We hypothesized that that short-term heat exposure, defined as a 2°C increase in temperature above physiologic normothermia, for 24 hours is sufficient to increase markers of autophagy within endothelial cells. Exposure to short-term heat stress enhanced markers of autophagosome formation (LC3II) and reduced markers of ubiquitination (p62). Taken together, these findings lend evidence that induction of autophagy mediates the positive beneficial effects of passive heat therapy. Given the shared benefits of exercise and heat therapy, understanding the role of autophagy may illuminate novel treatment options for high-risk populations with certain chronic diseases.

Sonia Slusarczyk

The Impact of Social Deprivation on Rotator Cuff Repair Outcomes

Authors: Slusarczyk SM, Van Boxtel M, Ehioghae M, Hodge R, Szakiel P, Andryk L, Hanley J, Graf A, Grindel SI
Project Mentor: Steven Grindel, MD; Orthopedic Surgery

Introduction: Rotator cuff tears are a common orthopedic injury and the role of social determinants of health (SDoH) in surgical outcomes remains underexplored. The goal of this study was to investigate the correlation between social deprivation, measured by the Area Deprivation Index (ADI), and outcomes following arthroscopic rotator cuff repair.
Methods: We conducted a retrospective chart review on patients undergoing primary arthroscopic rotator cuff repair at a level one academic center between 2006 and 2019. Patient demographics (age, gender, race), comorbidities, ADI scores, range of motion, visual analog pain scores, and patient-reported outcomes (SST, ASES, and QuickDASH) were collected. Patients were stratified into terciles based on their relative level of deprivation. Statistical analysis was performed using ANOVA, t-tests, chi-square tests, and univariate/multivariate logistic regression.
Results: 322 patients were included in this study. The most deprived group had a higher prevalence of diabetes compared to the least and intermediately deprived group ($p<0.001$). Massive tear occurrence was greater in the least deprived group ($p<0.05$) compared to the intermediate and most deprived group. There was no difference in objective outcomes between groups. Patient-reported outcomes (SST, ASES, and QuickDASH) were worse in the most deprived group compared to the least and intermediate deprived groups.
Discussion: Social deprivation significantly affects patient-reported outcomes in rotator cuff repair surgery. While clinician-reported outcomes were consistent, patients' perceptions varied based on social determinants. Integrating SDoH considerations in orthopedic care is a promising next step in securing equitable approaches. However, more research is needed to validate and expand these findings.

Nitin Somasundaram

Predictors of improvement in cardiovascular biomarkers with singing

Authors: Somasundaram N, Mohrdieck N, Visotcky A, Kulinski J
Project Mentor: Jacquelyn Kulinski, MD, FASPC; Medicine

Although regular physical exercise lowers the risk of coronary heart disease in both primary and secondary prevention populations, physical exercise may be difficult for some individuals, prompting the need for alternative therapies. This study is a sub-analysis of a previously completed clinical trial that aimed to assess the effect of singing on cardiac biomarkers. The previous trial included 60 patients recruited from a cardiology clinic (mean age 61 ± 13 years; 68% women) with measurements of vascular endothelial function and heart rate variability (HRV), and the results showed that 14 minutes of singing improves endothelial function acutely, similar to a short bout of physical exercise. The present sub-analysis examined whether predictive variables (prior singing experience, gender, age, enjoyment level, effort, smoking history) impacted changes in outcome measures. No significant change was seen in endothelial function or HRV based on exposure variables except for smoking status. Past smoking (compared to never smoking) predicted improvement in vascular endothelial function after singing. Abnormal baseline endothelial function was a predictor of acute improvement in endothelial function. These findings suggest that singing may have beneficial effects on vascular endothelial function, especially in patients with abnormal baseline endothelial function, regardless of singing experience.

Colin Steck

Effect of Bougie Utilization versus Stylet on First-Pass Success Rates during Endotracheal Intubation in Helicopter Emergency Medical Services (HEMS)

Authors: Steck CC, Tillmann J, Lenz TJ.
Project Mentor: Timothy Lenz, MD, MPH, EMT-P, FAEMS, FACEP; Emergency Medicine
Community Partner: Flight For Life Emergency Transport System

Introduction:
HEMS crews routinely care for critically ill patients requiring endotracheal intubation (ETI). To minimize risks of morbidity and mortality to patients undergoing ETI, it is imperative HEMS providers achieve first pass success (FPS).2 There are few HEMS specific studies that compare endotracheal introducing devices (EID) used during ETI. .3 The purpose of this study is to determine whether utilization of a bougie improves FPS versus a stylet during ETI.
Methods:
A retrospective chart review is in progress on all intubated patients for a midwestern HEMS service from January 1, 2018, to June 30th, 2025. On July 1st, 2023, our service introduced utilization of a bougie into protocol as the first-line technique during ETI. 140 patients were included in preliminary analysis. Patient charts were categorized by EID and rates of FPS and peri-intubation major adverse events (MAEs) were analyzed.
Results:
There was no significant difference between these EIDs s in achieving FPS, $p = 0.68$. There were no significant differences observed between EID and rates of peri-intubation MAEs; peri-intubation hypoxemia ($p = 0.19$), peri-intubation hypotension ($p = 0.57$), and peri-intubation cardiac arrest ($p = 0.28$).
Conclusions:
We found no statistically significant difference in achieving FPS during ETI between using the bougie and rigid or malleable stylets. Additionally, there was no significant difference in rates of peri-intubation MAEs in use of these EIDs. However, implementing a protocol utilizing the bougie as a first line EID led to upward trends in HEMS provider FPS with decreased rates of peri-intubation MAEs with statistically significant reduction in peri-intubation hypotension.

Abbey Stoltenburg

System of Health and Wellness for Teachers and Teens (SWIFTT): workforce development model to support K-12 health and physical education teachers

Authors: Stoltenburg A, Rodriguez C, Ruffalo L.
Project Mentor: Leslie Ruffalo, PhD, MS; Family & Community Medicine
Community Partner: Milwaukee Public Schools

Health, physical education, and wellness (HPEW) teachers spend a significant amount of time with students and are important in promoting student wellbeing. Professional stressors such as expanding scope of practice, large class sizes, and lack of resources to support students may create teacher burnout which may eventually lead them to leave the teaching profession. Teacher wellbeing programs can improve burnout and relationships with students to prevent the onset of teacher burnout. Online platforms are a novel way to expand wellbeing engagement in teachers. System of Wellness Instruction for Teachers and Teens (SWIFTT) offers a model for engaging teachers in self-care and wellness through podcasts and website resources. Four HPEW urban school teachers in Summer 2022 were surveyed and interviewed on the SWIFTT model and their opinions on wellbeing and burnout. Interviews were transcribed and coded by two researchers. Coding revealed seven themes: engagement with SWIFTT, critiques, application of SWIFTT, podcasts, future ideas, wellness, and burnout. Overall, teachers appreciated SWIFTT, an online professional development resource addressing wellness and burnout that they could access anytime. Future versions of SWIFTT should be designed for teachers to easily access resources addressing specific challenges in the teaching environment, involve local teachers, and include resources addressing local issues. Teachers identified several factors contributing to burnout including challenges with students, administration, limited support systems, parent interactions, and feeling overwhelmed. All teachers interviewed discussed their personal self-care strategies and admitted wellness was worth prioritizing though struggled with maintaining personal wellness during the school year.

Alexander Strunets, BS

Hormonal Evaluation of Adrenal Nodules After Implementation of Standardized Radiology Text

Authors: Zhang C, Strunets A, Carroll T, Findling J, Nencka A, Segal E, Tolat P, Dream S, Wang T, Zwagerman N.
Project Mentor: Ty Carroll, MD; Medicine

Introduction:
Adrenal nodules are incidentally found in 5-7% of patients who undergo abdominal cross-sectional imaging and are increasingly encountered in clinical practice with the widespread use of abdominal imaging. Most adrenal nodules are benign but may still cause morbidity and mortality. Guidelines recommend hormonal workup to rule out morbidity. However, this is often not performed. Our study explored whether implementation of standardized radiology text following incidental discovery of adrenal nodules increased the rate of follow up with hormonal evaluation.
Methods:
Two groups were analyzed: 1) patients diagnosed in the six months prior to standardized text implementation and 2) patients diagnosed in a six month period beginning one year after the text's implementation. For all adult patients, medical records were searched to determine if a biochemical evaluation was completed within 12 months of diagnosis. Hormone screening rates before and after the text implementation were compared using a Chi-Squared test.
Results:
Improved screening rates were observed with screening rates for excess cortisol increasing from 10% to 15% (P=0.28), hormonal screening rate for primary aldosteronism increasing from 13% to 22% (P=0.11), and hormonal screening rate for pheochromocytoma increasing from 16% to 20% (P=0.47). Although a trend of improved screening rates was observed, none of these trends were statistically significant.
Discussion:
Rates of hormonal evaluation after text implementation never rose above 22% for any individual test. This implies providers may be unaware of the necessity of adrenal nodule follow-up and that standardized radiology text was not enough to overcome this knowledge deficit.

Alexander Stuth

Respiratory Virus Co-infections in Pediatric Patients with COVID-19: prevalence and impact on disease severity

Authors: Stuth AEA, McCaul K, Bose M, DeHamer C, Henrickson K, Graff K
Project Mentor: Kelly Graff, MD; Pediatrics
Community Partner: Midwest Respiratory Virus Program

INTRODUCTION: The estimated prevalence of respiratory viral co-infections with SARS-CoV-2 and other viruses is highly variable due to targeted testing during the COVID-19 pandemic. It has been hypothesized that co-infections lead to more disease severity, but this remains unknown in part due to poor estimates of co-infection rates. Our study aims to determine the true prevalence of respiratory viral co-infections during the COVID-19 pandemic and their impact on disease severity.
METHODS: This is a retrospective cohort study among children tested for presumed respiratory infection from July 2021 to August 2022 during the COVID-19 pandemic in the Children's Wisconsin healthcare network. Chart review was performed to determine disease severity, measured as lower respiratory infection (LRI) vs. upper respiratory infection (URI)/None. Comprehensive multiplex PCR was performed on all respiratory specimens by the Midwest Respiratory Virus Program to determine the true co-infection rate.
RESULTS: Preliminary data on 406 unique respiratory specimens from 376 patients identified 42 (10.3%) co-infections, 274 (67.5%) mono-infections, and 90 (22.2%) with no virus. Overall prevalence of SARS-CoV-2 was 202/406 (49.8%), with 30 SARS-CoV-2 co-infections equating to 14.9% of all SARS-CoV-2 infections. There was no significant difference in disease severity between SARS-CoV-2 co-infections (14/30, 46.7% LRI) and SARS-CoV-2 mono-infections (66/172, 38.4% LRI, p = 0.39) or all mono-infections (152/274, 55.5% LRI, p = 0.36).
CONCLUSIONS: Based on preliminary data, respiratory viral co-infections were identified with a 10.3% prevalence, in line with previous estimates of 8-20%. SARS-CoV-2 co-infections were not more likely to result in LRI compared to SARS-CoV-2 mono-infections or other viral mono-infections.

Kimberlee Suenkens

Getting SSPOT to Run: Development of a Novel Direct Observational Tool for Usage in Clinical Settings

Authors: Ladell M, Jacobson N, Yale S, McCarthy C, Suenkens K, Venkitachalam R, Schindler C, Bordini B, Scanlon S, Nimmer M, Lerner Paputsky E.
Project Mentor: Meagan Ladell, MD; Pediatrics

Introduction: Observational research often requires the development and testing of tailored tools for data collection. However, there is limited published guidance on the process. Thus, researchers often develop such tools without the benefit of lesson learned, facing challenges associated with time and access to clinical environments. We describe the development process of a data collection tool.
Methods: Informed by SEIPS (System Engineering Initiative for Patient Safety) 2.0 model, we developed a data collection tool in four phases prototype development, nonclinical pilot testing, and clinical pilot testing.
Results: Development took 99 hours, including 71 hours of observation and 28 hours of debriefing over 9 weeks, of which approximately 4 hours of pilot testing were in a non-clinical setting. The coffee shop served as a successful alternative sociotechnical system for pilot testing.
Discussion: The SSPOT tool was developed using the SEIPS framework, with non-clinical and clinical pilot testing to refine its design. Non-clinical testing in a coffee shop allowed for rapid iteration and helped address issues like data clutter by adding free-text fields and popup features. Clinical testing further refined the tool by capturing specific nuances of healthcare tasks. The development process highlighted the importance of a multidisciplinary team, including clinicians and human factors experts, and the value of non-clinical testing in an analogous setting. Key lessons include the need for diverse expertise, iterative testing, and the time-intensive nature of tool development.

Margaret Summerside

From Podium to PubMed: Successful Manuscript Publication of Breast Surgical Oncology Presentations at National Meetings from 2017-2022

Authors: Summerside M, Istl AC, Rogers C, Cobb AN, Kong AL, Singh P, Cortina CS.
Project Mentor: Chandler S Cortina, MD, MS; Surgery

This study aims to assess manuscript publication rate for breast surgical oncology (BSO) national conference presentations and examine factors associated with successful manuscript publication.
We performed a retrospective review of orally presented BSO abstracts from the American Society of Breast Surgeons (ASBrS), Society of Surgical Oncology (SSO), and American College of Surgeons (ACS) meetings from 2017-2022. Univariate and multivariate logistic and linear regression models were used to examine factors predictive of publication.
441 presentations met inclusion. Manuscript publication rate was 60.5% (n=267). Publication rate by meeting was 81.2% for ASBrS, 63.4% for SSO, and 43.0% for ACS. Most f irst authors were trainees (56.8%) or attendings/faculty (26.7%). Presenting first authors more frequently had feminine pronouns compared to masculine pronouns (58.4% vs 26.6%, p<0.01) (15% unknown). Most published manuscripts were categorized as clinical outcomes (34.5%) or health-services research (28.5%).
On univariate analysis, manuscripts published in a society-associated journal had a significantly shorter time from presentation to publication compared to those published in non-society journals (p<0.001). Of the 102 manuscripts not published in ASO, a higher proportion of those from ACS and SSO were published in journals with an IF>3.7 (p=0.046). On multivariate regression analysis, presentations at SSO (OR 0.09, 95% CI 0.03-0.29) and ACS (OR 0.01, 95% CI 0-0.02) were less likely to result in manuscript publication than ASBrS (p<0.01). When compared to students, trainees (OR 2.2, 95% CI 1.1-4.5) and attendings/faculty (OR 2.9, 95% CI 1.4-6.4) were significantly more likely to publish a subsequent manuscript (p<0.01).
In this review, meeting of presentation and first author role were predictive of manuscript publication. Findings guide authors on where to submit abstracts and highlights the need for writing resources and mentorship for students.

Devin Sun

Correlating anti-cholinergic cognitive burden with fall risk in hospitalized patients

Authors: Sun D, Heinrich T, Yang X
Project Mentor: Thomas Heinrich, MD; Psychiatry

Froedtert Hospital is implementing a multicomponent delirium prevention protocol aimed at reducing delirium, one component of which being targeted towards medications with high anticholinergic burden (ACB) that may contribute to delirium and falls. This retrospective cohort study examined the association between ACB and incidence of falls among adult inpatients across three hospital units from March 2021 to March 2024. We hypothesized higher ACB to be correlated with increased rates of fall. Patients who experienced falls ("fallers") were compared to controls ("non-fallers") matched by hospitalization date. ACB scores were calculated over a 24-hour period prior to the fall or corresponding inpatient day for non-fallers. A total of 233 falls were recorded among 211 unique patients. Fallers had a mean ACB score of 1.803 (SD 1.853), while non-fallers had a mean ACB score of 1.547 (SD 1.663). Statistical analysis revealed that fallers had significantly higher ACB scores than non-fallers (p = .029), with logistic regression indicating that each additional point of ACB was associated with a 12.8% increased risk of fall. There was no significant difference between groups for age, sex, or race.

Nadia Tabit

Youth Leading Youth: Co-Construction of an Adolescent Sexual and Reproductive Health Education Program

Authors: Tabit, N, Kaljo, K, Kruper, A, Linton, A, Rader, J, Rosa, L, Sandoval, A, Matos, J, Reyes, J, Luther, S.
Project Mentor: Kristina Kaljo, PhD; Obstetrics and Gynecology
Community Partner: Escuela Verde High School and Planned Parenthood of Wisconsin (PPWI)

As teens transition into adulthood, comprehensive sexual and reproductive health education programs have demonstrated success in reducing instances of teen pregnancy, sexually transmitted infections, and sexual violence, as well as in improving self-efficacy and overall well-being. However, inconsistent laws and policies across the U.S. have limited access to standardized, medically accurate health curricula. Misinformation and educational deficits contribute to uninformed behaviors that impact both individuals and communities. A human-centered design (HCD) approach addresses preventable health challenges by engaging teens as active partners - experts in their own life challenges, experiences, and perspectives - to uncover needs and co-construct solutions. HCD also empowers historically marginalized populations through authentic engagement, the establishment of trust, and iterative improvement. To better understand local perspectives, we conducted focus groups (n = 28) with predominantly female, Milwaukee-based adolescents aged 15-17, who voiced frustration with limited and inconsistent reproductive health education. They emphasized the importance of instruction led by subject-matter experts and noted that peers were often their primary source of health information. Common themes included the desire to normalize discussions about bodily changes and to establish safe, nonjudgmental learning spaces. Collaborating with Escuela Verde students, we designed an afterschool program grounded in HCD principles and facilitated by trained providers that addressed pre-conception health, contraceptive access, communication skills, and social-emotional wellness. Participants (n = 6) demonstrated increased self-efficacy, greater confidence in health topics, and active engagement as collaborators in shaping youth-centered spaces and interventions. Next steps include empowering students to serve as peer health educators, delivering sessions to other Milwaukee schools.

Joshua Tillmann, CCP

Effect of Bougie Utilization versus Stylet on First-Pass Success Rates during Endotracheal Intubation in Helicopter Emergency Medical Services (HEMS)

Authors: Steck CC, Tillmann JL, Lenz TJ
Project Mentor: Timothy Lenz, MD, MPH, FAEMS, FACEP; Emergency Medicine

Introduction:
HEMS crews routinely care for critically ill patients requiring endotracheal intubation (ETI). To minimize risks of morbidity and mortality to patients undergoing ETI, it is imperative HEMS providers achieve first pass success (FPS).1 There are few HEMS specific studies that compare endotracheal introducing devices (EID) used during ETI.2 The purpose of this study is to determine whether utilization of a bougie improves FPS versus a stylet during ETI.

Methods:
A retrospective chart review is in progress on all intubated patients for a midwestern HEMS service from January 1, 2018, to June 30th, 2025. On July 1st, 2023, our service introduced the bougie into protocol as the first-line EID during ETI. 140 patients were included in preliminary analysis. Patient charts were categorized by EID and rates of FPS and peri-intubation major adverse events (MAEs) were analyzed.
Results:
There was no significant difference between these EIDs in achieving FPS ($p = 0.68$). There were no significant differences observed between EID and rates of peri-intubation MAEs; peri-intubation hypoxemia ($p = 0.19$), peri-intubation hypotension ($p = 0.57$), and peri-intubation cardiac arrest ($p = 0.28$).
Conclusions:
We found no statistically significant difference in achieving FPS during ETI between using the bougie and rigid or malleable stylets. Additionally, there was no significant difference in rates of peri-intubation MAEs between these EIDs. However, implementing a protocol utilizing the bougie as a first line EID led to upward trends in HEMS provider FPS with decreased rates of peri-intubation MAEs with statistically significant reduction in peri-intubation hypotension.

Paige Titak

Response Time of EMS to Out of Hospital Cardiac Arrest Patients in Wisconsin Based on Population Size

Authors: Titak PD, Ruffalo LA

Project Mentor: Leslie Ruffalo, PhD; Family and Community Medicine

Community Partner: Wisconsin Office of Rural Health, Wisconsin Department of Health Services

In Wisconsin, 41% of EMS agencies report having periods of time where a legal ambulance crew was not available to staff an ambulance. Agencies that rely on volunteers are more likely to have gaps in service due to insufficient staffing and most volunteer-based agencies serve rural areas. Staffing shortages can lead to delays in patient care if a call is received when there are not staff available to keep an ambulance in service. Act 113 passed in 2015 addresses these staffing issues by allowing a legal crew to be defined as an Emergency Medical Responder (EMR) driver and Emergency Medical Technician (EMT) in agencies that serve municipalities with populations less than 20,000 people instead of requiring two EMTs or paramedics. We hypothesized that there would be shortened response times with decreased time delays to defibrillation when EMTs and EMRs are available to respond to an out-of-hospital cardiac arrest. We extracted times from EMS dispatch receiving a 911 call to arrival of a first responder with a defibrillator in cardiac arrest patients from the Wisconsin Ambulance Run Data System Elite (WARDS) categorized by the level of certification of the first responders from 2018-2024. Areas with populations greater than 20,000 had quicker response times than in populations with less than 20,000 people ($p < 0.001$). Agencies eligible for the waiver that did not utilize EMRs had faster response times when compared to areas that have EMRs ($p = 0.003$).

Kailey Tooke

Understanding the Value of Monthly Contacts for a Complex Care Program

Authors: Tooke K, Schnell J, Johnson A

Project Mentor: Jessica Schnell, MD, MPH; Pediatrics

The Complex Care Program (CCP) at Children's Wisconsin provides medical co-management and care coordination for children with medical complexity (CMC) in inpatient and outpatient settings. A partnership between CCP and Wisconsin Medicaid led to new program requirements meant to increase the quality of care, one of which is monthly reciprocal contact with all families of children enrolled in the CCP. During these monthly contacts, a member of the care team communicates with a patient caregiver through phone or MyChart to check in, aid with ongoing issues, and identify unmet needs. We are interested in what is discussed during these monthly contacts and if they allow the CCP to proactively identify unmet patient needs to improve health outcomes. The CCP has about 740 patients, out of those patients a sample of 250 were randomly selected to be included in the study. The 250 patients were divided into 3 groups and their documented monthly reciprocal contacts were reviewed and categorized. In conclusion, the monthly reciprocal contacts do appear to preemptively identify and address the needs of patients and their families. The relatively low number of instances that contacts were categorized as "No Assistance Needed"seemingly disproves the concern that monthly contacts are disturbing the parents. In addition, the frequency of "Social Update"suggests CCP staff is successfully building rapport with patients and their families. Moreover, the frequency of "Community Resources"and "School/Therapies"suggests that adding more social workers to the CCP to assist in completing monthly contacts would be advantageous.

Marcello Tosso

Impact of an Embedded Phlebotomist on Lead Toxicity Diagnosis and Treatment

Authors: Yilu, D., & Tosso, M.
Project Mentor: Yilu Dong, PhD; Emergency Medicine

Title: Impact of an Embedded Phlebotomist on Lead Toxicity Diagnosis and Treatment
Lead poisoning poses a serious health threat to children in Milwaukee, particularly in high-risk neighborhoods, with up to 15% of children exhibiting elevated blood lead levels (BLLs). Timely confirmatory venous testing following elevated point-of-care testing (POCT) is critical for initiating interventions to mitigate lead exposure. However, barriers to accessing centralized venous testing have contributed to low follow-up rates, delaying care. This study evaluates the impact of embedding a phlebotomist in a high-risk clinic to improve rates and timeliness of confirmatory and interval BLL testing.
We used a difference-in-differences design with staggered adoption and inverse probability of treatment weighting to compare a placement site (Midtown), a nearby referral site (Next Door), and two control clinics. From January to May 2023, confirmatory venous test conformance rates improved significantly, with Midtown showing a 3.4-fold and Next Door a 1.5-fold higher probability of completion compared to control sites. Interval monitoring rates also improved at Midtown, though Next Door data remains underpowered. Kaplan-Meier survival analysis demonstrated faster confirmatory testing completion at intervention sites.
Surveys of families revealed that travel distance, difficulty scheduling venous draws, and lack of understanding about lead toxicity severity were major barriers to follow-up. These findings support embedding phlebotomy services in high-risk clinics as a promising strategy to enhance diagnosis and management of pediatric lead exposure.
Future work will explore the scalability of this intervention and its impact on parental behaviors to reduce BLLs, in partnership with community organizations.

Daniel Trotier

Do artificial intelligence-based tools improve patient outcomes and clinical practice in meaningful ways? A cross-specialty literature review

Authors: Trotier DH, Jotterand F
Project Mentor: Fabrice Jotterand, PhD, MA; Institute for Health and Humanity

Background:
Artificial Intelligence (AI) has taken massive strides in development in recent years. Given the unknown potential of AI, the deployment of AI in medicine must be investigated and how medicine could be fundamentally changed.
Purpose:

- To determine what effect AI has on patient outcomes and clinical care
- To understand the current applications of AI in medicine
- To determine the readiness of AI for deployment into clinical practice

Methodology:
A literature review was conducted (July - August 2023) across PubMed, Cochrane Library, and ClinicalTrials.gov. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) was utilized. Publications were eligible if they were published in the last 5 years, studied AI as a tool in clinical practice, and had interpreted results. From eligible publications, the AI tool was categorized by its use, its specialty, the tool's effectiveness, and whether further investigation was required.
Results:
1190 studies were identified, and 225 were included for review. 32 specialties (Gastroenterology most common) and 10 types of tools were identified (Predictive most common). 81% of the AI tools outperformed current standards of care, 18% made no difference, and 1% underperformed. 68% required further research to validate clinical effectiveness.
Conclusions:
AI is a promising tool to support physicians in clinical practice to optimize patient care and potentially surpass human performance due to its objective nature. However, AI tools must be validated and refined before use in clinical settings and should remain as support in clinical decision making, not operating independent of physician supervision.

Austin Tubbs

Reimagining Medical Educator Development: A Mixed-Methods Evaluation of KinetiC3, A Longitudinal, Character-Integrated Teaching Academy

Authors: Kaljo K, Tubbs A, Farkas A
Project Mentor: Kristina Kaljo, PhD; Obstetrics and Gynecology

Phenomenon: Medical educators in academic institutions face conflicts balancing clinical care, research, teaching, and administrative responsibilities, leading to professional isolation, identity dissonance, and career dissatisfaction. Barriers to development include limited time, resources, institutional support, and awareness.
Approach: KinetiC3 is a year-long educator development program integrating character education and pedagogy. This study analyzed career pathways of 173 KinetiC3 graduates (2018-2024) using retrospective data and qualitative interviews.
Findings: Post-program, participants advanced into leadership and academic roles. Thematic analysis identified five key themes: (1) role evolution into leadership, (2) recognition and application of character strengths enhancing professional fulfillment, (3) leadership development, (4) cross-discipline relationship-building fostering networks beyond institutional silos, and (5) benefits of longitudinal development over one-time sessions.
Insights: Traditional educator development programs lack continuity and fail to align professional values with academic responsibilities. KinetiC3 participants reported increased motivation, confidence, and belonging within the medical education community. The cohort-based design fosters integration across diverse backgrounds and expertise, promoting shared knowledge and practice. The program's longitudinal structure enhances professional reward and career satisfaction.
These findings underscore the need for sustained medical educator development. To retain educators, institutions must offer structured, long-term engagement opportunities. KinetiC3 serves as a feasible model for curricular development, fostering career advancement and institutional retention in academic medicine.

Nathan Tunell

"They can start helping people get clean": Medical student-elicited patient perceptions of addiction treatment intervention

Authors: Johnston B, Vega S, Tunell N.
Project Mentor: Bryan Johnston, MD; Family and Community Medicine

Objectives
This study aims to explore the perspective of patients with opioid use disorder (OUD) regarding their care. The research team conducted interviews with patients in the emergency department (ED) to analyze health outcomes and satisfaction, focusing on perceived stigma from healthcare providers and the community.
Methods
Eligible patients were identified by ED providers and invited to participate in the study. Verbal consent was obtained before initiating a semi-structured interview. The initial interview gathered information on the patient's treatment history and their satisfaction with care. Patients willing to participate in a follow-up interview provided their contact information for a subsequent phone call.
Results
Several themes emerged from interviews. First, patients had an excellent perception of their care and treatment by staff in the ED. Second, many patients did not discuss outpatient addiction resources or treatment options at the time of interview. Third, patients identified barriers to care including not knowing about resources, self-imposed barriers, and fear of prison time. Finally, while patients did not perceive stigma from healthcare workers, they did report experiencing stigma from their community.
Conclusion
Our study highlights barriers to care for patients in the ED with OUD-related complications. These barriers include ineffective transitions from acute ED treatment to chronic outpatient rehabilitation, self-imposed challenges, fear of incarceration, limited knowledge of available resources, and community stigma. These findings underscore the need for improved communication with patients, strong outpatient care connections, and enhanced community education about OUD.

Sheyenne Tung

Trends and Independent Correlates of Chronic Kidney Disease Awareness in United States Adults: NHANES 1999-2018

Authors: Ozieh MN, Tung SH, Wang X, Thorgerson A, Egede LE.
Project Mentor: Mukoso N. Ozieh, MD, MSCR; Medicine

Introduction: Chronic kidney disease (CKD) is a public health and economic burden with serious adverse health outcomes and extremely low awareness. Current evidence on independent correlates of CKD awareness is inconsistent and recent data examining time trends of CKD awareness in the U.S. are dated. The aims of our study are to examine time trends in CKD awareness from 1999 to 2018 and examine independent correlates of CKD awareness in U.S. adults with CKD.
Methods: We analyzed data from the National Health and Nutrition Examination Survey (1999-2018). The study sample consisted of 8,331 U.S. adults aged with CKD. The primary outcome was CKD awareness. Independent correlates included sociodemographic and clinical variables. Unadjusted and adjusted logistic regression models were used to examine the association of CKD awareness and covariates.
Results: CKD awareness increased from 8.5% to 12.6% from 1999 to 2018. In the fully adjusted regression model, male sex [OR 1.54, 95% CI [1.01, 2.36]) and having some college education (OR 1.59, 95% CI [1.03, 2.46]) were associated with higher likelihood of CKD awareness. Having two or more comorbidities, increased urine albumin-to-creatinine ratio, and GFR less than 60 were associated with increased likelihood of CKD awareness. However, age, race, and income were not significantly associated with CKD awareness.
Discussion: CKD awareness increased by only 4% during the two decades examined in this study and remains extremely low. More prospective studies are needed to understand patient-level barriers to CKD awareness and provider-level barriers to CKD screening, CKD education, and knowledge transfer.

Sophia Valenti

Phenotyping the Complex Human B Cell Compartment in Blood and Spleen Using Spectral Flow Cytometry

Authors: Valenti S, Meinhardt N, Dittel B
Project Mentor: Bonnie Dittel PhD; Microbiology & Immunology
Community Partner: Versiti Blood Research Institute

B cells are known for their role in antibody production, but they're a complex subset of cells. The lab previously discovered B cell IgD Low (BDL) which induces regulatory T cell (Treg) proliferation, which play a key role in immune system homeostasis. So far BDL is only identified in mice due to human B cell complexity. B cells can be identified by surface protein expression by fluorophore-conjugated antibodies by flow cytometry. Multiple markers are used in combination to identify B cell subsets, examining their differential expression patterns. Initial studies show human BDL is IgM+IgDlow/-, but many B cell subsets share the same phenotype. By adding additional markers, those phenotypes can be progressively eliminated to find BDL. Previously, conventional flow cytometry was used, however there's limited numbers of markers it can visualize due to spectral overlap. Spectral flow cytometry uses spectral unmixing, allowing for more markers to be visualized simultaneously. This increases the number of cell surface markers available to identify human BDL. Our goal was to develop a spectral flow cytometry panel for this purpose. We adapted the previous conventional flow cytometry phenotyping panel to spectral flow cytometry. We used human peripheral blood mononuclear cell (PBMC) samples while troubleshooting before human splenocyte samples were examined since BDL likely resides there. Using FlowJo for analysis, we identified class-switched memory, non-class switched memory, double negative, naïve, and transitional cells. This panel will be useful in future study of human BDL including implementing our gaiting strategy with new technologies like scRNAseq and CITE-Seq.

Vishnu Varadarajan

Optimizing Surgical Tray Utilization: An Ethical Imperative for Resource Stewardship and Efficiency Across Specialties

Authors: Varadarajan V, Jotterand F.
Project Mentor: Fabrice Jotterand, PhD, MA; Bioethics

Modern healthcare systems' financial, environmental, and ethical imperatives necessitate ongoing evaluation of resource utilization in surgical practice. This retrospective study examined implant usage frequency in spine surgery at a tertiary academic hospital from 2019 to 2022, identifying patterns of underutilization in standard implant trays. Among 2,964 multiaxial screws analyzed, the most used size accounted for 26% of utilization, while the top five sizes comprised 81%. Using a 95% coverage threshold, only 11 unique screw sizes were required, compared to the 19 sizes (total 152 screws) routinely stocked. These findings indicate a potential 42% reduction in total screws and a 37% decrease in unique sizes per tray.
While these findings highlight opportunities for operational improvement, their ethical relevance is equally significant. The redundant processing of seldom-used implants contributes to preventable occupational strain, accelerates device degradation, inflates healthcare costs, and consumes environmental resources. These inefficiencies intersect with core bioethical principles: justice, through equitable resource allocation; nonmaleficence, by mitigating risks to patients and healthcare workers; and stewardship, by promoting responsible management of shared medical assets. Thus, surgical tray optimization extends beyond logistical refinement, practically applying ethical obligations within perioperative care. This approach supports efficiency and the mission of delivering high-quality, sustainable, and equitable surgical care by aligning evidence-based resource management with foundational ethical principles.

Stephen Vega

"They can start helping people get clean": Medical student-elicited patient perceptions of addiction treatment intervention

Authors: Tunell N, Vega S, Johnston B
Project Mentor: Bryan Johnston, MD; Family and Community Medicine

Objectives
This study aims to explore the perspective of patients with opioid use disorder (OUD) regarding their care. The research team conducted interviews with patients in the emergency department (ED) to analyze health outcomes and satisfaction, focusing on perceived stigma from healthcare providers and the community.
Methods
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Results
Several themes emerged from interviews. First, patients had an excellent perception of their care and treatment by staff in the ED. Second, many patients did not discuss outpatient addiction resources or treatment options at the time of interview. Third, patients identified barriers to care including not knowing about resources, self-imposed barriers, and fear of prison time. Finally, while patients did not perceive stigma from healthcare workers, they did report experiencing stigma from their community.
Conclusion
Our study highlights barriers to care for patients in the ED with OUD-related complications. These barriers include ineffective transitions from acute ED treatment to chronic outpatient rehabilitation, self-imposed challenges, fear of incarceration, limited knowledge of available resources, and community stigma. These findings underscore the need for improved communication with patients, strong outpatient care connections, and enhanced community education about OUD.

Oscar Villarreal Espinosa

Locked Dimerized CXCL12 Exerts Radiosensitizing Effects in Head and Neck Cancer

Authors: Villarreal Espinosa O, Awan M, Memon A, Frei A, Foeckler J, Kuehn R, Bruening J, Massey B, Wong S, Shukla M, Kasprzak J, Joshi A, Dwinell MB, Himburg HA, Zenga J.

Project Mentor: Joseph Zenga, MD; Otolaryngology

Background: Head and neck squamous cell carcinoma (HNSCC) presents significant treatment challenges, particularly in cases unrelated to human papillomavirus (HPV). The chemokine receptor CXCR4, interacting with its ligand CXCL12, plays a crucial role in tumor proliferation, metastasis, and treatment resistance. This study explores the therapeutic potential of engineered monomeric and dimerized CXCL12 variants (CXCL121 and CXCL122, respectively) in HNSCC and evaluates potential additive effects when combined with radiation therapy.

Methods: Clinical HNSCC biopsies were evaluated for CXCR4 expression in both previously untreated and radiorecurrent disease. HNSCC cell lines were then treated with combinations of CXCL12 variants and radiotherapy and interrogated for proliferation, gene expression change, and underlying molecular mechanisms. In vivo studies evaluated the biodistribution of engineered CXCL12 and tested these treatments in humanized cell line- derived xenograft (CDX) models.

Results: CXCL122 significantly reduced HNSCC cell proliferation and enhanced the effects of radiotherapy, likely through biased agonism at the CXCR4 receptor and upregulation of the KISS1R pathway. In vivo, CXCL122 localized to tumor sites and augmented the effects of radiation to inhibit tumor growth.

Conclusions: CXCL122, in combination with radiation, demonstrates potent anti- tumor effects in HNSCC. These findings support further clinical investigation of CXCL122 to enhance the effects of radiotherapy.

Alexander Volk

Learning Anatomy Beyond the Lab: Student Perspectives on Plastinates, Cadavers, and Digital Models

Authors: Volk A, Hillmer R

Project Mentor: Ryan Hillmer, PhD; Cell Biology, Neurobiology, and Anatomy

Background: Plastinated anatomical models offer a durable, odorless supplement to cadaveric dissection. Other anatomical resources used in education at the Medical College of Wisconsin (MCW) have varying benefits and drawbacks making their combined contributions to medical education unclear.

Objective: To assess usage patterns and perceptions of plastinates at MCW compared to other anatomy resources (cadavers, plastic models, and digital tools). The results provide a baseline for future studies and improvements in anatomy education.

Methods: A brief survey utilizing 5-point Likert scales was distributed to first-year students. Mean responses were compared with one-way ANOVA analysis with Tukey's test for multiple comparisons.

Results: Among 45 respondents (n = 37 completing the full survey), cadavers were most valued for spatial learning, while plastic and digital resources were favored for ease of use and ease of structure visualization. Digital resources excel in demonstrating cross-sectional anatomy and are students' resource of choice for use outside of the lab and for future studies. Plastinates were less frequently used and scored lower regarding most resource characteristics.

Conclusion: A multimodal approach combining cadaveric dissection, plastic models, digital resources, and plastinates offers the greatest potential for supporting diverse learning needs. Expanding access to plastinates and promoting their integration into curricula could further enhance anatomy education at MCW.

Sophie Voss

Surgical Ligation versus Catheter-Based Device Closure of Patent Ductus Arteriosus in Premature Infants

Authors: Voss SM, Tanem J, Woods RK
Project Mentor: Justinn Tanem, MD; Anesthesiology

There has been a significant trend toward catheter-based device (CD) closure of PDAs rather than surgical ligation (SL). We sought to evaluate outcomes with catheter-based device closure and surgical ligation at Children's Wisconsin. This was a retrospective chart review spanning the intervals of 2019-2023 for CD and 2012-2023 for SL. Inclusion criteria were patient weight < 3 kg at the time of procedure and prematurity (<37 weeks). We excluded the first five CD patients per physician to minimize learning curve bias. The cohort included 59 CD and 111 SL patients. For the CD group, anesthesia time was longer (median 2.70 hours vs 1.45 hours for SL, p-value <0.001), and procedural time was longer (median 0.78 hours vs 0.48 hours for SL, p-value <0.001). CD patients also had a lower median low temperature (36.10°C for CD vs 36.50°C for SL, p-value= 0.001). One SL patient required surgical intervention to close a residual shunt and six CD patients (6 patients for CD vs 1 patient for SL, p- value=0.007) required surgical intervention - all for device migration or embolization. One CD patient with device embolization died secondary to intestinal ischemia. Three SL patients required vocal fold injection. At our institution, compared to SL, CD, while being free of recurrent nerve issues, was associated with longer anesthetic and procedural times and a higher percentage of patients requiring surgical intervention to address a severe complication, resulting in the death of one patient.

Alexa Weber

Determining Factors that Facilitate vs. Hinder Access and Participation in Treatment for Patients with a Substance Use Disorder and Areas for Community Engagement Influence

Authors: Weber AM, Nelson DA
Project Mentor: David Nelson, PhD; Family Medicine

Introduction: Medication for substance use disorder (MSUD) is an evidence-based treatment option for substance use disorder (SUD) that utilizes medications to reduce withdrawal symptoms and cravings to facilitate recovery. Patients often access MSUD through primary care clinics, however, many patients experience co-occurring trauma, poverty, or housing insecurity which can limit consistent treatment engagement. This project explores barriers and facilitators to treatment participation, community engagement strategies physicians can utilize to improve outcomes, and metrics for evaluating treatment success.
Methods: We conducted interviews with healthcare workers, social services professionals, and patients with lived experience around SUD. Previously audio-recorded interviews with patients receiving MSUD were also used. All responses were coded and thematically analyzed through the lens of the Socio-Ecological Model, which considers the interplay between individuals, communities, and society.
Results: This study includes data from 51 interviews. Common barriers include lack of transportation and stable housing, while common facilitators include intrinsic motivation for recovery and a supportive, non-punitive physician. One popular community engagement strategy involves partnering with patients and local organizations to educate the public about addiction and harm reduction with the aim of fostering empathy and reducing stigma. Finally, treatment success should be defined each patient and their individualized goals.
Conclusion: Despite the diverse personal and professional backgrounds of each interview participant, responses were incredibly similar, suggesting that these barriers and facilitators are widely seen and experienced. Further research is needed to explore how key supportive factors can be integrated into treatment programs to assess their impact on patient engagement.

Elizabeth Welsch

Gut microbiome and bile acid changes after rodent sleeve gastrectomy: what comes first?

Authors: Welsch EC, Barron MR, Storage KM, Kazen AB, Aboulalazm FA, Kirby JR, Kindel TL
Project Mentor: John Kirby PhD; Tammy Kindel MD, PhD; Microbiology and Immunology

Background
Understanding how a sleeve gastrectomy (SG) achieves metabolic improvement is challenging due to the complex relationship between the liver, bile acid (BA) pool, and gut microbiome. We hypothesized that SG alters the gut microbiome which then increases the BA pool leading to metabolic efficacy.
Methods
We performed fecal material transfer (FMT) from SG or sham mice to surgically-naïve mice with an intact microbiome. We evaluated the effect of surgery and FMT on BA-related liver enzymes, BA concentrations, and gut microbiome composition via ss and metagenomic analysis.
Results
SG significantly deflected weight gain compared to sham surgery, 5±2 g vs.10±3 g respectively (p= 0.004). SG significantly increased the BA pool and decreased liver transcription of Slc10a1 (p=0.04) and CYP8b1 (p=0.03). Random forest analysis identified several features with significantly increased relative abundance in SG compared to sham mice including Lactobacillus. Examination of metabolic profiles with metagenomic analysis revealed a BA salt hydrolase produced by the Ligilactobacillus species.
FMT of SG stool to surgically-naïve mice significantly decreased the BA pool compared to sham FMT (p=0.034). Unlike SG surgery, we found no effect of SG or sham FMT on bile acid related enzymes in the liver after 14 weeks of treatment.
Conclusion
Overall, we propose that the metabolic benefits of SG surgery are initiated by decreased liver transcription of CYP8b1and Slc10a1 with subsequent increases in the systemic and enterohepatic BA pool including LCA. The gut microbiome adapts to detoxify the altered BA pool with increases in Ligilactobacillus and bile salt hydrolase production.

Jenna Wettstein

Timecourse Single Cell Transcriptomic Analysis in a Human Model of Amnion Formation

Authors: Wettstein JC, Taniguchi K
Project Mentor: Kenichiro Taniguchi, PhD; CBNA

Despite the importance of the amnion for successful pregnancy, there is a large knowledge gap in our understandings of amnion fate specification due to ethical and technological limitations. This lab has pioneered a human pluripotent stem cell (hPSC)-based model of human amniogenesis, which allows us to perform mechanistic investigations into amniogenic events. hPSC can be cultured in specific 3D conditions that mimic the implantation of a blastocyst into the endometrium, allowing the spontaneous formation of pluripotent cysts that differentiate into amnion-like cells. In this study, we sought to explore identify a time course pattern of transcription factor that initiate the amniogenic cascade. Single cell RNA sequencing was performed in the established amnion model. All sample preparation methods (single cell isolation, labeling based on 10X Chromium, barcoding, library preparation and sample submission) as well as in silico analysis methods (alignment, demultiplex (CellRanger) and Seurat-based pipeline) have been previously established. After quality control, we identified 1,500 to 2,000 cells per sample with average reads of ~30,000 per cell. We performed integration of each sample based on canonical correlation analysis implemented in the Seurat package (reduce technical variation across samples), followed by normalization, dimensional reduction, and clustering analysis, which lead to the identification of ~6 clusters. Finally, we plotted this integrated dataset on a dimensionally reduced plot to examine global transcriptomic characteristics as well as lineage progression. Highly expressed genes will be potential candidate for genes involved in amniotic lineage progression and will be knocked out using CRISPR/Cas9-based genome editing strategy.

Laura Whitney

A Novel Abbe-Vermilion Switch Flap for Near-Total Upper Lip Reconstruction

Authors: Whitney, L, Park, K, McMains, C.
Project Mentor: Conner McMains, MD; Plastic Surgery

The Abbe flap is a well-established technique to reconstruct full thickness upper lip defects, while the vermillion switch flap is used for partial thickness myomucosal reconstruction. However, up to this time there has not been a described attempt to combine these techniques to address extensive upper lip defects requiring both components. We present the case of a 31-year-old woman who suffered a dog bite resulting in near complete loss of her upper lip, for which a novel combined Abbe- vermillion switch flap was performed. After complete secondary intention healing of her wounds, the patient was noted to have complete loss of her dry vermillion with effacement of aesthetic upper lip subunits including her central tubercle, philtrum, and cupid's bow with thick constrictive scarring throughout. She had an incisor show of approximately 10mm at rest, leading to oral incompetence. An Abbe flap was planned to address oral competence by reconstructing her philtrum and central tubercle. Lateral myomucosal extensions were added to restore her dry vermillion show. This was completed in a two-stage fashion. Post operatively she was noted to have restored oral competence, improved upper lip volume and contour, and decreased scar burden limiting oral function. The combined Abbe- vermillion switch flap is a feasible approach to address extensive upper lip defects requiring both full thickness and myomucosal reconstruction.

Kelsey Wigand

Navigating ETT Depth: Surfactant Administration in the Delivery Room for Very Preterm Infants

Authors: Wigand K, Gupta R, Cabacungan E.
Project Mentor: Erwin Cabacungan, MD and Ruby Gupta, MD; Pediatrics

Surfactant therapy is crucial for very preterm infants requiring mechanical ventilation for severe respiratory distress syndrome (RDS) with its success hinging on precise endotracheal tube (ETT) placement. We hypothesize that neonatal providers in the delivery room (DR) do not consistently use standardized methods for ETT depth measurement, and their inability to radiographically confirm ETT placement results in inconsistent surfactant delivery in the DR.

A retrospective chart review of ≤32 weeks gestation and intubated in the DR infants admitted to a level 4 neonatal intensive care unit (NICU) from 01/2021- 12/2022. In 06/2023, we surveyed neonatal providers using a non-probability convenience sampling method to assess preference for ETT depth measurement and challenges of administrating surfactant in the DR. For analysis, we compared the demographics, L&D characteristics, and outcomes of infants who got their first dose of surfactant in the DR vs. NICU using the Chi-square and Fisher's exact tests, Mann-Whitney, or Students T-tests.

Out of 266 infants, 53% were intubated in the DR. Of those, 84% received surfactant, but only 29% in the DR. Infants in the DR surfactant group were younger, had lower birth weight, and had lower Apgar scores. There was similar ETT depth location for both groups [between thoracic inlet and above carina (51%), below carina (12%), at carina (22%), and above thoracic inlet (15%)]. Out of 42 survey respondents, 49% use Tochen's formula for ETT depth measurement, and 40% would only give surfactant after x-ray confirmation.

Our findings underscore challenges surrounding DR surfactant administration where infants are more unstable at birth. Among neonatal providers, Tochen's formula is the predominant choice of ETT depth measurement. Our next step includes formulating and implementing a consistent method for ETT depth measurements and surfactant administration guidelines.

Elias Wojahn

Outcomes in Pediatric Septic Shock Patients Receiving Vasoactive Medications Given Early Nutrition: A Retrospective Cohort Study

Authors: Wojahn E, Zhang L, Pan A, Mikhailov T
Project Mentor: Theresa Mikhailov, MD, PhD; Pediatrics

Background: Previous guidelines lack sufficient data to comment on the safety of enteral nutrition in critically ill children. We retrospectively investigated the impact of early enteral versus parenteral nutrition on PICU length of stay (LOS) and mortality. We hypothesized that receiving early enteral nutrition was associated with better outcomes.
Methods: We obtained demographic and outcome data for pediatric patients admitted to the PICU at Children's Hospital Wisconsin for sepsis or septic shock including those treated with vasoactive medications from Virtual Pediatric Systems, LLC (VPS) database, a data registry for PICU patients. We obtained details of nutrition administered and vasoactive medications by chart review. We compared categorical variables by Chi-square tests and continuous variables by non-parametric tests.
Results: Of the 636 patients that met study criteria, 401 received vasoactive medication. Of these 95 patients met the early enteral nutrition goal and 51 met the early protein goal. Meeting either goal was associated with longer LOS, even after accounting for severity of illness and use of vasoactive medications. Meeting either goal was not associated with a mortality benefit after controlling for severity of illness and use of vasoactive medications.
Conclusion: Early enteral nutrition in children with sepsis or septic shock was not associated with a difference in mortality but was associated with longer PICU LOS.

Steven Xu

Risk factors and timing of incisional hernia development following ostomy reversal: a retrospective analysis

Authors: Xu SY, Zhou J, Sherman BE, Peterson CY, Goldblatt MI
Project Mentor: Matthew I. Goldblatt, MD; Surgery

Introduction: Former stoma-site incisional hernia (FSH) is a common complication after ostomy reversal, with a variable reported incidence of up to 50%. Current literature suggests that FSH is underreported due to the lack of a definitive under- standing of the timeline of its occurrence and recurrence, making FSH prevention a clinical dilemma. This study identifies FSH risk factors and diagnostic timeline to aid surgeons' clinical decision-making.
Methods: A retrospective chart review was conducted on 340 patients who underwent ostomy reversal between January 1, 2016, and December 31, 2021. Data collected include demographics, medical history, course of ostomy treatment, and hernia diagnosis. Logistic regression and Kaplan-Meier analysis were used to identify risk factors and understand the timeline of hernia occurrence.
Results: The total incidence of hernia, including patients who had a parastomal hernia before ostomy reversal, FSH after reversal, or both, was 38.8%. The incidence of former stoma-site hernia alone was 24.4%. Significant risk factors identified were elevated BMI, presence of parastomal hernia, hypertension, diabetes, immunosuppression, and the emergency nature of the case. Kaplan-Meier analysis showed that patients with either parastomal hernia prior to ostomy reversal or obesity had a greater than 35% likelihood of being diagnosed with FSH within the first 2 years following reversal. Other risk factors, including chemotherapy, radiation therapy, ostomy history, hernia history, smoking, and type of ostomy, lacked significance. The median time between ostomy reversal and the first FSH diagnosis was 295 days, and 84.3% of the cases were diagnosed within the first 2 years.
Conclusion: Patients with ostomy are at substantial risk of developing FSH throughout the entire span of ostomy treatment. Patients with a high BMI, a parastomal hernia before ostomy closure, diabetes, and hypertension are at even higher risk of developing FSH.

Kevin Young

Characterizing Medical Management Strategies in Type B Aortic Dissection: A Single-Center Retrospective Review

Authors: Young KP, Carver TW
Project Mentor: Thomas W Carver, MD; Surgery

Background: Uncomplicated Type B Aortic Dissection (TBAD) is managed nonoperatively with anti-impulse therapy aimed at reducing aortic wall stress. However, standardized protocols guiding such medical management strategies remain limited. This study aims to characterize impulse control approaches used in TBAD and identify early indicators of failure in nonoperative management.
Methods: A retrospective review was conducted of patients admitted to a tertiary care center for medical management of acute TBAD over a 5-year period. Data collected included demographics, medical history, anti-impulse medications used, surgical interventions, and length of stay metrics. Statistical analyses included descriptive measures and logistic regression to assess predictors of medical management failure.
Results: Of the 73 patients, 25 (34.2%) required surgical intervention, indicating medical management failure. All patients received one or both first-line anti-impulse agents (esmolol and/or nicardipine) with 79.5% requiring additional agents. Receiving three or more different impulse control medications was associated with higher failure rates. Younger age was significantly associated with failure (53.0 ± 11.4 vs. 64.0 ± 16.7 years; $p<0.05$), while sex and BMI were not predictive.
Conclusions: Over one-third of patients admitted for medical management of TBAD ultimately failed, requiring surgical intervention during the index admission. The need for increasingly aggressive anti-impulse therapy in the form of additional agents, as well as younger patient age were both predictive of eventual failure of medical management. The insights gained from this analysis will assist in development of future research, which should focus on evaluating specific anti-impulse medications and their efficacy in achieving and maintaining hemodynamic targets.

Tobi Yusuf

Effectiveness of Urban Faith-Based Mental Health Programming: Perspectives of Congregations

Authors: Yusuf HO, Jandrisevits MD
Project Mentor: Matthew D. Jandrisevits, PhD; Psychiatry and Behavioral Medicine

Religious congregations can offer needed and acceptable mental health resources for members of religious communities who face barriers to mental healthcare due to stigma or access barriers. This study examines stigmatizing beliefs and barriers to mental health care in urban faith-based communities by comparing individuals' personal beliefs with their perceptions of congregational beliefs regarding mental illness. It also assesses awareness and the benefit of congregation-based mental health outreach programs. Surveys (n=41) were distributed to congregations in Milwaukee, Wisconsin, measuring demographics, attitudes toward mental illness, engagement in mental health programming, and perceived benefit of those services to their congregations. Participants from multiple faith traditions were included in this study. Results indicated that while 97% of congregants held positive views on mental health and treatment, only 74% believed their congregation shared this acceptance (McNemar $p < .01$). Additionally, 42% were unaware of any congregational mental health resources despite their congregations having available resources. Those who engaged in any mental health program viewed all congregational outreach programs as more beneficial than non-participants (ANOVA $p < .05$). Findings suggest congregations should enhance and promote mental health outreach to foster acceptance and reduce stigma in faith-based communities, as these are perceived as beneficial among members of religious congregations.