The image shows the front entrance of the Medical College of Wisconsin building. The building is a multi-story structure with a combination of red brick and light-colored stone or concrete panels. Large windows with blue-tinted glass are prominent. The entrance is centered and features a set of glass doors under a small overhang. Above the entrance, the words "MEDICAL COLLEGE OF WISCONSIN" are displayed in dark, bold, sans-serif capital letters. In the foreground, there is a large, vibrant bush of yellow daylilies. The overall scene is well-lit, suggesting daytime.

**MEDICAL COLLEGE
OF WISCONSIN**

Scholarly Pathways

**Scholarship Forum
Class of 2018**



Director of Scholarly Activities: Pat Lye, MD

Scholarly Pathway Directors

| | |
|---|--|
| Bioethics | Cynthiane Morgenweck, MD, MA Arthur Derse, MD, JD |
| Clinical & Translational Research (<i>Physician Scientist</i>) | David Brousseau, MD, MS |
| Clinician Educator | Joseph Budovec, MD |
| Global Health | Stephen Hargarten, MD, MPH Bruce Campbell, MD |
| Health Systems Management & Policy | John Meurer, MD, MBA William Hueston, MD |
| Molecular & Cellular Research (<i>Physician Scientist</i>) | Jennifer Strande, MD, PhD |
| Quality Improvement & Patient Safety | Catherine Ferguson, MD |
| Urban & Community Health | Linda Meurer, MD, MPH Rebecca Bernstein, MD, MS |

Scholarly Pathway Coordinators

Meaghan Hayes, MEd

Jen Kraus

Sarah Leineweber

Scholarly Pathways 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 participate during M3 year, of which 122 Class of 2018 students were accepted to participate.

Each Pathway 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.

Students must complete a faculty-mentored Scholarly Project which meets *Glassick Criteria for Scholarship* by the end of M3 year regardless of M3 Pathway participation. Current M3s and their Scholarly Projects are featured here.

CLASS OF 2018

SCHOLARLY PATHWAYS SCHOLARSHIP FORUM

THURSDAY, JUNE 29, 2017

1:00 PM

WELCOME

KERRIGAN AUDITORIUM

Connie Truong, Junior Medical Student, Emcee

Opening Remarks

Leonard Egede, MD, MS

Director, Center for Patient Care and Outcomes Research

Professor of Medicine & Eminent Scholar

Chief, Division of General Internal Medicine

Associate Director for Cancer Disparities, MCW Cancer Center

1:15 PM

PODIUM PRESENTATIONS

KERRIGAN AUDITORIUM

Alexandra Dyer

Patient Perceptions of Weight Loss: Implications for Patients, Providers and Trainees

Urban & Community Health Pathway

Franklin Chang

Expediting Diagnosis of Diabetic Ketoacidosis in the Pediatric Emergency Department

Quality Improvement & Patient Safety Pathway

Ruben Rauchaadhuri

Function of IGE in Anti-Viral Immunity

Molecular & Cellular Research Pathway

Jordan Rennie

Physical Activity Habits in Medical Students at MCW

Health Systems Management & Policy Pathway

Jaron Smith

A Qualitative Analysis on Substance Abuse and Care Engagement Amongst PLH in Russia

Global Health Pathway

Sheridon 'Sam' Cooper

With Ashley Chinn

Joining Forces Initiative: Military Medical Academic Enrichment Elective

Clinician Educator Pathway

Clinical & Translational Research Pathway

Sandeep Jain

Nasal Fiberoptic Endoscopic Evaluation to Predict Obstructive Sleep Apnea

Clinical & Translational Research Pathway

Vincent Yang

Debating Physician-Assisted Suicide: a Rational Discussion

Bioethics Pathway

Students Moderators: Junior Medical Students

Alex Barr; Courtney Gaberino; Douglas Pierce

2:45 PM

POSTER PRESENTATIONS

ALUMNI CENTER

Refreshments served

4:15 PM

ADJOURN

BIOETHICS



**Cynthiane Morgenweck, MD,
MA**

Art Derse, MD, JD

Enables students to integrate knowledge and tools of bioethics as an essential part of the physician career.

CLINICAL & TRANSLATIONAL RESEARCH



David Brousseau, MD, MS

Offers instruction of essential research skills in the area of clinical and bench-to-bedside research.

CLINICIAN EDUCATOR



Joseph Budovec, MD

Students gain skills needed to teach in a clinical setting, learn how to apply educational principles to their teaching, and develop a scholarly educational product.

GLOBAL HEALTH



**Stephen Hargarten, MD, MPH
Bruce Campbell, MD**

Designed for students seeking to understand the causes of, and finding solutions to, the challenges and disparities in the health status of worldwide populations.

M3 SCHOLARSHIP FORUM



The M3 Scholarship Forum celebrates the Scholarly Projects completed by each member of the graduating Class of 2018. Projects not listed as POSTER or PODIUM were presented previously. HALLWAY posters are special featured projects.

HEALTH SYSTEMS MANAGEMENT & POLICY



**John Meurer, MD, MBA
William Hueston, MD**

Enables students to engage in the changes shaping our health care system.

MOLECULAR & CELLULAR RESEARCH



Jennifer Strande, MD, PhD

Students acquire core research skills in the area of basic sciences to encourage a career as a Physician Scientist.

QUALITY IMPROVEMENT & PATIENT SAFETY



Catherine Ferguson, MD

Provides students with the core principles and skills necessary to understand and analyze the systems-based aspects of patient care and safety.

URBAN & COMMUNITY HEALTH



**Linda Meurer, MD, MPH
Rebecca Bernstein, MD, MS**

Prepares students to effectively care for patients in urban communities, promote community health and reduce health disparities.

Notification Process in Exception From Informed Consent Studies**Authors:** Lerner B, Blalock M**Project Mentor:** Brooke Lerner, PhD

Introduction: The goals of this project were to identify similarities and differences in the notification process used in studies that followed the Exception from Informed Consent (EFIC) in Emergency Settings regulations (21CFR50.24), and to propose a standardized guideline for future EFIC studies. Methods: This was an observational study using an internet based survey to obtain information on the standardized operating procedures for the required subject/family notification process across several multi-center cardiac arrest related clinical trials. Results: Each site's method of notification was via letter/phone, however the timeline for notification ranged from 2-21 days, and demonstrated variability in whether or not a script was used to express condolences or explain the nature of the study. Discussion: Our research demonstrates a lack of standardization in the notification process; furthermore, emphasizes the importance of balancing respect for grieving family members and patients with the goals of the study.

A Diagnostic Evaluation of Froedtert's Short-Term Readmitted Patient Population**Authors:** Rachael Bodes, James Billings**Project Mentor:** Jonathan Rubin, MD

To avoid penalties established under the Hospital Readmissions Reduction Program, we aimed to identify the top initial diagnoses that resulted in short-term hospital readmissions and hoped to identify specific patient populations at high risk of readmission. Patients admitted to Froedtert Hospital from 1/1/2015 to 9/30/2015, who returned to the Froedtert emergency department within 30 days were analyzed for this study, constituting approximately 6,765 emergency department visits. Patients initially admitted for septicemia (ICD 038) represented the largest group of patients who visited the ED within 30 days of initial hospital discharge. Among this group, 137 were seen in the ED and discharged to home, while 261 were seen in the ED and readmitted to the hospital. This information, can pave the way for further research to be conducted in establishing ways to reduce short term readmissions for all patients.

A Narrative Inquiry into Physician Impairment**Authors:** Falk CM, Campbell B**Project Mentor:** Bruce Campbell, MD

Case reports and nonfiction essays are often used to frame academic discourse about ethical dilemmas. The author of this paper drafted a work of fiction" an experiential investigation into how imagined accounts, and the process of developing such accounts, might enhance our understanding of complex situations. Methods: A student writing group was formed. Sessions consisted of free-writing exercises on topics in medical ethics. Results: When the material generated was adequately informed by human experience, it attained sufficient emotional authenticity to maximize reader engagement with ethically-relevant content. The author's final piece of writing was inspired by an encounter with diversion program participants and their characterization of physician impairment. Conclusion: Fiction can provide a unique access point for evaluating scenarios of ethical ambiguity. It may have special utility for consideration of desires and behaviors that reflect poorly on health care professionals.

Engagement Study for MCW Genomics

Authors: Kimberly A. Strong, PhD; Nathanael Holman, BS; Kaija Zusevics, MPH, PhD; Michael Farrell, MD; Alison LaPeau Kirschner, MS, CGC; Jessica Jeruzal, BA; Thomas May, PhD; Ryan Spellecy, PhD; Arthur Derse, MD, JD

Project Mentor: Kimberly A. Strong, PhD

The Program in Genomics and Ethics, in collaboration with the Human Molecular Genetics Center, conducted a qualitative engagement study in order to better understand and describe the attitudes, hopes and concerns of MCW employees regarding genome sequencing in general, and genome sequencing in the workplace. The aim of the study was to explore the perceived benefits and risks of having genome sequencing done within one's workplace and provide a forum for discussion. A wide range of attitudes, concerns, and questions that MCW employees had regarding genome sequencing were identified including excitement about the possible benefits related to improved diagnostic and treatment opportunities, questions about the cost, access, and meaning of genomic information, as well as fears about discrimination and misuse of their personal sequence information. The ideas and attitudes identified in this study can be used to inform future workplace genomics research projects in order to address employees' concerns.

Macronutrient Meals Normalize Glucose/Insulin in Impaired Glucose Tolerant Teenagers

Authors: Lynch A, Coe G, Nadeau K, Cree-Green M

Project Mentor: Jacquelyn Kuzminski, MD

Purpose: Obese adolescent girls with impaired glucose tolerance (IGT) are at risk for developing Type 2 Diabetes. Postprandial hyperglycemia is impacted by liquid carbohydrate consumption, but it is unclear if the addition of protein/fat mitigates this response. **Methods:** Seven overweight post-menarchal adolescent females completed an oral glucose tolerance test (OGTT), followed by carbohydrate/protein/fat shake consumption. Glucose and insulin levels were drawn hourly. Responses were measured via area under the curve and then compared via students 2-tailed T-test. **Results:** Both glucose and insulin concentrations trended higher with OGTT. Glucose trended higher for IGT vs. NGT girls with OGTT; however, IGT glucose and insulin levels were comparable to NGT with shake consumption. **Conclusion:** The addition of protein/fat to carbohydrate drinks mitigates the peak glucose response in obese teenage girls. The normalization of postprandial glucose in IGT subjects suggests pre-diabetic teenage girls may experience metabolic benefit from mixed macronutrient meals.

Making Health Literacy Child's Play: An Unconventional Approach to Patient Education

Authors: Myers E, Huppler A

Project Mentor: Anna Huppler, MD

Despite profound advancements in infectious disease prevention through vaccination, there is a sweeping "anti-vaxxer" movement promoting immunization non-compliance. The misinformation propagated by the members of this movement is directly affecting many parents' decisions whether or not to vaccinate their children. The consequence of this negligence has been seen in a startling resurgence of previously controlled and eradicated infectious diseases. Efforts to educate the public on the benefits of routine vaccination have largely become the responsibility of primary care physicians. With limited time and resources to engage parents in discussions of immunology it is often impossible to provide enough information to combat the vast amount of misinformation that is only ever a click away. Through producing a children's book detailing how vaccines work to provide immunity, I hope to provide an essential tool that targets an untapped approach to the fight to keep our parents informed and our children immunized.

Debating Physician-Assisted Suicide: A Rational Discussion**Authors:** Yang VG, Spellecy R**Project Mentor:** Ryan Spellecy, PhD

Physician-assisted suicide refers to the intentional killing of one-self by one-self with the aid of a physician. On the surface, the act appears to be one that goes against all of the basic instincts we have to survive, but the issue is much more complex. This paper rationally looks at Physician-assisted suicide through the perspectives provided by Principlism and explores the conclusions reached by each of the four main pillars of Principlism, namely: autonomy, beneficence, non-maleficence, and justice. Through the discussion of Physician-assisted suicide and its oppositional views, it is hoped that medical professionals will gain a greater understanding into the topic beyond their initial gut reaction and be able to formulate their own thoughts using rational and valid approaches.

Telephone Encounters in Pediatric Functional Gastrointestinal Disorders**Authors:** Alvarez A, Erato G, Beesley C, Silverman A, Miranda A**Project Mentor:** Adrian Miranda, MD

Pain-predominant functional gastrointestinal disorders (FGIDs) refers to a group of disorders that cause pain in the absence of disease and are the most common cause of abdominal pain in children. Chronic pain from FGIDs can be concerning and often leads to a high number follow-up telephone calls placed to our clinic. All telephone calls must be triaged and logged by nursing staff; a process that can be time consuming. Our goal was to search for an association between pain symptoms and telephone call volume to determine if we could identify patient profiles that call more often. We hypothesized that children who present to clinic with higher and longer duration of pain have higher telephone encounters within the first year. We retrospectively reviewed telephone encounters and found no significant correlation between pain symptoms and number of phone calls. These findings were not expected but conceivable given the complex nature of FGIDs.

Suppression Impairment in Aging During Bimodal Selective Attention**Authors:** Athreya A, Humphries C, Kassell M, Altonji K, Sabri M**Project Mentor:** Merav Sabri PhD

We investigated the effects of aging on brain activation in auditory cortex and the FPN and CON executive control networks during bimodal selective attention. fMRI was acquired in 18 younger and 18 older adults with normal hearing thresholds and cognitive function. In five task runs, syllables were presented simultaneously in the visual and auditory modalities. Subjects attended to either the auditory or visual modalities and performed a discrimination task, with the other modality serving as a distractor. Distractor syllables were either Fixed or random. Results showed left STG enhancement during AA only in older adults; right STG suppression during AV only in young adults. Effects of distraction observed only for AV (Random>Fixed) showed greater activation in CON and FPN for older adults during randomly presented distraction. Overall these results indicate that older compared to younger adults have greater difficulty suppressing specifically task-irrelevant auditory information when faced with bi-modal stimulation.

Reliability of EOS System in 3D Modeling of Patients with Idiopathic Scoliosis**Authors:** Bagheri A, Liu X-C, Tassone C, Thometz J, Tarima S**Project Mentor:** Xue-Cheng Liu, MD, PhD

Introduction: The EOS imaging system has provided advancements in 3D spinal modeling. The purpose of this study is to determine the inter- and intra-observer (IAIO) reproducibility of the 3D spinal models in children with idiopathic scoliosis (IS). Methods. Biplanar x-ray images of fifteen patients with IS were uploaded into the sterEOS software to perform spinal modeling. The intra-class correlations (ICC) between IAIO were calculated and compared for specific spinal parameters. Results. ICCs between IAIO were significant for all parameters ($P < 0.05$). There was substantial inter-observer agreement for the AVR in the TL/L region and for the AVR in the T region. One rater had substantial intra-observer agreement for the AVR in the TL/L region while another rater reported moderate to substantial intra-observer agreement in both the T and TL/L regions. Conclusion. The EOS system is reliable and accurate results in the 3D spinal modeling of children with IS.

Neoadjuvant Chemoradiotherapy Versus Surgery in Gastric and Gastroesophageal Junction Cancer: A Single Institutional Review**Authors:** Baltrusaitis DA, Cheng H, Banerjee A, Eastwood A, Rajeev R, Gamblin TC, Turaga KK, Johnston FM**Project Mentor:** Fabian Johnston MD

Background and Objectives: Current data suggest equivocal results in patients receiving neoadjuvant chemoradiation therapy (CRT) to supplemental surgery for gastric and gastroesophageal junction cancer. We aimed to report the results of this treatment paradigm at our institution. Methods: Patients with either gastroesophageal junction or gastric adenocarcinoma undergoing neoadjuvant CRT followed by planned surgical resection and those undergoing surgery first approaches at our institution were reviewed. Results: Twenty-nine (35%) patients were grouped into the neoadjuvant therapy (NT) arm and 54 (65%) were grouped into the surgery alone (SA) arm. The median 5-year OS was 51% for SA and 42% for NT ($p = 0.43$). Multivariate cox-regression analysis yielded a hazard ratio of 1.49 (0.55-4.06, $p = 0.43$) for NT compared to SA. Conclusions: Preoperative CRT was well tolerated in comparison to surgery alone with acceptable rates of morbidity and mortality. Further study comparing equivalent groups of neoadjuvant CRT to surgery alone is needed.

Assessing Range of Motion Following Total Ankle Arthroplasty**Authors:** Brennan SM, Huntington WP, Marks RM**Project Mentor:** Richard Marks, MD

Background Total ankle arthroplasty (TAA) is an accepted option for the treatment of end-stage ankle arthritis. This study compares the ROM outcomes of TAA assessed using goniometric measurements with those of two radiographic measurement techniques. Methods Preoperative and 2 year postoperative dorsiflexion, plantarflexion, and sagittal ROM were evaluated for 40 TAAs using goniometry and two radiographic techniques involving the talus (ankle method), and medial cuneiform (full foot method). Results Mean postoperative sagittal ROM assessed using goniometry, the ankle method, and the full foot method increased by 12.2 ± 11.3 degrees ($P < .0001$), 5.3 ± 11.0 degrees ($P = .003$), and 2.5 ± 11.1 degrees ($P = .28$), respectively. Goniometric and ankle measurements were moderately correlated pre- and postoperatively ($r_s = 0.43$, $r_s = 0.63$, respectively). Conclusion While goniometry tends to overestimate ankle ROM relative to radiography, it may serve as a cost-effective indicator of postoperative changes in ankle ROM.

Hypertension During Weight Lifting Reduces Flow Mediated Dilation in Non-Athletes**Authors:** Buchanan CE, Hoch AZ, Gutterman DD, Durand MJ**Project Mentor:** David Gutterman, MD & Matthew Durand, PhD

It is unknown if increased systolic blood pressure or a circulating neurohumoral factor is the damaging stimulus which reduces vasodilation in non-athletes who perform resistance exercise. We hypothesize that attenuating the rise in brachial artery pressure during weight lifting prevents post-exercise impairment of brachial artery flow-mediated dilation (FMD). Nine sedentary and six exercise-trained individuals performed maximal exertion leg press exercises on two occasions and had brachial artery FMD assessed using ultrasonography. During one visit, a blood pressure cuff was inflated to 100 mmHg on the upper arm to protect the distal vasculature from the exercise-induced hypertension. Without the cuff, FMD in sedentary individuals was significantly reduced after weight lifting, while in exercise-trained individuals FMD was unchanged. Protecting the brachial artery from exercise-induced hypertension enhanced FMD in sedentary and exercise-trained individuals. These results indicate that increased systolic blood pressure is responsible for reducing FMD following resistance exercise in sedentary individuals.

Laser Versus Pneumatic Lithotripsy for Bladder Calculi: Which is Faster?**Authors:** Patrick C. Budny, Marcus J. Lacey, Michael A. Avallone, Carley M. Davis**Project Mentor:** Carley M. Davis, MD

Introduction Endoscopic management of bladder calculi can be performed with either holmium laser or pneumatic lithotripsy. The aim of our study is to determine which lithotripter is more time efficient to treat bladder stones. Methods Retrospective review was conducted for patients undergoing cystolitholapaxy from 2011 to 2016. Stone parameters were calculated from pre-operative CT imaging and procedure time was extracted from the electronic medical record. Statistical analysis was performed with analysis of covariance. Results 13 patients underwent pneumatic lithotripsy utilizing the Cook Stone Breaker® and 26 patients underwent laser lithotripsy with a 100W Holmium laser. When controlling for stone volume, laser lithotripsy requires on average 1.6 times longer than pneumatic lithotripsy ($P=0.0212$, 95% confidence interval 1.08, 2.37). Conclusions Pneumatic and holmium laser are effective to treat bladder calculi, however, pneumatic lithotripsy is more time efficient.

False Localization with Subdural Electroencephalography Due to Gyral Overlap**Authors:** Chan AY, Hecox KE, Lew S**Project Mentor:** Sean Lew MD

Background: Subdural electrodes are commonly used to identify the epileptogenic zone(s) (EZ) in patients with medically refractory epilepsy. Accurately locating a patient's EZ is crucial to the success of any subsequent resective surgery. Patient Description: The patient was an 8-year-old boy with medically refractory epilepsy. Ictal episodes were characterized by clonic stiffening of the right upper extremity followed by Todd's paralysis. Pre-operative workup indicated that the ictal onset was in the left peri-rolandic region. Electroencephalography (EEG) data from subdural electrodes, co-registered to intraoperative photography and postoperative imaging, implicated two gyri. The EZ was actually restricted to one gyrus that extended obliquely beneath an adjacent gyrus, leading to false localization. Conclusion: Subdural electrodes can produce false localization due to gyral overlap.

Joining Forces: Military Academic Enrichment Elective**Authors:** Chinn A, Cooper S, McBride-Hayes M, Kiehl C, Lee K, McBride M**Project Mentor:** Kenneth Lee, MD

The Medical College of Wisconsin, though a part of the Joining Forces Initiative, demonstrates a clear deficit in preparing its students with the knowledge and skills pertinent to the challenges faced by military service members, both past and present, and their families. This course, designed for M1 and M2 students, addresses in six core sessions military ethos, TBI, blast injuries, stressors of deployment, PTSD, and social stigma specifically related to the military community. Not only will this course provide students with necessary knowledge for the USMLE but also bridge the gap that exists between teaching institutions, students, and the Department of Defense in regards to the commitment involved in serving in the military while pursuing higher education. As an Academic Enrichment Elective, this course will serve an institutional and national need, better preparing MCW students in both their professional and community endeavors.

Bioabsorbable Pledget Reinforcement Reduces Complications in Open Ventral Hernia Repairs**Authors:** Cho JE, Helm MC, Helm JH, Kastenmeier AS, Gould JC, Goldblatt MI**Project Mentor:** Matthew Goldblatt, MD

Absorbable synthetic mesh is a safer alternative to biologic or synthetic mesh for contaminated and high-risk wounds. We hypothesized that a novel bioabsorbable pledget technique and retrorectus placement of mesh will independently enhance midline fascial closure reinforcement. This is a retrospective review of patients who underwent open complex ventral hernia repair at MCW between September 2011 and January 2015. Eighty-one patients were included in the study (39 pledget, 42 non-pledget; 74 retrorectus, 7 intraperitoneal placement). Patient demographics, including preoperative comorbidities, did not differ between groups in either scenario (reinforcement or mesh placement). The pledget group had a significantly lower incidence of 30-day postoperative complications than the non-pledget group ($p=0.01$). In terms of mesh placement, the retro-rectus group showed significantly lower recurrence rates than the intraperitoneal group ($p<0.05$). Thus, a general consensus on implementation of pledgets and mesh placement should be considered in ventral hernia repairs.

Conversion to Resectability in Unresectable Metastatic Colorectal Cancer Chemotherapy Trials**Authors:** Chrabaszcz S, Rajeev R, Klooster B, Chinn A, Gamblin TC, Johnston F, Banerjee A, Turaga K**Project Mentor:** Kiran Turaga, MD, MPH

Patients with metastatic colorectal cancer (mCRC) undergoing surgical metastasectomy have been shown to derive significant survival benefit with potential for cure. We hypothesized that conversion to resectability (c2r) is correlated with increased overall survival in patients with unresectable mCRC. A systematic review was utilized to identify randomized clinical trials published after 2003. Trials were classified based on difference in c2r between study arms (<2 , $2-2.9$, ≥ 3 %). Out of 2,902 studies reviewed, 30 satisfied selection criteria ($n=13,618$ patients). Median c2r was 7.3%, with maximum c2r of 28.6%. Median survival difference between study arms with minimal c2r difference ($<2\%$) was 0.8 months, compared to 1.6 months with higher c2r ($\geq 3\%$). Incremental dose effect response was noted with increasing c2r leading to improved survival in regression models ($p=0.021$). Higher response rates correlated with higher c2r ($p=0.003$). Conversion to resectability is positively correlated with survival improvement in trials examining therapies for unresectable mCRC.

Hematopoietic Stem Cell Transplantation Versus Maintenance Chemotherapy in AML**Authors:** Crabtree M, Carlson KB**Project Mentor:** Karen-Sue Carlson, MD, PhD

AIM: Our aim was to compare two treatment options in patients with anaplastic myeloid leukemia (AML). BACKGROUND: We compared survival outcomes of consolidation chemotherapy versus bone marrow transplant (BMT) for treatment of different risk groups of AML, as defined by European LeukemiaNet (ELN) objective criteria, based on cytogenetics. Current risk assessments are outdated, and there is need to reassess risks as these treatments have developed. METHODS: We performed a retrospective study of 87 patients who received a diagnosis of AML after 2005 and who have been seen at Froedtert hospital for their cancer care, where we compared survival using Kaplan-Meier curves between both treatment groups (BMT vs. chemotherapy), and made this comparison across each ELN risk group. RESULTS: Only the advanced AML patients had a survival benefit when receiving BMT ($p = 0.0022$). The intermediate and favorable risk groups showed a similar trend, but were not significant ($p > 0.05$).

Comparing CPR Quality Measurement Data in a Two-Tiered EMS System**Authors:** Ding P, Kinzel AJ, Jastie J, Aufderheide TP**Project Mentor:** Tom P. Aufderheide, MD, MS

With a two-tiered EMS system, comparisons of CPR quality were made between the first five minutes and the overall and remaining episode, and between BLS and ALS. For the first five minutes versus the overall episode, the compression depth (cm) was 5.11 versus 5.17 ($p=.0379$), compression rate (compressions/min) was 111.50 versus 114.47 ($p<.0001$), and adjusted no-flow-rate (NFRadj) (%) was 15.07 versus 12.89 ($p<.0001$). For the first five minutes versus the remaining episode, the compression depth was 5.11 versus 5.18 ($p=.0316$), compression rate was 111.5 versus 115.12 ($p<.0001$), and NFRadj was 15.07 versus 12.28 ($p<.0001$). For BLS versus ALS, the compression depth was 5.05 versus 5.14 ($p=.0568$), compression rate was 110.11 versus 115.35 ($p<.0001$), and NFRadj was 15.65 versus 11.25 ($p=.0003$). The differences are statistically significant but clinically insignificant, suggesting that using the first five minutes of data is acceptable for CPR quality research and CPR by BLS and ALS are comparable.

Biomechanical Properties of Cardiomyocytes in Hypoplastic Left Heart Syndrome Patients**Authors:** Dyrud P, Tomita-Mitchell A, Mitchell M, Goetsch M, Mahnke D, Krolikowski M, Fitts R**Project Mentor:** Aoy Tomita-Mitchell, PhD**Community Partner:** Marquette University

Introduction: HLHS is one of the most severe forms of congenital heart defects and we sought to understand why HLHS patients with a mutation in the alpha myosin heavy chain (MYH6) fare worse than their non-variant HLHS counterparts. Hypothesis: HLHS patients with MYH6 variants will show distinct differences in several contractile properties. Specific Aims: Compare three groups: healthy, HLHS MYH6 variants, and HLHS MYH6 non-variants. Methods: We used atrial septum surgical discards obtained from the CHW Tissue Bank. 3-5 cell (60x100 μ m) preparations were connected between a force transducer and torque motor arm by placing both ends of the cardiomyocytes into troughs and fixing each end with monofilament suture. Contractile properties were measured by subjecting cardiomyocytes to physiologic activating solution while undergoing various lengthening and shortening protocols. Results: We found significantly reduced power generating capacity in HLHS cardiomyocytes and this data supports the flow hypothesis of hypoplastic congenital heart disease.

Biomechanical Effects of Cadaveric Hip Capsulotomy and Capsular Repairs**Authors:** Smith S, Easterday P, McGrady L, Douros D, Wang M**Project Mentor:** Demetrios Douros, MD

During hip arthroscopy, an incision is often made through the capsular ligaments that provide static and dynamic hip stability. Repair of these ligaments following completion has been highly debated. We hypothesize that capsulotomy will cause significant hip joint instability due to increased joint laxity and range of motion, and the magnitude of instability is dependent on joint flexion-extension. We hypothesize that complete surgical capsular repair can restore native hip joint kinematics. Human cadaveric hemipelvis-femur model will be used to investigate loading responses of the hip joint while undergoing simulated full range of external rotation. Data on external rotation torques, femur angles, and relative hip joint movements will be collected and used to evaluate stability. This process will be repeated with capsular tissues at various stages of repair, and at various hip flexion-extension positions. ANOVA will be used to compare significant changes in biomechanical measures between various capsule conditions ($\alpha=0.05$).

Clinical Assessment and Treatment of Humeral Head Avascular Necrosis**Authors:** Ellison C, Ristow J, Berg K, Haidet K, Mickschl D, Grindel S**Project Mentor:** Steven Grindel, MD

Background: This retrospective study aimed to evaluate the efficacy of surgical intervention for humeral head avascular necrosis (HHAVN). Methods: Forty-five shoulders treated for HHAVN between 2004 and 2015 were reviewed and divided based upon treatment received which included: total shoulder arthroplasty (TSA), hemiarthroplasty, and physical therapy. The three treatment groups were evaluated based upon preliminary vs. follow-up shoulder functionality scores, and complication rates. Results: At a median follow-up time of 2.7 years, the patients who received TSA ($n=10$) and hemiarthroplasty ($n=19$) showed significantly greater improvement and had significantly higher follow-up scores in all five shoulder scoring methods as compared to patients that underwent physical therapy ($p < 0.05$). Conclusions: This study demonstrates that shoulder functionality can be improved with shoulder arthroplasty as compared to physical therapy when surgical intervention is indicated.

Correlation of Anterior Wall Index and Anterior Center Edge Angle**Authors:** Ershadi S, Schwab J, Baynes K, Carrera G, Stetz M**Project Mentor:** Joseph Schwab, MD

The Anterior Center Edge Angle (ACE) is a validated measurement for evaluating shape, depth, or rotation of the acetabulum, but is only obtained on a standing false profile pelvis x-rays. Another measurement, the Anterior Wall Index (AWI) measures coverage of the anterior acetabulum and is obtained on AP pelvis radiographs that are routinely taken intraoperatively. Our hypothesis is that the AWI will directly correlate with ACE, therefore, allowing surgeons to evaluate anterior wall coverage via the AWI measurement intraoperatively to confirm success of corrective acetabular surgeries. The parameters were measured on radiographs from 36 adult patients without corrective acetabular surgeries or excessive degeneration, analyzed for correlation via Bland and Altman plots, and reliability via interclass correlation coefficient. ICCs for ACE and AWI were both 0.90, and the plots showed agreement between them. This suggests that these measurements are correlated and could be used interchangeably to analyze intraoperative anterior acetabular coverage.

Early Psychological Intervention in the Trauma Population: A Pilot Study**Authors:** Fredrickson KA, Carver TW, Kugler NW, deRoos-Cassini T, Paul JS**Project Mentor:** Thomas Carver, MD

Trauma patients have long-lasting, significantly diminished quality of life (QOL) associated with anxiety. Heart rate variability biofeedback (HRVBF) has been shown to improve QOL and overall health. This randomized prospective study was conducted in the adult trauma population to determine whether acute HRVBF is a feasible approach to preventing long-term psychological sequelae. Qualifying patients were screened then randomized to control vs HRVBF with Inner Balance® which entailed three in-hospital sessions and written practice instructions before discharge. All participants completed psychological assessments at discharge then one- and six-months via phone. Seventeen patients were enrolled, and seven completed HRVBF protocol. Completion rate at six months was 47%. HRVBF group had better average QOL score at one month but this was not statistically significant. Early psychological intervention can be completed during primary admission of trauma patients, and a larger-scale study should investigate the potential benefits of acute psychological therapy in the trauma population.

Estimates of Nasal Airflow at the Nasal Cycle Mid-Point**Authors:** Gaberino C, Rhee JS, Garcia GJM**Project Mentor:** Guilherme Garcia, PhD

INTRODUCTION: The nasal cycle represents a significant challenge when comparing pre- and post-surgery objective measures of airflow. Future virtual surgery planning software for nasal airway obstruction (NAO) will need to account for the nasal cycle when using anatomic models based on single instantaneous imaging. METHODS: In this retrospective study, computational fluid dynamics models were constructed for 12 NAO patients with nasal cycling. Biophysical variables were estimated at mid-cycle by two methods. Subjective scores of nasal patency were obtained pre- and post-surgery via NOSE/VAS surveys. RESULTS: The two methods provided similar estimates of how nasal aerodynamics changed after NAO surgery. After correcting for the nasal cycle, the correlation between objective variables and the NOSE/VAS scores increased. CONCLUSIONS: The correlation between objective variables and patients' subjective feelings of nasal patency improves after correcting for the nasal cycle. The nasal cycle correction is required to evaluate individual patients, but not cohort averages.

OTC Analgesic Use After Sustaining a Concussion: Friend or Foe?**Authors:** Glenn KJ, Fehr SD, LaRoche AA, McCrea MA**Project Mentor:** Shayne Fehr, MD

This study examined the frequency of over-the-counter (OTC) analgesic use in high school and collegiate athletes post-concussion to determine if symptoms were more severe or prolonged in the group taking analgesics (OTCy). One hundred fifty seven concussed athletes (mean age 17.4-years), analgesic-using (OTCy=64) and non-analgesic-using (OTCn=93), were compared. Utilizing self-reported health history, computerized neurocognitive testing, Brief Symptom Inventory (BSI)-18, and SCAT-3 at 24hrs and 8, 15, and 45 days post-concussion, the study determined that analgesic-users demonstrated various higher concussion-related symptoms plus higher psychological burden (somatization and depression) at 24hrs. Headaches in OTCy resolved in similar fashion, but these athletes continued to report greater symptoms at 8 days. While taking analgesics for a headache after concussion may indicate symptom severity and influence recovery, the expression of a headache and symptom recovery may also be influenced by the psychological state (somatization and depression) of the athlete.

Exome Sequencing Identifies VOS Patient with a Novel RASA1 Mutation**Authors:** Gonzalez LE, Drolet BA**Project Mentor:** Beth Ann Drolet, MD

Vascular overgrowth syndromes (VOS) are complex disorders which most often present with cutaneous and skeletal abnormalities, as well as regional overgrowth. They are difficult to classify clinically due to their variability in presentation and overlapping clinical features. Correlating the genetic profile of a patient with their phenotypic presentation offers an alternative approach to better understanding each disease. We sought to sequence affected tissue samples from patients with VOS via targeted next generation sequencing. In a patient with clinically diagnosed Parkes Weber syndrome we found a novel premature stop codon in the RASA1 gene associated with vascular malformations, which had been missed by previous clinical whole blood sequencing. Testing using whole blood, while easier to obtain, may thus not provide the entirety of the patient's relevant genetic profile. Obtaining affected tissue for sampling presents its own challenges, but selective sampling could reveal undiscovered mutations allowing for a better understanding of VOS.

The Prognostic Utility of Baseline Alpha-Fetoprotein for Hepatocellular Carcinoma Patients**Authors:** Jack P. Silva, Richard A. Gorman, Nicholas G. Berger, Susan Tsai, Kathleen K. Christians, Callisia N. Clarke, Harveshp Mogal, T. Clark Gamblin**Project Mentor:** T. Clark Gamblin, MD, MS, MBA

Introduction: This study hypothesized that increasing baseline AFP value is associated with worse overall survival in HCC patients. Methods: Patients were stratified according to baseline AFP measurements into the following groups: Negative (<20), Borderline (20-199), Elevated (200-1,999), and Highly Elevated (>2,000). The primary outcome was overall survival, which was analyzed by log-rank test and multivariate regression. Results: A total of 41,107 patients were identified, of which 15,809 (33.6%) were Negative. Median overall survival was highest in the AFP Negative group, followed by Borderline, Elevated, and Highly Elevated. Multivariate analysis revealed that AFP was an independent predictor of overall survival. Compared to the reference Negative group. Conclusion: Baseline AFP independently predicted overall survival in HCC patients regardless of treatment plan. Although an optimal cutoff value for the determination of elevated AFP remains controversial, a baseline AFP value is a simple and effective method to assist in expected survival for HCC patients.

Kinematic Strength Predictors at the Shoulder in Youth Baseball Players**Authors:** 1. Hadro A, Fehr S, Butler B, Apolinario M, Damrow D, Liu X.**Project Mentor:** Shayne Fehr, MD

The purpose of this study was to determine if shoulder strength is associated with youth pitchers throwing mechanics and investigate how Biodex can be used as a training modality for improving performance. Kinematic data was collected from seventeen youth pitchers age 9-14. Isometric and isokinetic strength data was collected using Biodex. Correlations were investigated at the shoulder for maximum external rotation (MER), maximum internal rotation (MIR), maximal internal acceleration (MIA), and maximal internal velocity (MIV). There was a significant correlation between MER and isokinetic external rotation strength at 60 and 180°/sec, and isometric external and internal rotation strength at 45°. MIA significantly correlated with isokinetic external and internal rotation strength at 60°/sec, and isometric internal rotation strength at 0, 45, 105°. MIV significantly correlated with isokinetic external rotation strength at 60°/sec and isokinetic internal rotation at 60°/sec. There are significant correlations between kinematic measurements during the pitching cycle and strength.

Retrospective Analysis of Pathology Review Criteria for Cancelled Specimens**Authors:** Hutchison B, Harrington A**Project Mentor:** Alexandra Harrington, MD

Introduction: Specimens analyzed in clinical laboratories occasionally meet pre-determined criteria deeming them in need of pathology review. If the pathologist concludes that review is unnecessary (another review performed recently, abnormal values already known), they cancel the review. This time-consuming process may be streamlined by updating pathology review criteria. Objective: Determine whether pathology review criteria can be modified to limit cancellations. Methods: Order and cancellation data was analyzed on 268 pathology reviews ordered between January and March 2015. T-tests were performed seeking significant differences between cancelled and non-cancelled specimens. Results and Conclusion: 40% of analyzed specimens were cancelled due to a recent bone marrow transplant or chemotherapy. A rule written into the review criteria flagging patients on chemotherapy or with recent bone marrow transplants could improve pathology department efficiency. No significant difference exists between sub-threshold white cell and platelet values among specimens that were cancelled and specimens that were reported.

Comparison of Pericardial Effusion Size and Physiology as Assessed By Echocardiography and Computed tomography**Authors:** Huxley S, Meskin J**Project Mentor:** Joshua Meskin, MD

Background: How computed tomography (CT) compares to echocardiography (echo) in determining pericardial effusion (PE) size or findings of tamponade physiology (TP) is unknown. Our goal is to compare echo and CT in sizing a PE and determining TP. Methods: A retrospective chart review was performed using 122 patients who had a PE on echo and a chest CT within three days of the echo. The presence of TP and qualitative sizes of PE on CT and echo were compared. Results: TP by CT did not predict with significance TP by echo [Odds ratio 2.09; 95% confidence interval (CI): 0.58 to 7.09, $p = 0.24$]. The correlation of sizing between echo and CT was variable, being strongest at the size boundaries [Spearman's $\rho = 0.784$, $p < 0.0001$]. Conclusions: TP on CT does not correlate with TP on echo and sizing between modalities does not correlate well for mid-range sized PEs.

Anxiety Experienced By Children and Parents at a Polish Hospital**Authors:** Jacobson, A, Telega, G, Drendel, AL.**Project Mentor:** Amy Drendel, DO, MS

This prospective, observational cohort study aimed to describe and evaluate characteristics of state anxiety of children and their parents in the General Pediatric (GP), Emergency, and Orthopedic Departments at a Polish hospital. Seventy-nine children and their parents were recruited. Children were 12.9-years old ($SD=2.8$) and 53.2% female. Parents were 41.1-years old ($SD=6.4$) and 83.1% female. The state anxiety score for children was consistent with slightly elevated state anxiety; however, did not significantly differ for children under 13 years old, across the three departments, nor between genders. The state anxiety score for parents was consistent with average state anxiety levels. State anxiety was not different for those with children under 13 years, but was significantly lower in Orthopedics compared to GP (40.7 vs 48.6; $p=0.01$) and significantly higher for mothers compared to fathers (42.4 vs 37.1, $p=0.04$). Anxiety experienced by children was slightly elevated with no significant differences found for subgroups.

Nasal Fiberoptic Endoscopic Evaluation to Predict Obstructive Sleep Apnea**Authors:** Jain S, Kallio P, Less K, Simon E, Uhrich T, Barney J, Ebert T**Project Mentor:** Thomas J. Ebert, MD, PhD

Introduction: Undiagnosed Obstructive Sleep Apnea (OSA) is common, frequently undiagnosed and increases perioperative risk. Purpose To describe how Nasal Fiberoptic Endoscopic Evaluation (NFEE) could predict OSA diagnosis and severity in a pre-operative setting. Methods: 27 patients underwent airway evaluation via NFEE during their pre-operative visit with pictures taken in various positions at retropalatal, retrolingual and glottic views. Degree of airway closure and OSA severity were predicted by a CRNA and compared to polysomnography. Results: Of those who have completed polysomnography, OSA severity was predicted within 1 degree of severity 11/11 and 9/11 times respectively during two tests. Univariate regression revealed that airway closure at seated baseline retropalatal ($p=.03$) and combined retropalatal views ($p=.09$) best predicted OSA diagnoses. Conclusion: NFEE may have use in predicting OSA. We hope that this protocol can be used to guide a clinical pilot study.

Repurposing Existing Medications as Cancer therapy: Feasibility Results**Authors:** Kerswill SA, Rizzo JD, Hari P, Cole SW, Pasquini MC, Logan BR, D'Souza A, Shah N, Horowitz MM, Stolley MR, Thomas JP, MD, Hamadani M, Chhabra S, Dhakal B, Knight JM**Project Mentor:** Jennifer Knight, MD

This proof-of-concept randomized controlled pilot study evaluated the feasibility of prophylactic β -blocker administration in multiple myeloma patients undergoing autologous hematopoietic stem cell transplantation. The feasibility of this study was assessed by enrollment rate, tolerability, compliance and study retention rates. Twenty-five participants were enrolled. Enrollment rate of those screened who did not refuse or choose to participate in a competing trial was 59.5%. Enrollment rate of eligible patients was 100%. One of the 12 patients in the intervention arm was unable to complete the propranolol course due to hypotension. The other 11 (>91%) treatment arm patients tolerated and were compliant with all 5 weeks of propranolol administration. All 25 patients enrolled were retained through the duration of the study. The results of this study demonstrate that a study using a beta blocker in this population is feasible and that patients can both tolerate and comply with the intervention.

Determination of the Best Adiposity Measurements to Predict Insulin Resistance Among Young African Americans**Authors:** Kilakakthi S, Obi B, De Vogel N, Wang T, Kidambi S**Project Mentor:** Srividya Kidambi, MD, MS

Central adiposity and increased waist circumference (WC) are associated with insulin resistance (IR). African Americans (AA) have lower visceral adipose tissue (VAT) and higher subcutaneous adipose tissue (SAT) for the same body mass index (BMI) and WC compared to Caucasians. This study aimed to investigate how differences in adiposity distribution affect IR among AA. 18-45 year-old AA subjects ($n=107$, women= 46) without cardiometabolic diseases were recruited. Adiposity indicators were measured. IR was calculated using homeostasis model assessment (HOMA-IR). Regression analysis was performed to determine the best predictors of HOMA-IR. Among healthy AA subjects, the best composite model to predict IR included age, WC, and abdominal SF with Aikake Information Criterion (AIC) of -151.5 compared to VAT alone AIC of -144.7. Further studies are needed to evaluate whether VAT and its relationship to IR may be modified by the relative amount of SAT, which is considered less pathogenic and potentially protective.

Racial Disparity in Hyperthyroidism Prior to Surgical Referral**Authors:** Kim J, Wang TS, Doffek K, Evans DB, Yen, TWF**Project Mentor:** Tina W.F. Yen, MD, MS

There is a paucity of information on racial differences in benign thyroid disorders. Through a retrospective chart review of 191 patients, we sought to determine whether racial disparities exist in the etiology, presentation, and management of patients with hyperthyroidism prior to surgical intervention. There was no difference in the etiology of hyperthyroidism by race. By race, there was no difference in the presence and the duration of each of the 8 symptoms, except for heat intolerance ($p=0.03$). The total number of symptoms per patient differed by race; non-white patients had more symptoms than white patients ($p=0.03$). There was no racial difference in the TSH or free T4 values, the receipt and the duration of antithyroid medication, and receipt of radioactive treatment prior to surgery. Future studies in larger, more racially diverse populations are needed to improve our understanding of potential racial disparities among patients with hyperthyroidism.

Transplant Skin Cancer Network (TSCN) Incidence Study**Authors:** Konicke K, Olasz E**Project Mentor:** Edit Olasz, MD, PhD

Skin cancer is the most common malignancy in the solid organ transplant recipient (SOTR) population. Population-based data on skin cancer incidence after organ transplantation is limited. The TSCN Incidence Study is the first population-based study investigating post-transplantation skin cancer outcomes in SOTRs. Adult recipients of a primary transplant performed at 25 US transplant in 2003 and 2008 were included. Patient demographics were analyzed, and the incidence rate (IR) and crude incidence of overall skin cancer, squamous cell carcinoma (SCC), melanoma, and Merkel cell carcinoma (MCC) were calculated. Post-transplant SCC had the highest IR, followed by post-transplant melanoma. Post-transplant MCC was a rare event. The predictors of post-transplant skin cancer were pre-transplant history of skin cancer, male gender, white race, and age of 50 years or older at transplant. Due to the potentially high morbidity and mortality of post-transplant-skin cancer, early dermatological follow-up and preventative education are recommended for SOTR.

Low Anastomotic Leak Rates Can Be Achieved Utilizing Clinical Perfusion Assessment without Fluorescent Imaging Techniques**Authors:** Kream JR, Peterson CY, Ridolfi TJ, Ludwig K**Project Mentor:** Timothy Ridolfi, MD

Recent reports suggest that fluorescence evaluation of perfusion after colorectal anastomosis creation is associated with low anastomotic leak rates. The purpose of this work was to evaluate our anastomotic leak rate following left-sided colorectal resections as performed with standard and meticulous operative technique, without fluorescence imaging. We performed a retrospective chart review. This study was conducted at an academic tertiary referral center. A total of 317 consecutive patients who underwent a pelvic anastomosis after sigmoid colectomy, left colectomy or low anterior resection (LAR), performed by a single surgeon, from March 2008 to January 2015, were evaluated. The primary outcome measure was the anastomotic leak rate as diagnosed by clinical symptoms, exam, or routine imaging. The average patient age was 59.7 years with an average body mass index (BMI) of 28.8 kg/m². Rectal cancer (128, 40.4%) was the most common indication for surgery. The anastomotic leak rate was 1.6% (5/317).

Widened QRS-T Angle as a Predictor of Diastolic Dysfunction Progression to Heart Failure with Preserved EF**Authors:** Marong B, Strande J, Karagodin I, Rein L, Tarima S**Project Mentor:** Jennifer Strande, MD, PhD

Background: No prior studies have investigated the association of fragmented QRS (fQRS) and QRS-T angle with the progression of asymptomatic diastolic dysfunction to Heart Failure with Preserved Ejection Fraction (HFpEF). We hypothesized that widened QRS-T angle in the setting of fragmented QRS (fQRS) will be a positive predictor for disease progression. Methods: In a retrospective case-control study of 53 matched pairs (n=106) we analyzed ECGs for presence of fQRS and widened QRS-T angle (90-180°). Results: In the setting of fQRS, the odds of progression to heart failure was 13.91 times greater in subjects with widened QRS-T angle than those with standard QRS-T angles (0-90°) (p=0.02). Conclusions: Widened QRS-T angle in the setting of fQRS can be used as a positive predictor for the progression of asymptomatic diastolic dysfunction to HFpEF.

Utility of Speckle Tracking Echocardiography in Measuring Systemic Right Ventricular Systolic Function**Authors:** Masterson C, Saudek D, Cohen S, Slicker J, Kinney A, Krolikowski M, Samyn M**Project Mentor:** Margaret Samyn, MD

Background: Patients with d-transposition of the great arteries, status post atrial switch, are at risk for developing systemic right ventricular dysfunction. Echocardiographic assessment of RV function is typically subjective because the complex RV geometry. Currently, RVEF measured by cardiac magnetic resonance imaging is the gold standard for quantitative assessment of systemic RV function. Methods: This was a retrospective review of medical records and imaging studies for D-TGA patients with atrial switch. Results: Twenty-seven patients were enrolled. Median age at atrial switch was 10.8 months. There was no significant correlation between GPLS and MRI RVEF. When comparing GPLS in patients with MRI RVEF >45% and <45%, GPLS was similar. MRI RVEF correlated weakly with echo RV EF. GPLS of the systemic RV did not correlate with MRI RVEF or exercise endurance, nor was there a difference in GPLS when patients were stratified by MRI RV EF greater or less than 45%.

Breath-Hold and Resting-State Cardiovascular Reactivity Mapping for Pre-Surgical Planning**Authors:** Mathew AB, Jafari-Fesharaki N, DeYoe EA**Project Mentor:** Edgar DeYoe, PhD

Introduction: Blood Oxygenation Level Dependent (BOLD) fMRI is used in pre-surgical planning for patients with neurologic disease and relies on local cardiovascular reactivity (CVR). Breath-hold and resting-state tasks have been used to map CVR in gray matter, however a direct comparison has not been done. Hypothesis: The resting-state method is comparable to the breath-hold method in mapping CVR in healthy subjects. Methods: fMRI data was obtained from five healthy subjects while they performed a breath-hold task (normal breathing 40s, inhalation 4s, breath-hold 16s) and a resting-state task (normal breathing for 10 minutes). Breath-hold CVR maps were generated using correlation analysis with an empirically derived respiratory response function. Resting-state CVR maps were generated by finding the amplitude of low-frequency fluctuation between 0.01-0.08Hz. Results: Intrsubject comparison between breath-hold and resting-state CVR maps yielded a mean Dice Spatial Coefficient of 0.638 (SD=0.64). Conclusions: Resting-state CVR mapping is similar to the breath-hold method.

Does Listening to Music Affect Running Cadence and Biomechanics?**Authors:** Meinerz C, Fritz J, Kipp K, Harris G, Vetter C**Project Mentor:** Carole Vetter, MD

INTRODUCTION Studies show runners with higher peak positive accelerations (PPA) are associated with tibial stress fractures. Cadence modulation has been used to reduce PPA via metronomes. We hypothesized that the use of music could also reduce PPA. **METHODS** Ten runners ran in a laboratory and on an outdoor track. A triaxial accelerometer was attached to the tibia. A 10-minute warm-up was used to calculate preferred cadence. Subjects were then instructed to run for two 5-minute trials to the beat of a song that had a 5% and 10% greater cadence than preferred. **RESULTS** Subjects failed to significantly increase cadence during both 5% and 10% conditions in both settings. Subjects were also unable to significantly decrease tibial PPAs under the 5% and 10% conditions in both settings. **CONCLUSIONS** More practical applications of cadence modulation haven't been demonstrated. Participants were unable to use music to significantly increase their cadence and decrease PPAs.

Identification and Validation of a Sickle Cell Disease Cohort within Electronic Health Records**Authors:** Michalik D, Taylor D, Panepinto J**Project Mentor:** Julie Panepinto, MD, MPH

OBJECTIVES: To develop and validate a computable phenotype algorithm for identifying patient populations with sickle cell disease (SCD). **METHODS:** This retrospective study used electronic health record (EHR) data from the Children's Hospital of Wisconsin (CHW), to develop a computable phenotype algorithm for SCD. The algorithm was based upon ICD-9 codes, number of visits, and hospital encounters for SCD. The algorithm was verified using EHR review and by comparison to a database of confirmed SCD cases. The algorithm was then validated at Froedtert. **RESULTS:** Using the CHW EMR, our algorithm identified SCD patients with a PPV of 99.4% and a sensitivity of 99.4%. Using Froedtert data, the algorithm identified SCD patients with a PPV of 95.8% and a sensitivity of 98.3%. **CONCLUSIONS:** Our algorithm allows us to harness data provided by the EHR to rapidly and accurately identify patient with SCD and is a rich resource for future clinical trials.

Inter-Rater Reliability of Standardized Proprioception Exam in Spinal Cord Injury**Authors:** Minkley AM, Waring WP**Project Mentor:** William Waring, MD

Objective: Determine the inter-rater reliability (IRR) of a standardized proprioception exam in spinal cord injury (SCI). **Methods:** Subjects were examined at six joint locations and scoring was based on ability to identify: both large and small movements (2/normal); large movements only (1/impaired); or no movements (0/absent). **Results:** Percent agreement in cases where at least one rater found a deficiency (n=82) was 63.4% with $k=.56$. With absent proprioception (n=58) agreement was 77.6%, $k=.72$. With impaired proprioception (n=24), agreement was 29.2%, $k=.26$. With normal proprioception (n=152) agreement was 89.5%, $k=.71$. Overall, agreement was 88.9%, $k=.78$. **Conclusion:** The exam shows a moderate IRR overall and in joints with normal proprioception, but minimal correlation for proprioception-deficient locations. Because the purpose of the exam is to determine impairments, clinical usefulness is limited as a screening tool for potential deficiencies.

Does a Splenic Blush Really Matter?**Authors:** Moore C, Peschman J, Kugler N, Carver T**Project Mentor:** Thomas Carver, MD

Introduction: The significance of contrast extravasation, or “blush” on CT following blunt splenic trauma remains controversial. This study was performed to determine whether the presence of a blush correlated with failure of NOM (Non-Operative Management). Methods: A 5-year retrospective chart review was performed on all adult trauma patients evaluated at a ACS Level 1 trauma center admitted for blunt splenic trauma following contrast-enhanced CT scan. Results: NOM was attempted in 258 patients and failed in 18 (7%). A blush was present in 55.5% of NOM failures but was only predictive of failure in patients not on anticoagulation prior to injury ($p = 0.027$). Blush was not predictive in patients on anticoagulation ($p=.35$). Conclusion: The presence of a splenic blush may predict failure of NOM in patients who do not take aspirin or warfarin.

Prevalence of Sexual Dysfunction in Adults with Congenital Heart Disease**Authors:** Neiman A, Ginde S, Earing MG, Bartz PJ, Cohen S**Project Mentor:** Scott Cohen MD

The aims were to: 1. Determine prevalence of SD, 2. evaluate for risk factors of SD, and 3. determine the association between SD and QOL in adults with CHD. This was a cross-sectional study of adults ≥ 18 with CHD presenting for follow-up. 105 subjects. The mean age was 31.9 ± 11.7 years, 51% were men, 81% were NYHA Class 1, 84% had normal systemic ventricular function, and 76% had complex CHD. The rates of SD were 28% overall, 30% in men and 25% in women. Men and women with SD were more likely to be taking spironolactone ($p < 0.001$) and digoxin ($p < 0.001$). Men reported poorer mental health ($p = 0.004$), feeling anxious ($p = 0.003$). Women with SD were more likely to have atrial arrhythmias ($p = 0.002$). There was no association between SD and use of beta blockers, smoking, hypertension or diabetes. SD is highly prevalent and associated with indicators of worse QOL in this young, well-functioning population.

RV-PA Conduit Use in TOF Patients With and Without DiGeorge Syndrome**Authors:** Pang R, Fedderly R**Project Mentor:** Raymond Fedderly, MD

The goal of the project was to investigate the impact of DiGeorge Syndrome on the utilization, placement, and timing of right ventricle to pulmonary artery (RV-PA) conduits post primary repair for Tetralogy of Fallot (TOF). Between 1998 and 2014, a total of 103 patients had both TOF repair and RV-PA conduit placement at any age at the Children's Hospital of Wisconsin. The patients were separated into two groups, with or without DiGeorge Syndrome. There was no significant difference in the proportion of patients who received RV-PA conduit on the same day as the initial TOF repair between the two groups. There were no significant differences in the timing between primary TOF repair and 1st RV-PA conduit, between 1st and 2nd, or between 2nd and 3rd conduits placed among the two groups. As expected, there is significantly higher proportion of DiGeorge patients with absent pulmonary valve than those without DiGeorge Syndrome.

Dose Determination of Doxorubicin Administered During DEB-TACE By Spectral Measurements**Authors:** Park D, Gogineni V, White SB**Project Mentor:** Sarah B. White, MD, MS

Hepatocellular Carcinoma (HCC) is the second leading cause of cancer-related death worldwide. Drug-eluting bead transarterial chemoembolization (DEB-TACE) is one treatment option. In DEB-TACE, microspheres coated with chemotherapeutic drugs, such as doxorubicin, are delivered directly to arteries feeding tumors. The drugs then release slowly. DEB-TACE is limited by unknown amount of drug delivered; thus, the specific aim is finding the effective dose delivered. Loading efficiency was determined by loading Doxorubicin onto LC beads, followed by performing UV/Vis/NIR spectrophotometry on the supernatant. To calculate delivered drug dose, residual DEBs were eluted and placed under UV/Vis/NIR spectrophotometry to determine residual drug concentration. Volume of residual beads was measured with a syringe. Loading efficiency was greater than 99.8%. From the 8 patients that underwent DEB-TACE, residual amounts of doxorubicin ranged from 7.6mg to 43.2mg with a mean of 28.46mg and residual volume collected was from .20mL to 1.25mL with a mean of .82mL.

Poor Glycemic Control is Associated with Failure to Complete Therapy and Surgery in Localized Pancreatic Cancer**Authors:** Paul Rajamanickam ES, Christians KK, Aldakkak M, Krepline AN, Ritch PS, George B, Erickson BA, Foley WD, Aburajab M, Evans DB, Tsai S**Project Mentor:** Susan Tsai, MD, MHS

The impact of glycemic control in patients with localized pancreatic cancer treated with neoadjuvant therapy is unclear. Glycated hemoglobin (HbA1c) values were measured prior to any therapy and after neoadjuvant therapy prior to surgery. HbA1c levels greater than 6.5% were classified as abnormal. Patients were categorized based on the change in HbA1c levels from pretreatment to preoperative: GrpA, always normal; Grp B, worsened; GrpC, improved; and GrpD, always abnormal. HbA1c levels were evaluable in 123 patients. 92 (75%) completed all intended therapy to include surgery; 57 (85%) patients in GrpA, 4 (50%) patients in GrpB, 16 (72%) patients in GrpC, and 15 (58%) patients in GrpD ($p=0.01$). Elevated preoperative carbohydrate antigen 19-9 (CA19-9) (OR:0.22;[0.07-0.66]), borderline resectable (BLR) disease stage (OR:0.20;[0.01-0.45]) and abnormal preoperative HbA1c (OR:0.30;[0.11-0.90]) were negatively associated with completion of all intended therapy. Elevated preoperative HbA1c is associated with failure to complete neoadjuvant therapy and surgery.

Assessment of Manual Wheelchair Propulsion with Intensive, Routine Therapy in Children with Orthopaedic Disabilities**Authors:** Rana PV, Rammer JR, Osborn C, Tarima S, Daley R, and Harris GF**Project Mentor:** Rodger Daley MD PhD

Children with orthopedic disabilities relying on manual wheelchairs for independent mobility places great demands on upper extremities (UE) resulting in higher rates of injury. The objective of this study is to investigate the biomechanics of wheelchair propulsion in a pediatric population of manual wheelchair users (MWU) undergoing intensive therapy. We selected 10 pediatric MWU receiving individualized therapy for 3 weeks and utilized markerless motion capture technology and kinematic modeling to investigate pre- and post- therapy changes. Propulsion trajectory changes were seen in 3 subjects post-therapy. Thoracic kinematics showed significant decrease in flexion and rotation. Spatiotemporal parameters showed significant decrease in propulsion/recovery ratio. Therapy revealed changes in propulsion suggesting a potential role for propulsive therapy. Decreased thoracic flexion and rotation may be a result of improved core strength and sitting posture. Decreased propulsion/recovery ratio indicates improved push efficiency, and ability to complete propulsion cycles with less time spent in propulsion phase.

Gait and Strength in Patients of Distal Femoral Reconstructions**Authors:** Reason NG, Neilson JC**Project Mentor:** J.C. Neilson, MD

Limb-salvage surgery is the standard of care for soft-tissue and bony sarcomas. The most common site of malignancy is about the knee, and despite growing interest in strength and gait outcomes, current literature has not shown whether the extent of femoral resection plays a role. We hypothesized that patients with more resection had greater deficits in gait and knee strength. A retrospective chart review was conducted on 19 patients that underwent this procedure and analysis. Femoral resection was calculated from x-ray imaging and patients were dichotomized as those with less than 40% removed versus those with 40% or more removed. Group averages were analyzed for differences in joint kinematics and knee torque. The more-resected group was found to have better strength compensation in the non-operative limb, with additional, minor gait changes not previously described in the literature. Further exploration is required to determine their novelty and potential long-term effects.

Outcomes of Latissimus Dorsi Transfer for Irreparable Rotator Cuff Injury**Authors:** Regent-Smith A, Grindel S, Jager Z**Project Mentor:** Steven Grindel, MD

Fourteen subjects were analyzed retrospectively and prospectively on their outcomes of a latissimus dorsi tendon transfer for irreparable rotator cuff injuries. The objective of this study was to determine if the latissimus transfer allowed for a decrease in pain and return to ADL, similar to pre-injury status. Subjects were analyzed by a multitude of strength tests, range of motion tests, and functional outcome scores (15 in all). These scores were analyzed by way of a Wilcoxon Rank Sum Test. Prospective analysis included only functional scores due to data gathering being over the telephone with the subjects. The only scores which resulted significance were the ASES, VAS (pain), and UCLA Shoulder Test in both retrospective and prospective portions. From evaluation and insight into what each test scores on, we concluded there was a considerable and constant decrease in pain from pre-operation and a return to ADLs, consistent with pre-injury status.

Radiation Impacts of Inter-Fractional Organ Movement During Liver SBRT**Authors:** Schmid RK, Robbins J**Project Mentor:** Jared Robbins, MD

Background: Stereotactic body radiation therapy (SBRT) is highly effective in treating liver malignancies. However, less is known about how dose varies to nearby organs-at-risk (OAR). We investigated daily dose variations due to inter-fractional organ movement. Materials and methods: Twenty subjects treated with liver SBRT were analyzed. Daily images were used to delineate OARs including the liver, heart, right kidney, esophagus, stomach, duodenum and large bowel. Contouring was performed using Monaco planning software and dose distribution was then determined for each daily CT. Results: Analysis of all OARs in all patients showed some large variations between planned and delivered dose for some OARs distant from the target, but did not reach clinically meaningful levels. For most OARs in close proximity to target lesions the average daily dose tended to be less than the planned dose. While some days did exceed radiation dose constraints, no clinical adverse effects were observed.

The Effect of Sleep Disruption on Mild Traumatic Brain Injury in an Animal Model**Authors:** Schwartz M, Shah A, Chiariello R, Stemper B**Project Mentor:** Brian Stemper, PhD

Mild traumatic brain injury (mTBI) is one of the most common injuries across all age groups. There is concern whether subsequent sleep deprivation will have a lasting effect on neurological function. Previous studies show that sleep deprivation (SD) may have a neuroprotective role both prior to and following a TBI. The objective of our experiment was to determine the role sleep deprivation plays in rodent neurological function following a mTBI via a unique rotational model. Our study consisted on a TBI, SD+TBI, and Sham group were given their respective treatments and tested weekly for 4 weeks. Their function was measured via an elevated plus maze. The results indicated that sleep deprivation did have a modulative effect on neurological function following TBI, but a larger sample size (12) is needed for further analysis.

Effects of Sitagliptin on Endothelial Function in Type 2 Diabetes on Background Metformin Therapy**Authors:** Widlansky ME, Puppala VK, Suboc TM, Malik M, Branum A, Signorelli K, Wang J, Ying R, Tanner MJ, Tyagi S**Project Mentor:** Michael Widlansky, MD

Cell and animal studies suggest dipeptidyl-peptidase-4 (DPP-4) inhibition may provide cardiovascular benefits by promoting vascular endothelial change. However, human studies demonstrate conflicting long-term effects. No human study has assessed acute vascular response to DPP-4 inhibition. We recruited 38 patients with type 2 diabetes on metformin for a randomized, double-blind, placebo-controlled crossover trial of DPP-4 inhibition with sitagliptin. Markers of endothelial activation (ICAM-1 and VCAM-1) were measured before and 2 hours after sitagliptin or placebo, and 8 weeks after each. Neither acute nor chronic sitagliptin significantly changed vascular endothelial function. Post-acute sitagliptin ICAM-1 levels were lower than post-chronic. However, ICAM-1 concentration was not significantly different than pre-acute sitagliptin levels or placebo level. VCAM-1 levels did not significantly differ. Acute and chronic sitagliptin therapies have neutral effects on vascular endothelium in patients on metformin, suggesting DPP-4 inhibition has a neutral effect on cardiovascular risk in patients without heart failure or renal insufficiency.

Surgical Outcomes Following Resection of Extremity Vascular Anomalies**Authors:** Straszewski A, King D**Project Mentor:** David King, MD

Background: Despite a multitude of reports regarding the nomenclature, diagnosis, and overall management of vascular anomalies, few studies regarding the outcomes of surgical resection exist to guide management and decision-making for the clinician and patient. The goal of our study was to evaluate outcomes following surgical resection of extremity vascular anomalies. Methods: Telephone survey and retrospective chart review of all patients who have undergone surgical management of extremity vascular anomalies of a single surgeon's practice was conducted. Descriptive statistics were utilized for the purpose of this study. Conclusions: In patients selected for surgical management, resection of extremity vascular anomalies can result in durable pain relief (76%) and improved function (77%). Patients undergoing incomplete resection or debulking of their lesions, due to extensive limb involvement or involvement of critical neurovascular structures, can experience improved pain control, but are at increased risk for recurrence of symptoms.

XRT or Ablation for Solitary HCC: A Survival Analysis**Authors:** Berger NG, Tanious MN, Hammad AY, Miura JT, Christians KK, Tsai S, Gamblin TC**Project Mentor:** T. Clark Gamblin, MD, MS, MBA

Hepatocellular carcinoma (HCC) patients are often ineligible for resection. This study hypothesized that external beam radiation (XRT) and ablation therapy (AT) would be equally effective for selected HCC patients. The Surveillance, Epidemiology, and End Results (SEER) identified HCC patients (2004-2012) undergoing XRT or AT for solitary HCC lesions. Propensity score modeling adjusted for baseline characteristics. Median OS for XRT and AT was 22 and 32 months ($p < 0.001$) respectively. AT was associated with a better OS for tumors 3-5cm (30m vs. 16m, $p < 0.001$) and > 5 cm (25m vs. 9m, $p < 0.001$); similar survival rates were found in tumor size < 3 cm ($p = 0.508$). Multivariate analyses showed XRT was associated with a worse hazard ratio ($HR = 1.64$, $p < 0.001$). Similar survival for solitary HCC lesions < 3 cm exists between XRT and AT. However, AT demonstrates improved survival rates for lesions > 3 cm. This 3 cm reference point may serve as a valuable metric to guide treatment and future investigations.

Functional Outcomes After Autograft Reconstruction of the ACL in Pediatrics**Authors:** Tednes M, Van Valin S, Lyon R, Liu XC**Project Mentor:** Scott Van Valin, MD

This study analyzed the functional outcomes of two of the most popular autograft choices, bone-patellar tendon-bone (BPTB) and semitendinosus/gracilis (ST/G), to see if a mechanical advantage exists in one versus the other. Five patients with 6 ACL replacements (3 BPTB and 3 ST/G) were analyzed. Seated proprioception was tested. Motion analysis was conducted during walking, running, and stair climbing. Peak flexion/extension knee moments were gathered using an isokinetic test on the Biodex system. BPTB patients showed decreased hip extension, hip flexor moment, and hip power generation during walking. During running, ST/G patients showed decreased hip adduction and hip internal rotation, whereas the BPTB patients showed decreased plantar flexion. While ascending stairs, the BPTB patients showed increased internal foot progression angle. While descending stairs, the ST/G patients showed decreased hip adduction and increased knee flexion. ST/G patients had decreased peak knee flexion and extension moments compared to BPTB patients.

Implementation of a Validated Bowel Function Index into Clinical Care of Colorectal Cancer Patients**Authors:** Toy E, Peterson C, Ludwig K, Ridolfi T**Project Mentor:** Timothy Ridolfi MD

Introduction: Increased survival rates of sphincter sparing surgery has led to increased rates of bowel dysfunction regarding urgency, frequency and incontinence. However, implementation of an index tracking dysfunction has yet to be standard in clinical care. Hypothesis/Specific Aims: Our aim was to evaluate the capability of a single colorectal cancer clinic to implement bowel function indices (BFI) into clinical practice. Study Methods: Each patient from June 1, 2015 to March 1, 2017 were given a BFI at time of visit. Surveys were scored and scanned into the medical record. Results: The patient cohort of 60.4 years showed that were 1860 clinic visits with a total of 1794 BFIs filled out. The completion rate of indices was 96.4%. Conclusions: Overall, bowel function data can be collected in a colorectal cancer clinic efficiently with high acceptability from patients. It remains to be seen how this data will change the overall clinical experience.

Radiation Therapy Dose Escalation in Rectal Adenocarcinoma, a Review

Authors: Jonathan D. Van Wickle, Eric A. Paulson, Paul Knechtges, Jerome C. Landry, Beth A. Erickson, William A. Hall

Project Mentor: William A Hall, MD

INTRODUCTION: Total mesorectal excision after neoadjuvant chemoradiotherapy (CRT) has offered superior control for patients with locally advanced rectal cancer, but carries a high quality of life cost. Fortunately, some patients achieve a complete response after chemoradiation alone without the added morbidity caused by surgery. Efforts to increase fidelity of radiation treatment planning and delivery may allow for escalated doses of radiotherapy (RT) with limited off-target toxicity and elicit more pathological complete responses to CRT sparing more rectal cancer patients from surgery. **AREAS COVERED:** Methods of delivering escalated RT boost above 45-50.4 Gy are evaluated including: 3D conformal, intensity-modulated radiotherapy, and brachytherapy. Newly developed adaptive boost strategies and imaging modalities used in RT planning and response evaluation such as magnetic resonance imaging and positron emission tomography are also discussed.

Effects on Zebrafish of Pesticides Used in the Alto Mayo

Authors: Weber J, Klingler R, Carvan M, North P

Project Mentor: Paula North, MD, PhD

Community Partner: University of Wisconsin Milwaukee, School of Freshwater Sciences

This project focuses on the Alto Mayan region of Peru where pesticides are used without proper training in protective equipment use and correct application technique. We seek to establish a method of testing for harmful levels of pesticide using a transgenic strain of zebrafish that produces a luciferase "green fluorescent protein under conditions of oxidative stress. Embryos were dosed with 0 ng/ml, 0.01 ng/ml, 0.1 ng/ml, 1 ng/ml, 10 ng/ml, 100 ng/ml and 1000 ng/ml of Carbofuran, Dimethoate, Methomyl and Oxamyl separately in 24 well plates. Embryos were observed at 24, 72 and 120 hours post fertilization and analyzed for morphological defects. Analysis showed significant body and tail truncation in response to 1000 ng/ml doses of Carbofuran at time points of 72 and 120 hours post fertilization when compared to all other doses at each time point. This technology may have future application as a teaching tool for rural communities.

Helicopter Interfacility-Transport of Pediatric Trauma Patients: Overutilizing a Costly Resource?

Authors: Meyer MT, Gourlay DM, Weitze KC, Ship MD, Drayna PC, Werner C, Lerner EB

Project Mentor: E. Brooke Lerner, PhD

Background: Helicopter emergency medical services (HEMS) help decrease interfacility transport times, compared to ground ambulances, while increasing expense of transfer and risk to passengers. Our objective was to determine how frequently pediatric patients who are interfacility-transported by HEMS to a level 1 pediatric trauma center (PTC) received a time-sensitive intervention. **Methods:** Four year (2008-2012) retrospective study of children aged 0 to 17. Patients were identified using the trauma registry. A previously published outcome was used to determine whether patients received time-sensitive interventions. Data was analyzed using descriptive statistics. **Results:** There were 207 cases identified. Roughly 44% received a time-sensitive intervention. Of the 117 patients who did not receive time-sensitive interventions, 82% were within 120 driving miles of the PTC and 49% were within 60 miles. **Conclusions:** This study suggests an overutilization of HEMS for pediatric interfacility transfer. Further research is needed to investigate how interfacility transport modes are selected.

Validation of a Newborn Screening Test for 22q11.2 Deletion Syndrome

Authors: Wleklinski NP, Mahnke DK, Bulman DE, Theriault M, Madrzak M, Dunham-Ingle J, Krolikowski M, Tomita-Mitchell A, Mitchell M, Routes JM

Project Mentor: Aoy Mitchell, PhD

22q11.2 Deletion syndrome (22q11.2DS) is the most common microdeletion syndrome with highly variable clinical presentations. Early diagnosis is critical to ensure patients access to medical interventions as soon as possible. This study is being conducted as a collaboration between the Mitchell group and Newborn Screening Ontario (NSO) to validate a 22q11.2DS newborn screen using a MQPCR platform. Patient dried blood spot samples from the CHW Congenital Heart Disease Tissue Bank were sent to NSO and a chart review was conducted on the cohort. The average age of diagnosis was 1.9 years, and 7/41 22q11.2DS patients received a late diagnosis. One patient has yet to be clinically diagnosed. Preliminary analysis of the MQPCR assay showed a high sensitivity and specificity plus strong negative and positive predictive values. These results indicated that this MQPCR assay is applicable to newborn screening for 22q11.2DS, which could help lower the incidence of late diagnoses.

Quantitative Upper Extremity Assessment in Pediatric Population Following Rehabilitative Therapy

Authors: Zarb RM, Rammer JR, Osborn Cornwell C, Daley RA, Tarima S, Harris GF

Project Mentor: Roger Daley, MD, PhD

Community Partner: Marquette University

Introduction: This prospective study evaluates changes in upper extremity functional scores and ranges of motion in children with physical impairments undergoing intensive rehabilitation. It employs a novel markerless motion analysis platform using Microsoft® Kinect 2® and OpenSim musculoskeletal modeling software along with standardized Shriners Hospital for Children Upper Extremity Evaluation metrics. Methods: Children (n=34) receiving three weeks of rehabilitative therapy at a health camp completed pre/post-assessment using both motion analysis and the Shriners Hospital of Children Upper Extremity Evaluation. Chart review provided demographic and health information. Therapist interviews elucidated frequency, duration, and types of interventions and descriptive functional assessment. Results: From weeks 1 to 4, there were significant improvements in unprompted use and segmental positioning of the impaired upper extremity. Ranges of motion increased across eight of 10 tasks measured by motion analysis ($p < .01$). Conclusion: Intensive therapy improves functional scores and ranges of motion in children with physical impairments.

ED Utilization of CT and MRI in Acute Stroke Management

Authors: Alam N, Bhalla M, Ulmer J, Klein A, Fitzsimmons B, Pamorthy S, Quinet S, McAvoy K

Project Mentor: John Ulmer, MD

Introduction and Objective: Acute stroke requires quick and accurate diagnosis to guide management. CT has played an important first-line, without a specific role for MRI in emergencies. We investigated whether MRI or CT serves more effective as a first-line imaging modality. Study Methods: An ongoing retrospective cohort receiving both CT and MRI for stroke evaluation. The accuracy and positive and negative predictive values (PPV and NPV) of final CT/MRI interpretations were compared against discharge diagnoses. Results: Out of 150 patients, 73 were diagnosed with stroke. CT was inferior to MRI in PPV within the tPA therapeutic window of 4.5 hours (83% vs 100%), and inferior in NPV and accuracy in all time windows. Conclusion: Our preliminary review shows that CT serves primarily to rule-out acute hemorrhagic stroke and is inferior to MRI in diagnosing and ruling out acute ischemic stroke. Review of more patients needs to be done.

From Learning to Changing: Enhancing Patient Education in FGID Clinic**Authors:** Carpenter S, Carr K, Chelimsky G, Hainsworth K, Rausch S, Simpson P, Renov V, Chelimsky T**Project Mentor:** Thomas Chelimsky, MD

Purpose: Self-management is the predominant treatment for functional GI disorders (FGIDs). Patient compliance is low without self-motivation. This study will determine if education emphasizing self-management and goals improves treatment adherence and patient outcomes. Methods: 100 patients ages 12-18 with FGID and Functional Disability (FDI) score ≥ 13 were assigned to intervention or care-as-usual. The intervention group received one-on-one education and set short-term goals. Patient outcomes were measured by pre/post intervention FDI scores and other validated questionnaires assessing fear, catastrophizing, readiness to change, anxiety, and depression over three clinic visits. Results: Since October 2016, 157 patients were screened: 68 eligible, 53 interested, 37 enrolled (M:F = 6:31). 16 patients have completed initial follow-up. Average age/enrollment FDI was 15.8 years/30.3. Total average change in pre/post FDI on initial follow-up was -4.69 points: -3.83 (SD: 11.97) for intervention and -5.20 (SD: 11.97) for controls. Conclusions: No definitive conclusions. We will reassess after study completion.

Joining Forces: Military Academic Enrichment Elective**Authors:** Chinn A, Cooper S, McBride-Hayes M, Kiehl C, Lee K, McBride M**Project Mentor:** Michael McBride, MD

The Medical College of Wisconsin, though a part of the Joining Forces Initiative, demonstrates a clear deficit in preparing its students with the knowledge and skills pertinent to the challenges faced by military service members, both past and present, and their families. This faculty approved course, designed for M1 and M2 students, addresses in six core sessions military ethos, TBI, blast injuries, stressors of deployment, PTSD, and social stigma specifically related to the military community. Not only will this course provide students with necessary knowledge for the USMLE but also bridge the gap that exists between teaching institutions, students, and the Department of Defense in regards to the commitment involved in serving in the military while pursuing higher education. As an Academic Enrichment Elective, this course will serve an institutional and national need, better preparing MCW students in both their professional and community endeavors.

CT for Radiation-Induced Changes in Normal Breast Tissue**Authors:** Chen, X., C. Bergom, A.d. Currey, T.r. Kelly, E. Corral, A. Montes, and A. Li.**Project Mentor:** Xiaojian Chen, PhD

Purpose Radiation-induced cosmetic side effects, such as breast fibrosis, are observed after radiation therapy for breast cancer, particularly after accelerated partial breast irradiation (APBI). Quantitative CT texture analysis has the potential to predict radiation-related changes that may result in side effects. In this study we investigated the feasibility of using quantitative CT as an imaging biomarker for early assessment of radiation-induced changes in breast tissue during the delivery of APBI. Methods Daily diagnostic-quality CT data acquired using an in-room CT during daily CT-guided APBI for 15 breast cancer patients were analyzed. Conclusion Increase of mean Hounsfield Units in normal breast tissue was observed from the first to the last fraction CT sets. This increase depends on radiation dose. These changes in quantitative CT may reflect physical and/or chemical changes in the healthy breast tissue and may be used as an early predictor of acute and/or late treatment effects.

Lyme Disease Presentation: Improving the Knowledge of Medical Practitioners**Authors:** Declusin AR, Bower D, Ruffalo L, Treat R**Project Mentor:** Douglas Bower, MD

Lyme disease is the most commonly reported vector-borne illness in the United and is a serious public health issue in the state of Wisconsin. A presentation on Lyme disease was offered to general practitioners at the 2016 MCW Winter Refresher Course for Family Medicine with the goal of improving their knowledge of the illness. A pre- and post-test was administered to the audience at the time of presentation to evaluate learning. The results show a statistically significant improvement (N=73, p=.001) in their confidence of their knowledge of the various topics discussed during the presentation. The presentation successfully met the goal of measurably furthering the education of the attendees.

Understanding Medical Students' Comfort Communicating with Pediatric Patients**Authors:** Destiche D, Atwood D, Drendel A**Project Mentor:** Amy Drendel, DO, MS

Physician communication with pediatric patients is essential to their care. However, during pre-clerkship years medical students are not provided significant opportunity to interact with pediatric patients. The study team hypothesizes that medical students, pediatric residents, clerkship program directors and parents of children at CHW will identify a deficit in medical student communication with pediatric patients entering their third-year pediatric clerkship. A needs assessment was performed by surveying medical students and interviewing pediatric residents, pediatric and family medicine clerkship program directors and parents of children at CHW. All participants identified that medical students were underprepared to communicate with pediatric patients entering the third-year pediatric clerkship. The specific deficits identified were in age-appropriate questioning, sensitive questioning, party-specific questioning, infantile physical examination, ear examination, and balancing communication between physician and family during family-centered rounds. Study findings indicate that medical students would benefit from an educational intervention targeting communication with pediatric patients.

Introduction to Medical School**Authors:** Rahman S, Dhaliwal T, Alum N, Gordon J, Gooley B, Applin D, Lyons V**Project Mentor:** Jeffrey Whittle, MD, MPH

There is a great deal of anxiety and fear associated with beginning medical school. Many people have a limited understanding of what to expect prior to entering. Our goal was to make the transition from undergrad to med school less difficult. We did this by designing and teaching a course titled Introduction into Medical School for undergraduate students who were either already accepted or anticipated being accepted into med school. The course was bimonthly, consisted of eight 2 hour sessions, and ended with a brief final exam. Our main objectives were to introduce concepts that would help students succeed in medical school and to provide students with a better understanding of the stages of medical education. The course was led by a team of one resident, six med students, and several guest lecturers from the Medical College of Wisconsin community.

Characteristics of Pediatric Recurrent Erythema Multiforme

Authors: Adam Heinze, Manrup Hunjan, M.D., Megha Tollefson, M.D., Kristen Holland, M.D., Yvonne E. Chiu, M.D.

Project Mentor: Yvonne Chiu, MD

Objective: To characterize clinical features, laboratory findings, and treatment responses in pediatric recurrent erythema multiforme (EM). **Background:** EM is an acute condition characterized by target lesions of the skin and often mucosal ulcers. Although rare, a subset of patients experience recurrent EM. Pediatric recurrent EM is poorly understood. **Methods:** A retrospective chart review was conducted at Children's Hospital of Wisconsin in Milwaukee, WI (2000-2015) and Mayo Clinic in Rochester, MN (1990-2015). **Inclusion criterion** was diagnosis of recurrent EM before age 18. **Results:** Twenty-six patients were included, 16 (62%) were males. The median age of onset was 9.1 years (range, 0-15.7). Nine patients (35%) required hospitalization. Herpes simplex virus (HSV) testing was positive in 9 of 17 (65%) patients. **Conclusion:** This study found a greater male predominance, more hospitalizations, fewer cases caused by HSV, and lower response to immunosuppression in the pediatric population of recurrent EM compared with the general population.

Is Long-Term Survival Possible After Margin-Positive Resection of Retroperitoneal Sarcoma?

Authors: Klooster B, Rajeev R, Chrabaszcz S, Charlson J, Miura J, Bedi M, Gamblin TC, Johnston F, Turaga K

Project Mentor: Kiran Turaga, MD, MPH

Background/Objectives: For various reasons, some patients undergo a gross margin positive resection(R2) leading to a dilemma in care. We hypothesized that there is a subset of patients who have long term survival(LTS, ≥ 5 years) after R2 resection for retroperitoneal sarcoma(RPS).

Methods: National Cancer Database data from 1998-2011 was reviewed to identify patients with RPS who had R2 resections. Logistic and Cox regression models were used to compare LTS with short term survival.

Results: Of 12,028 patients, R2 resection rate was 3.28%. Median survival for RPS with R2 resection was 21 months vs. 69 months for those with R0/R1 resections($p < 0.001$). Of 272 patients with available survival, 24%($n=64$) survived ≥ 5 years with 64% alive at follow-up. LTS was most often seen in younger patients(< 65 years) with well-differentiated liposarcoma.

Conclusion: Long term survival is possible for a subset of patients after an R2 resection for RPS, especially with favorable histology characteristics.

Treatment of Intraosseous Low-Grade Chondroid Lesions of the Proximal Humerus

Authors: LaPrade CM, Hackbarth DA, Neilson JC, King DM

Project Mentor: David M. King MD

Background: While there is concern for malignant transformation of low-grade chondroid tumors in the proximal humerus, few studies have evaluated their natural history. **Hypothesis:** The vast majority of low-grade chondroid lesions in the proximal humerus can be observed with minimal risk of malignant transformation in the short-term. **Methods:** The final patient population included 57 intended for conservative treatment and 15 proceeding directly to surgery. Data collection was based on chart review and original radiographs, CTs, and MRIs. **Results:** No malignant transformations were noted amongst any group. In the conservative treatment group, 14% progressed on to surgery after 23.4 months of conservative treatment; however, 63% experienced continued pain at 26.6 months post-surgery. **Conclusions:** The majority of low-grade chondroid lesions of the proximal humerus can be managed with conservative treatment. Patients with a clear source of their shoulder pain without concerning characteristics on imaging can be managed with yearly radiographic imaging.

The Development, Implementation, and Evaluation of a Suicide Prevention Gatekeeper Training Curriculum for High School Students

Authors: Ledvora L, Russeth K

Project Mentor: Kathy Russeth, MD

Community Partner: Prevent Suicide of Greater Milwaukee

Ample research supports the efficacy of suicide prevention gatekeeper training programs for adults, but little research evaluates their use with adolescents. This study modified an adult suicide prevention gatekeeper training to include statistics and examples relevant to adolescents and a suicidality screening. This curriculum was implemented with 32 high school students who participated in a pretest, the curriculum, and a posttest. Efficacy was evaluated using paired samples t-tests comparing participants' pre and posttest scores. Posttest scores were significantly higher compared to pretest scores in the categories of declarative knowledge about suicide/suicide prevention behaviors [(M= 1.22, SD= 1.75); t(32)=4.01, p <0.001] and self-perceived confidence and comfort in enacting suicide prevention behaviors [confidence: (M= 0.72, SD= 0.58); t(32)=7.22, p <0.001] [comfort: (M= 0.45, SD= 0.75); t(32)=3.39, p =0.002]. These results indicate that it is feasible to implement a suicide prevention gatekeeper training program for adolescents and that such a program is effective.

Publication of the Auscult Literary Magazine at Medical College of Wisconsin

Authors: Qaisar T, Havas N

Project Mentor: Nancy Havas, MD

Writing, reflection, and creative expression within medical education can be cathartic for medical students and health care professionals. The Auscult literary magazine is a creative outlet at MCW. The 2015 edition of this magazine was completed by two student editors, a faculty editor, and a project assistant. Submissions of poetry, short stories, essays, photographs, and original artwork were welcomed to a general project email address for 3 months. Submissions were de-identified by the project assistant and reviewed independently by members of the editorial team. Selection of pieces for publication was finalized through editorial team discussion. A total of 123 submissions were received, with 40 chosen for publication. Of the published pieces, 9 were poetry, 3 were prose, 3 were short stories, 15 were photographs, 5 were original drawings, and 2 were mixed media art. The project allowed for student leadership, community collaboration, professional development, and exploration of humanities in medicine.

Cadavers as Educators: A Web-Based Education Portal

Authors: Swartz J, Stauder E, Stevens S, Huerta M, Segatta A, Stauder S, Hoagland T

Project Mentor: Todd Hoagland, PhD

Cadavers as Educators (CAE) has been a popular community outreach program at MCW for several years. The number of high school students (HSS) allowed to attend CAE, however, has been limited by the capacity of volunteer medical students to proctor/grade quizzes, provide school tours, and teach in the anatomy lab. An online tool could be created and utilized to alleviate these limitations and allow for a larger population of HSS to participate in CAE. By working with a web developer, an education portal was created and utilized to facilitate each aspect of hosting and coordinating a CAE event. Surveys were distributed amongst CAE managers to assess the usefulness and success of the website compared to their prior methods. The results showed unanimous agreement that the website streamlined the event process, decreased the workload of CAE managers, advertised the CAE program, and successfully increased the program's capacity to host more HSS.

Clinical Instruction in Physical Examination on the Internal Medicine Clerkship: A Mixed-Methods Descriptive Study**Authors:** Taylor A, Bergl P, Muntz M, Feagles J, Quirk K, Fletcher K.**Project Mentor:** Paul Bergl, MD

Previous studies capture quantitative data regarding physical exam instruction during undergraduate medical education, however they do not describe how educational environments influence PE teaching. We aimed to describe the content and quality of PE instruction during the internal medicine clerkship. This prospective mixed-methods study used checklists and written reflections to document behaviors of medicine teaching teams during pre-rounds, attending rounds, and admission activities. Written reflections were coded qualitatively using NVivo software. Sixteen teams were observed. PE instruction occurred in the workroom, hallway and bedside. Location was a significant predictor ($p < .001$) of the discussion of PE findings: most frequently at the bedside (67%) compared to the hallway (57%) and in workroom (44%). Reflections revealed two major educational influences: social dynamics and physical aspects of the learning environment. PE instruction depends on the broader educational framework. Clinician-educators should consider location as well as social contexts of clinical care when selecting teaching strategies.

Sex Differences in Endovascular Aneurysm Repair Outcomes**Authors:** Truong C, Kugler NW, Rossi PJ, Brown KR, Lewis BD, Seabrook GR, Lee CJ**Project Mentor:** Cheong Jun Lee, MD

Endovascular aneurysm repair (EVAR) is used to repair abdominal aortic aneurysms (AAA). Women did not previously benefit as well much as men from EVAR due to difficulty vessel anatomy. EVAR stent grafts have since become lower-profile and conformable. Our hypothesis is men and women benefit equally from this procedure nowadays. A chart review was performed on 181 patients who had elective EVAR for AAA from 2005-2013. Unplanned intraoperative interventions weren't different between sexes ($p = 0.957$). EVAR durability extrapolated as time to secondary intervention (SI) was 91% at 2 years and 85% at 5 years and showed no difference in long-term durability between sexes. Severe iliac artery tortuosity (HR 4.8, $p < 0.05$) and aortic neck angle > 60 degrees (HR 4.7, $p = 0.022$) predicted SI. EVAR durability was found to depend on vessel anatomy. Future directions should focus on developing more conformable stent grafts to improve EVAR outcomes.

Implementation of An Adhesive Small Bowel Obstruction Protocol and the Impact on Patient Outcomes**Authors:** VandeWater T, Webb T, Trevino C**Project Mentor:** Colleen Trevino, RN, MSN, APNP, PhD

Small bowel obstruction (SBO) is a common condition leading to many hospital admissions and operations. Standardized care of SBO patients has not been widely implemented but may improve patient outcomes and streamline management. Our institution implemented a SBO protocol developed using evidence-based guidelines. We hypothesized that length of stay (LOS) and time to operation would decrease, rate of SBO resolution with non-operative management would increase, and the rate of readmission within 30 days and rate of complications in operative patients would remain unchanged. A prospective cohort of patients after protocol implementation was compared to a historical cohort of patients. Univariate analyses demonstrated decreased time until surgery and decreased rate of complications. There was a statistically significant decrease in LOS and in the proportion of patients that received surgery. Utilizing an evidence-based SBO protocol can lead to shorter LOS and may result in fewer operations for adhesive SBO patients.

Identifying Risk Factors for First-Time Hookah Use and Health Perceptions Across University Students in Lebanon

Authors: Rahhal, Ghady. Yacoubian, Hagop A. Yacoub, Stephanie. Abdelhakiem, Mohamed. Saleh, Jamal. Irani, Jihad. Rein, Lisa. Szabo, Aniko. Atallah, Ehab.

Project Mentor: Ehab Atallah, MD

Hookah has become an increasingly popular pastime in Lebanon, where as many as 34.8% of adolescents smoke hookah. To our knowledge, this is the first study to investigate potential triggers for first-time hookah smoking among university students in Lebanon and to evaluate the prevalence of health misconceptions about hookah smoking. An online survey was sent out to students at two universities in Lebanon using REDCap. A total of 246 responses were analyzed. The two most common reasons for smoking hookah were because a close contact smoked (either a friend or family member) and/or boredom. With regards to health misperceptions, 50% of students falsely believed or were unsure whether fruit flavored or better smelling hookah had different health outcomes than their respective counterparts. This study illustrates the importance in raising public awareness and implementing educational interventions in order to foster better understanding on the health effects of hookah.

International Health Electives: The Student Experience

Authors: Akagi NE, Wilson SL

Project Mentor: Samantha Wilson, PhD

This review explored the current literature on the student / trainee experience while on medical electives abroad. Prominent themes included student benefits, student safety, ethical issues, and cultural adjustment. The current perspectives on these topics were discussed, as well as future directions for research and elective program development.

Combination HIV Prevention Strategy Implementation in El Salvador: Perceived Barriers and Adaptations Reported By Peer Educators

Authors: Buck M, Dickson-Gomez J, Bodnar G

Project Mentor: Julia Dickson-Gomez, PhD

El Salvador was one of three countries to receive funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria to conduct a combination HIV prevention intervention among transwomen (TW), men who have sex with men (MSM), and commercial sex workers (CSW). Program evaluation revealed that prevention activities reached only 50% of the target population. The purpose of this study is to examine the barriers that Salvadoran educators faced in implementing the peer education as designed and adaptations made as a result. Between March and June 2015, 18 in-depth interviews with educators were conducted. Violence was reported as the biggest barrier to intervention implementation. Other barriers differed by subpopulation. The level of violence and discrimination calls into question the feasibility and appropriateness of peer-led interventions in the Salvadoran context and demonstrates the importance of implementation research when translating HIV prevention interventions developed in high-income countries to low- and middle-income countries.

Online IPE and Immigrant & Refugee Health Curriculum Quality Improvement**Authors:** Camenga E, Thompson G, Holt J, Zabler B, Sanders J**Project Mentor:** James Sanders, MD, MPH**Community Partner:** University of Wisconsin - Milwaukee, College of Nursing Institute for Urban Health Partnerships

To improve healthcare quality, the University of Wisconsin - Milwaukee (UWM) College of Nursing's Institute for Urban Health Partnerships (IUHP) developed an asynchronous, online module, teaching interprofessional competencies and information on culture and health of immigrants and refugees (I&R). Two components of the module were voice-over PowerPoint presentations, on interprofessional education (IPE) and on immigrant & refugee (I&R) culture and health. The IPE PowerPoint covered the Interprofessional Education Collaborative (IPEC) competencies. The I&R PowerPoint covered the refugee resettlement process and cultural sensitivity. The pilot cohort of project staff and students took quality improvement surveys. IPE Likert-like responses (n=25) had a mean of 4.52 ± 0.22 . IPE responses called the PowerPoint engaging and useful. I&R Likert-like responses (n=23) had a mean of 4.67 ± 0.18 . I&R responses called the PowerPoint a thorough, though long, introduction. The cohort suggested changes to the curriculum and its delivery. The cohort found the presentations informative and engaging.

Newborn Screening: Assessing the Level of Knowledge of Genetic Testing Among Mothers in Rzeszow, Poland**Authors:** David A, Nagorska M, Telega G**Project Mentor:** Grzegorz Telega, MD

Newborn screenings are defined by using a few drops of blood from the newborn's heel to screen certain genetic, endocrine, and metabolic disorders. Currently in Poland, screening tests are available for over 40 different disorders. The aims of this study are to assess the knowledge gap regarding newborn blood spot screenings in Poland with a questionnaire. During June to August 2015, pregnant and postpartum women given an anonymous multiple-choice questionnaire. The data shows that there is still a gap that remains to be filled. Education is lacking and often incomplete, yet informed choice is a vital part of health care. If patients are not making informed choices, healthcare professionals need to advocate for services that allow access to accurate information to create informed decisions. Future efforts can address the knowledge gap by teaching health professionals how to better educate patients and create accurate and accessible material on the Internet.

United Community Center Employee Perspectives on Alcoholism**Authors:** Gehrmann R, Ruffalo L, Arestegui D**Project Mentor:** Leslie Ruffalo, PhD

With the U.S. Latino population growing, understanding cultural factors that influence drinking patterns within the Latino population may give insight to physicians. Using qualitative research methods, we conducted interviews with alcohol treatment facility staff members at a Latino community center to learn what cultural factors cause alcoholism in this population, and what motivates individuals to seek help. Findings indicate that patients at the center complete treatment due to familismo. This cultural value causes Latinos to feel duty and responsibility toward their families, motivating them to start and finish treatment. Another theme was traditionalism, with staff members citing that patients drink to grieve the loss of old cultural values. The results support literature that has quantitatively examined the connection between alcohol and culture in Latinos. By using qualitative methods, an intimate portrait of alcoholism in Latinos was created that is fitting considering the emotional aspects of the disease.

Literature Review to Define Culture Shock and Assess Measurement tools**Authors:** Ismail Z, St Clair NE**Project Mentor:** Nicole E St Clair, MD

Global health has become a major focus in medical training programs with several medical trainees choosing to participate in global health electives. These electives provide clinical experiences in diverse cultural, economical and ethical settings. While one goal of these experiences is to immerse into these diverse settings, there are several barriers to achieving this goal. This review focuses on the experience of culture shock as a major barrier to successful immersion. In order to understand the experience of culture shock it is important to define and differentiate it from the experiences of acculturation and enculturation, two patterns of socialization albeit under different circumstances. In addition to defining culture shock, this review analyzes various tools that have been used to measure culture shock. Identifying an optimal tool to measure culture shock will, ideally, help trainers enhance pre-travel preparation and, ultimately, create a healthier global training experience.

Out there: A Student-Organized Workshop Series on Low Resource Medicine**Authors:** Mischo MS, Joel CL, Milia D**Project Mentor:** David Milia, MD

BACKGROUND: The global need for doctors proficient in providing care in wilderness, disaster, and other austere settings is rapidly growing. In response, medical schools have designed courses centered on teaching students the basics of low resource medicine. These courses are often expensive and resource intensive for both participants and organizers. **OBJECTIVE:** Describes and analyzes the efficacy of an unfunded student-run workshop series on low resource medicine. **METHODS:** The workshop series consisted of five faculty-led sessions, totaling ten hours, and was evaluated using a multiple-choice exam, scenario-based evaluation, and participant survey. **RESULTS:** Participants demonstrated a 6.7% mean improvement in performance on the multiple-choice evaluation ($p=0.028$), an average performance of 82.7% during the scenario-based evaluation, and strong subjective increases in knowledge, confidence, and skills. **CONCLUSION:** The results of this study demonstrate an effective, easily implemented, student-driven model for medical student education in low resource medicine.

An Explorative Discussion on the Topic of Refugee Health and Stressors Following Relocation to Milwaukee**Authors:** Knabel M, Ssempijja S**Project Mentor:** Sebastian Ssempijja, PhD**Community Partner:** Sebastain Family Psychological Practice

Refugees are exposed to stressors both pre and post displacement that effect a person's mental health and emotional well-being, but relevant literature is lacking. This project aims to explore topics in mental health pertaining to refugee communities in the Milwaukee area. We will identify stressors refugees experience pre and post displacement as well as coping mechanisms refugees use to manage stressors. To accomplish this we organized and mediated a series of focus groups using a participatory learning model among community leaders, interpreters, and other community partners who work intimately with one of several refugee populations in the Milwaukee area. We have identified previous traumatic and ongoing social stressors as well as coping mechanisms, both behavioral and substance related, used in response to stress. Health care providers and community leaders can use the information presented to better address the needs of these communities and to spark interest in further discovery.

Latent Tuberculosis Infection (LTBI) Targeted Testing and Treatment in Milwaukee Community Clinics**Authors:** Lacey M, Jin Y, Hansen S, Lundh R, Hunter P**Project Mentor:** Paul Hunter, MD

Background: Reactivation of LTBI in at risk patient groups continues to be a source of TB transmission within the US. Completing antibiotic treatment prevents reactivation in 90% of cases. We developed an LTBI targeted testing and treatment protocol at a weekly free clinic in Milwaukee. Methods: The protocol includes a risk assessment questionnaire, same day testing and methods to ensure treatment adherence. A retrospective chart review was used to assess its effectiveness. Results: Between 6/27/15 and 12/31/16, 74.7% of patients completed the risk assessment. 82 of 432 (19.0%) patients met criteria for ordering tuberculosis blood testing and 33 of those 82 (40.2%) completed testing. We received 2 positive results and 1 patient completed treatment successfully. Conclusions: Implementing a targeted testing protocol for LTBI at a student-run free clinic in Milwaukee was feasible and sustainable. Future iterations will focus on increasing the percentage of patients completing the risk assessment and testing.

Eyes on the Future: Shaping Tomorrow's Healthcare Through Interactive Education**Authors:** MacDonald M, Medic V, Kim J**Project Mentor:** Judy Kim, MD**Community Partner:** Bruce Guadalupe Community School

Although Latinos represent one of the fastest growing populations in the United States, they remain greatly under-represented among physicians and scientists. Through the Eyes on the Future Program, a collaboration between the Medical College of Wisconsin and the Bruce Guadalupe Community School, we investigated the effect of early exposure to medical-based and interactive curriculum, demonstration of medical technologies, and partnership with medical students on increasing interest in pursuing careers in medicine. Additionally this program explored barriers that students perceive to pursuing careers in medicine. Finally, we assessed the role of this program serving as a community health initiative through educating Latino youth on health topics that are more prevalent among Latinos, thus, empowering students to share their knowledge and become ambassadors for health in their communities. We found that the majority of students reported increased medical knowledge, sharing this education with community members, and increased comfort contacting medical student mentors.

Out There: The Efficacy of a Student-Organized Workshop Series on Low Resource Medicine**Authors:** Mischo M, Joel C, Milia D**Project Mentor:** David Milia, MD

BACKGROUND: The global need for doctors proficient in providing care in wilderness, disaster, and other austere settings is rapidly growing. In response, medical schools have designed courses centered on teaching students the basics of low resource medicine. These courses are often expensive and resource intensive for both participants and organizers. OBJECTIVE: Describes and analyzes the efficacy of an unfunded student-run workshop series on low resource medicine. METHODS: The workshop series consisted of five faculty-led sessions, totaling ten hours, and was evaluated using a multiple-choice exam, scenario-based evaluation, and participant survey. RESULTS: Participants demonstrated a 6.7% mean improvement in performance on the multiple-choice evaluation ($p=0.028$), an average performance of 82.7% during the scenario-based evaluation, and strong subjective increases in knowledge, confidence, and skills. CONCLUSION: The results of this study demonstrate an effective, easily implemented, student-driven model for medical student education in low resource medicine.

The Soldier's Heart: A Resource for Veteran Post Traumatic Stress**Authors:** Mooney JM, Jelacic NP, Weber MW**Project Mentor:** Mike McBride, MD

Post-Traumatic Stress Disorder in veterans is a modern health epidemic in America. It is estimated that up to 20% of veterans have PTSD in a given year. Furthermore, it is estimated that the actual prevalence of PTSD is significantly higher, with up to 30% of veterans suffering from PTSD in their lifetime¹. Lack of understanding about PTSD symptoms, difficulty in finding connections to resources, and avoidance of discussing these sensitive topics in healthcare settings all contribute to veterans not accessing needed care. The mission of The Soldier's Heart is to provide a comprehensive website for veterans, families, and providers to understand PTSD through each other's perspectives. Additionally the website aims to educate about treatments and improve communication between those affected and their caretakers. The website will utilize short videos presented by fellow veterans, caregivers, and families, to communicate understanding and educate on this complex topic.

Op-Ed: New Immigration Policy and Pediatric Mental Health**Authors:** Murguia LF, Wilson S**Project Mentor:** Samantha Wilson, PhD

The recent personnel changes in the US government have brought with them several adaptations to immigration policy. Among these adaptations is an expedition of the deportation process. Some lawmakers are even considering separating children of parents caught illegally crossing the US border from their parents. The American Academy of Pediatrics has since denounced this policy, stating that this kind of stress placed on children may have significant health consequences. In fact, animal models have shown that this toxic stress has significant effects on mental health, and may even have an impact on the neuronal programming of the developing brain. In the following opinion editorial, I will explore the changes made to immigration law, highlighting those that may lead to unfavorable health outcomes in pediatric patients. These efforts are not to make a political statement, but rather provide scientific information to support policy decision-making.

Improving HIV Testing in Froedtert's Emergency Department**Authors:** Owen J, Burmeister B, Pace C, Petroll A**Project Mentor:** Caroline Pace, MD

In Wisconsin, 28-30% of people diagnosed with HIV are concurrently diagnosed with AIDS, increasing the likelihood of unintended forward transmission. Early diagnosis of HIV is crucial in reducing incidence, as well as avoiding the significant expenses related to morbidity and mortality. A qualitative and quantitative survey of prior testing experience, perceived barriers, and working knowledge of HIV epidemiology was conducted. Our team of ED faculty, residents, medical students, and infectious disease (ID) faculty developed a pathway to simplify HIV test ordering. A presentation including epidemiology trends and missed testing opportunities was delivered during departmental Grand Rounds and an ED faculty meeting. During the two academic years before intervention, 5.25 and 7.00 tests per month were performed, and 1.57% of tests were positive. Post-intervention, the average number of monthly tests increased to 34.5, with an average of 1 reactive test per month.

Use of International Donors for Hematopoietic Cell Transplantation at MCW**Authors:** Placone N, Pasquini M**Project Mentor:** Marcelo Pasquini, MD, MS

Integration of donor registries allow the search for HLA matched donors in multiple countries for hematopoietic cell transplant (HCT) candidates. According to the genetic background in Wisconsin, patients frequently have donors from European countries. This study describes the use of international donors (intD) at our center. Results: Of 278 patients undergoing HCT from 2008-2016, 52.8% (148/280) came from intD and ranged from 31 to 89% annually. There were no significant differences in recipient demographic according to URD origin. However, the time from collection to receipt was longer for intD (23.5 hours longer and 9.52 hours longer for peripheral blood and marrow $P<0.0001$). Also, certain cell lines collected had lower cell dose from intD ($p<0.001$). Despite differences in cells dose and transit time, survival was comparable according to donor origin. The use of intD expands access to HCT for WI patients without other donor options.

Mortality Analysis of Croatia's Southern Dalmatian Islands**Authors:** Rehberg J, Polasek O**Project Mentor:** Jason Liu, MD, MPH

This study sought to discover potential differences in mortality rates between the Dalmatian islands and mainland of southern Croatia, and evaluate the burden of disease among the islands. It was hypothesized that islands would have lower mortality rates than the mainland. The study sample consisted of death records from residents within the two most Southern counties of Croatia over the period of 1998-2013. Performed analyses consisted of standard mortality ratios (SMRs), average age at the time of death, and the top causes of death based on ICD-10 classifications. The analyses showed the island populations tend to have lower SMRs and higher mean ages of death compared to the mainland. Island mortality was largely cardiovascular in nature, and lung cancer in males was a frequent cause of mortality. As a result future public health interventions could focus on reducing cardiovascular disease prevalence and investigating smoking habits of the Croatian island populations.

Lessons Learned: From SARS to MERS**Authors:** Rosengren ML, Franco Z**Project Mentor:** Dr. Zeno Franco, PhD

An important aspect of disaster preparedness is infectious disease prevention, control, and management as outbreaks can play a major role in the development of local epidemics, global pandemics, and bioterrorism. By understanding the failures of disaster preparedness for past emerging diseases we can gain valuable insight into the process and procedures to help communities and governments better prepare for future outbreaks. This project will examine two outbreaks that represent different but related diseases: SARS in China and MERS in South Korea. By looking at varied diseases to understand commonalities, the project will explore the response to infectious disease outbreaks and the related public health issues that all communities will face. Developing a conceptual framework to understand past failures in controlling and managing respiratory coronaviruses, will allow governments and society to better protect themselves from future outbreaks.

A Qualitative Analysis on Substance Abuse and Care Engagement Amongst PLH in Russia**Authors:** Smith JA, Amirkhanian YA, Kelly JA, Amirkhanian AG**Project Mentor:** Jeffrey Kelly, PhD

While it is known that adherence to antiretroviral therapy (ART) and engaging in medical care both improve health and reduce transmission in people living with HIV (PLH), millions are out of care, and Russia's situation is particularly poor. We recruited 18 PLH in St. Petersburg, Russia in and out of care and explored multiple aspects of their lives through in-depth interviews, which were audio recorded, transcribed, and qualitatively analyzed. A significant barrier to care identified was substance abuse, namely conceptions of the microbiological effects that substance abuse has on an individual's HIV and ART, an individual's capacity to take medications and make and keep appointments, and the personal character of one who abuses substances. By directly addressing from a multidisciplinary approach this pervasive component of Russian culture and lifestyle, a greater proportion of PLH in Russia may engage in care, infection rates could decline, and lifespan could be prolonged.

Working with Interpreters - An Interprofessional Educational Session**Authors:** Bordini B, Chavez H, Umhoefer R, Kaupla G**Project Mentor:** Brett Bordini, MD

Physicians utilize medical interpreters to bridge the communication barriers Limited English Proficient (LEP) patients face in seeking healthcare. Though many doctors encounter LEP patients in medicine, not all medical schools educate students on interacting with interpreters and LEP patients. The required educational session Working with Medical Interpreters and Limited English Proficient Patients taught medical students and medical interpreter trainees techniques for facilitating interpreted doctor-patient interactions. Participants (n=126) evaluated their skill level, confidence level, and perceived educational value on 5-point scales via a retrospective post-session self-assessment. Results showed 65.9% of participants believed the session increased their confidence in communicating with LEP patients, 73.0% were very satisfied with the improvement in their skills, and 83.2% felt the session was very important to their education. Interprofessional educational programs can provide valuable learning experiences to medical students to help them gain confidence in working with interpreters and LEP patients in the medical setting.

The Soldier's Heart**Authors:** Mooney J, Weber M, Jelacic N, McBride M**Project Mentor:** Michael McBride MD

Post-Traumatic Stress Disorder in veterans is a modern health epidemic in America. It is estimated that up to 20% of veterans have PTSD in a given year. Furthermore, it is estimated that the actual prevalence of PTSD is significantly higher, with up to 30% of veterans suffering from PTSD in their lifetime¹. Lack of understanding about PTSD symptoms, difficulty in finding connections to resources, and avoidance of discussing these sensitive topics in healthcare settings all contribute to veterans not accessing needed care. The mission of The Soldier's Heart is to provide a comprehensive website for veterans, families, and providers to understand PTSD through each other's perspectives, learn about treatments, and better communication between those affected and their caretakers. The Soldier's Heart will utilize short videos, presented by fellow veterans, caregivers, and families, to communicate stories and provide education into this complex topic.

GERD and Acid Reduction Medication Use Following Gastric Bypass and Sleeve Gastrectomy**Authors:** Barr AC, French MJ, Bosler ME, Goldblatt MI, Gould JC**Project Mentor:** Jon Gould, MD

Background: Gastroesophageal reflux disease is a common comorbid medical condition of obesity. Laparoscopic sleeve gastrectomy has been associated with de novo and worsening GERD following surgery. For this reason, patients who suffer from GERD and are considering bariatric surgery are often counseled to undergo gastric bypass. Given this practice, we sought to determine acid reduction medication (ARM) utilization in bariatric surgical patients who undergo one of these procedures prior to surgery and at one year following surgery. Methods: A retrospective review of prospectively maintained data on patients to undergo gastric bypass or sleeve gastrectomy between November 2012 and December 2014 was conducted after IRB approval. ARM utilization and Gastroesophageal Reflux Disease Health Related Quality of Life (GERD-HRQL) scores (range 0 [no symptoms] - 50 [severe GERD]) were compared prior to surgery and at 1-year postoperatively.

Survey for Experts' Opinions About Cardiac Regeneration and Health Policy**Authors:** Bell FT, Lough JW, Meurer JR.**Project Mentor:** John Lough, PhD, MS and John Meurer, MD, MBA

Heart disease is a leading cause of death in the United States. Cardiac regeneration using transplanted progeny of stem cells has been proposed to ameliorate this problem. This project seeks experts' opinions in the field of cardiac stem cell research to ascertain their views on health policy, funding, and general outlook. A questionnaire was developed and approved by the MCW IRB. Over 100 researchers related to the field of cardiac stem cell research were identified across the United States through publications, symposia, trials, funding and awards using internet-based searches from NIH and NSF. To date, data acquired from six anonymous respondents suggests that progress has been hindered by lack of funding, clinical trials have been prematurely performed, the use of cardiomyocytes generated from pluripotent stem cell lines may become most effective, and increasing funding is critical to support collaborations between bench-to-bedside and ensure the efficacy and safety before clinical investigations.

Froedtert Hospital Short-Term Readmissions**Authors:** Rubin J, Bodes R, Billings J**Project Mentor:** Jonathan Rubin, MD

Emergency department visits to Froedtert Hospital from 1/1/2015-9/30/2015 were analyzed to identify and categorize patient populations at high risk for short-term hospital readmission. Approximately 6,765 patients visited the ED within 30 days of a previous hospital discharge during this time period. Patients initially admitted for septicemia represented the largest group of short-term hospital readmissions, followed closely by those admitted for chest pain. Approximately 45% of patients with chest pain returned to the ED within 10 days of their initial discharge. Methods for reducing the spread and severity of infection should be studied further for the purposes of lowering short-term hospital readmissions. Similarly, the early return to the ED by chest pain patients warrants further study.

Fractures and Peripheral Neuropathy Among Elderly Breast Cancer Patients Receiving Taxanes**Authors:** Brown AM, Neuner JM, Smith EC, Laud PW, Wozniak E, Kamaraju S**Project Mentor:** Joan Neuner MD, MPH

We sought to examine the rates of fractures in patients receiving chemotherapy regimens containing taxanes. We also examined the relationship of fracture rate with peripheral neuropathy (PN) that warranted treatment. Using nationwide Medicare files, we identified women age 65 years and older with breast cancer who received adjuvant chemotherapy containing a taxane agent between 2006 and 2008. We identified treated PN by patients who received gabapentin, pregabalin, amitriptyline or nortriptyline after starting chemotherapy. 3,781 patients were included in our cohort. The fracture rate in the cohort was 10.31%. The fracture rate was higher in users of PN-treatment drugs than in non-users (12.37% vs. 9.72%). We believe this information could prove useful for breast oncologists in their awareness of fracture risk and their education to their elderly patients of potential adverse effects associated with taxanes.

Socioeconomic Status and Breast Cancer Treatment**Authors:** Dreyer MS, Pezzin LE, McGinley EL, Nattinger AB**Project Mentor:** Ann B. Nattinger, MD, MPH

Evidence suggests substantial disparities in breast cancer survival by socioeconomic status (SES). We examine the extent to which receipt of treatments “a plausible source of disparities in survival” varies by SES among elderly women with breast cancer. Multivariate regression analyses were applied to 11,368 women (age 66-90 years) identified from SEER-Medicare as having invasive breast cancer diagnosed in 2006-2009. Poor and near-poor women were less likely than high SES women to receive sentinel lymph node biopsy and radiation after breast conserving surgery. Poor women were also less likely than near-poor or high SES women to receive any axillary surgery and adjuvant chemotherapy. Near-poor women who initiated hormonal therapy were more likely to use tamoxifen, and less likely to use aromatase inhibitors when compared to both poor and high SES women. Our results indicate that SES disparities in the receipt of treatments for incident breast cancer are both pervasive and substantial.

Characteristics of Elderly Male Veterans Associated with Physical Activity**Authors:** Erdmann M, Semons-Booker K, Lans D, Whittle J**Project Mentor:** Jeffrey Whittle, MD, MPH

Prior studies of factors associated with physical activity (PA) suggest intrinsic motivation is important, along with self-efficacy and external support. However, these studies include few older men. We analyzed baseline data from a study of exercise and cognition to identify characteristics associated with PA among 115 male veterans, aged 65-89 years old receiving care at the Zablocki VAMC. We measured PA via three measures: International Physical Activity Questionnaire, Community Health Activities Model Program for Seniors, and Stanford Brief Activity Survey. We measured self-efficacy, social support, depression, and motivation using validated instruments. Multivariate linear regressions were used to assess the impact of each characteristic on PA. Fewer depressive symptoms and higher intrinsic motivation, social support, cognitive ability and income associated with more PA. Extrinsic motivation was not predictive of PA. The results agree with previous literature, and suggest older men would benefit most from interventions catering to individual interests and benefits.

An Appraisal of Materials and Value for Patch Reconstruction of the Pulmonary Arteries

Authors: William Hollabaugh, Michael McGinnis, William K. Johnson, Michael E. Mitchell, James S. Tweddell, and Ronald K. Woods

Project Mentor: Joseph O. Hill, PhD

Background/Hypothesis: We sought to evaluate quality (re-intervention) and cost of various patch materials used for main and branch pulmonary artery (PA) patch reconstruction. Patients/Methods: Retrospective single-institution review spanning 1990-2015 of patients undergoing main or branch PA reconstruction. Five patch materials were analyzed. Primary outcome was re-intervention on the reconstructed PA site. Results: Cohort included 341 patients, 442 patch reconstruction sites. TOF/PS and other biventricular repair constituted 54.3% of the cohort. The majority of patch sites were located on the main PA, LPA, RPA or hilar branches. For PA reconstruction there is considerable variability in types of patches, unit cost per patch, and the material-associated need for re-intervention. Autologous pericardium is free, provided the lowest rate of patch re-intervention and has the potential to save thousands of dollars per operation. Conclusions: Selection of patch material for PA reconstruction has the potential to substantially improve value by reducing cost.

Social-Cognitive Deficits After Traumatic Brain Injury

Authors: Xiao H, Jacobsen A, Chen Z, Wang Y

Project Mentor: Yang Wang, MD, PhD

Traumatic brain injury (TBI) can result in significant social dysfunction, which is represented by impairment to social-cognitive abilities. The precise brain networks mediating this social dysfunction and the underlying mechanisms, however, remain unclear. We performed a systematic search for functional magnetic resonance imaging (fMRI) studies of social-cognitive abilities following TBI; then, we performed a quantitative activation likelihood estimation (ALE) analysis. We found that the temporo-parietal junction (TPJ) and the medial prefrontal cortex (mPFC) were the specific regions that social cognition predominantly engaged. The cingulate gyrus, frontal gyrus, and inferior parietal lobule were the main regions related to social attention/executive functions. Communication dysfunction, especially related to language deficits, was found to show greater activation of the temporal gyrus and fusiform gyrus in TBI patients. Our findings provide evidence of significant social-cognitive disabilities following TBI. Existing studies indicate that social-cognitive abilities following TBI is an area that would benefit from further investigation.

OCT Angiography: Seeking FDA Approval and the Impact to the Medical Practitioner

Authors: Khan J, Hueston W

Project Mentor: William Hueston, MD

Background/Aims: OCT-Angiography (OCT-A) is an imaging modality that allows clinicians to have instant snapshots of the retinal/choroidal vasculature. The purpose of this project was to assess the FDA regulatory approval process for new medical devices, uses of OCT-A, and a cost-benefit analysis to determine whether an OCT-A merits investment in a private practice setting. Methods: Data was collected from publicly available government data and scholarly articles relevant to OCT-A. Cost-benefit analysis was performed following best practices applicable. Results: OCT-A is a Class II medical device recently approved by the FDA. Based on estimated analysis, an initial investment of \$137,682.00 at an average revenue of \$2,356.80, it would take regular use in an ophthalmology private practice approximately 21.68 months to break even. Conclusions: Based on estimated analysis, it is beneficial for a private ophthalmology practice to invest in an OCT-A machine to provide better care in patients with retinal vascular diseases.

Using a Mentor-Mentee Based Approach to Establish Workplace Lactation Support**Authors:** Lennon T, Willis E**Project Mentor:** Earnestine Willis, MD MPH

Background: Many businesses report barriers to setting up a workplace lactation program to comply with the ACA. Objective: To use a mentor-mentee based approach to establish workplace lactation support in Milwaukee County businesses. Methods: Mentor businesses with existing lactation programs were paired with mentee businesses without lactation policies. Mentor businesses served as the model for mentee businesses in development of their lactation program as well as provided guidance, advice, and encouragement to mentees. Pregnant or postpartum mentee women were surveyed to evaluate the effectiveness of the lactation program in the workplace. Results: Five weeks after the BEST intervention, 75.0% of women reported access to a designated breastfeeding space and 87.5% of women could adjust their work schedule to allow pumping of breast milk. In addition, low-income women reported a higher perception of lactation support. Conclusion: A mentor-mentee based approach may be useful for establishing workplace lactation support programs.

Criminal Backgrounds and Firearms Deaths: Policy Implications**Authors:** Leonhard A, Hernandez-Meier J, Guse C, Hargarten S**Project Mentor:** Stephen Hargarten MD, MPH

Background: Firearms deaths are a serious biosocial disease burden in the United States. With policies regarding firearms purchase and possession becoming a large part of the national discussion, studies are needed to assess the role of firearms policies in relation to homicides and suicides. Methods: Mixed effects Poisson regression was used to assess any association between the presence of firearms policies and homicides in the largest cities in the U.S. and at the state level for the years 2010-2013. Policies analyzed included universal background checks, prohibition of firearms purchase for violent misdemeanants, and state prohibitions on purchase for subjects of domestic violence restraining orders. Results: No statistically significant change in homicides was detected at both the city and the state level of analysis. Conclusions: This study could not detect any association between the presence of the policies examined and homicides at both the city and state level.

IVC Filter Complications in Radiology Reports Vs Image Review**Authors:** Lin L, White SB, Dybul SL, Hohenwarter EJ**Project Mentor:** Eric Hohenwarter, MD, FSIR

The purpose of this study is to determine the accuracy of the diagnostic radiology report in reporting complication rates of IVC filters as determined by image review. A retrospective review of patients undergoing IVC filter placement from 2006-2013 was performed after IRB approval was obtained. 200 patients were randomly selected as a representative group for IVC filter placements from an institutional QA/QI database. Demographic data was collected, as was filter type, when and if the filters were removed, and follow-up time was noted. In addition, complication data, specifically filter strut penetration, filter tilt or migration and IVC thrombosis, was extracted through review of radiology reports in the patient EMR. Those same cross-sectional imaging studies were then evaluated for the presence of those same complications. Complication rates of IVC filters as determined by image review were significantly different than reporting of strut penetration, migration and tilt.

MRNA Expression in Mouse Renal Vasculature Using Laser Capture Microdissection**Authors:** LoDuca TP, Kumar S, Duris C, North PE, Tabatabai NM**Project Mentor:** Niloofar M. Tabatabai, PhD

Diabetic nephropathy, one form of kidney disease, accounted for 44% of the new cases of kidney disease in the United States in 2011. Understanding the underlying molecular changes that occur in a diabetic kidney is vital in understanding the pathogenesis of diabetes. The aim of this study was to establish a protocol for investigating changes in expression of factors known to be involved in changes of renal vascular function. Our developed protocol centered upon collecting RNA from structure specific regions in mouse kidney using Laser Capture Microdissection (LCM). Following cresyl violet staining, LCM was used to collect the specific cells of interest. RNA was extracted and cDNA was synthesized. Polymerase chain reaction (PCR) was performed using primers for both non-specific and structure specific genes. PCR products were separated using gel electrophoresis. Our results show that our protocol is robust in collecting high quality, structure-specific RNA from mouse kidney.

Same Day Cancellations in Elective Surgeries: What Do They Cost?**Authors:** Manderle B, Kallio P, Ebert T**Project Mentor:** Thomas Ebert, MD, PhD

The purpose of this project is to review methods that have been employed to reduce same day cancellations and examine the rate of same day elective surgical cancellations at Clement J Zablocki VA Medical Center. The eventual goal is to determine the cost to the hospital, and others, that these cancellations have and to suggest improvements. Data was from in person interviews and a surgical service cancellation rate report. The results of this study showed that there was an overall 15% cancellation rate. The total cost of a same day cancelled orthopedic case to cost anywhere from \$2020-\$3320. A weakness of this VA data is that it lacked the information about when the cancellation was made. The next step is to improve recording to more accurately determine the cost to the institution of these cancellations. Once the true cost is determined, a cost effective solution can be put forward.

Effects of LRRK2-induced Microtubule Destabilization on Mitochondrial Trafficking Velocities in Parkinson's Disease Dopaminergic Neurons**Authors:** Meade M, Schwab A, Ebert A**Project Mentor:** Allison Ebert, PhD

Although most cases of Parkinson's Disease (PD) are sporadic, familial mutations account for nearly 10% of patients with PD. Mutations in leucine-rich repeat kinase 2 (LRRK2) are the most common genetic determinants of PD, and cause an autosomal dominant hereditary form of PD which is clinically indistinguishable from those patients with sporadic PD. The G2019S mutation is detected most frequently in dopamine neurons, and has consistently been shown to functionally increase the kinase activity of the LRRK2 protein, resulting in neurite elongation deficits and increased microtubule destabilization among other putative deficits. We used LRRK2 G2019S induced pluripotent stem cells (iPSCs) to assess functional deficits in mitochondrial trafficking velocities in dopamine neurons related to this microtubule destabilization. Variances in these mitochondrial trafficking velocities may indicate a role for the loss of microtubule integrity in the pathogenesis of PD.

Physical Activity Habits in Medical Students at MCW**Authors:** Rennicke J, Hsu A**Project Mentor:** Andrew Hsu, MD

Studies have analyzed the physical activity levels of the average population, but few have targeted the medical student population which is well known to spend hours per day studying. This study was designed to determine how sedentary typical first and second year medical students were, and to see what percentage of them met government recommended daily physical activity levels. The M1 and M2 classes at the Medical College of Wisconsin were surveyed on their physical activity habits via electronic survey. Significant differences were found in the time sitting per day between M1 and M2 students. Additionally, it was seen that M1 and M2 students were more likely to reach government recommended physical activity levels than non-medical students in similar age groups. This study sheds light on the important topic of medical student wellbeing, and demonstrates the need to develop strategies to combat the physical inactivity seen in this population.

The Effect of Care Team Composition on Patient Experience Among Hospitalist Patients**Authors:** Stefanczyk R, Singh S, Stadter G**Project Mentor:** Siddhatha Singh, MD, MS

Objective: To determine if patients respond more favorably to HCAHPS surveys after hospital stays when cared for by hospitalists working with APP vs house staff teams. Background: Due to resident hours' restrictions, more patients are being cared for by hospitalists paired with advanced practice providers. Hospitals are held accountable for patient's experiences, yet there is limited research investigating impact of H-APP teams on patient experiences. Methods: A retrospective cohort study compared results between hospitalist teams over five years at Froedtert Hospital. A repeated measures logistic regression was performed using Statistical Analysis Software. Scores for the HCAHPS questions were compared for APP-Hospitalist and Resident-Hospitalist teams. Results: Results showed higher scores for APP-Hospitalists for the "Courtesy/Respect" question (3.1%), the "Listen Carefully" question (4.3%), the "Explain" question (6.7%, $p=0.05$), and 4.6% higher response rate in aggregate compared to house staff teams. Conclusions: Patients scored hospitalists working with APP teams higher than resident teams.

Is the Split Flow Model Effective in Reducing Length of Stay?**Authors:** Tabakin M, Decker M**Project Mentor:** Michael C. Decker, MD

Long waits and overcrowding in the emergency department due to a multitude of often unpredictable variables present a unique challenge for administrators tasked with increasing ED efficiency and throughput. The split flow model is a novel concept designed to improve efficiency by altering the way patients flow through the emergency department. Since January 1st 2016, the emergency department at Froedtert Hospital has been using a modified version of the split flow model to decrease the time patients spend in the ED. This paper discusses whether the split flow model was successful in reducing the time patients spend in the emergency department through a retrospective study that analyzes the length of stay for patients admitted and discharged before and after the implementation of the model.

Altering Buffer Ca²⁺ and Ph Stimulates Mitochondrial Ca²⁺/H⁺ Exchanger**Authors:** Boswell MR, Blomeyer CA, Heisner JS, Aldakkak M, Camara AKS, Stowe DF**Project Mentor:** David Stowe, MD, PhD

Calcium overload in mitochondria (m) is known to contribute to myocyte damage in cardiac ischemia and reperfusion injury. Integral proteins across the inner mitochondrial membrane facilitate transmembrane influx and efflux of Ca²⁺. Influx of Ca²⁺ occurs primarily by the mitochondrial Ca²⁺ uniporter (mCU) and efflux by the Na⁺/Ca²⁺ exchanger (mNCE). Evidence for activation of Ca²⁺/H⁺ exchange (mCHE), an additional mechanism for Ca²⁺ influx or efflux tied to trans-matrix pH, has been investigated recently but requires further mechanistic understanding. We hypothesized that altered buffer (extra-matrix) pH and [Ca²⁺] can induce CHE activity as demonstrated by reciprocal changes in matrix pH_m and [Ca²⁺]_m when mCu Ca²⁺ influx is in equilibration and NCE is prevented by using Na⁺ free buffer and an NCE blocker (CGP 37157). We observed that mitochondria submerged in acidic buffer exhibited a secondary, H⁺ concentration-dependent uptake in matrix Ca²⁺. This phenomenon was not observed in the other pH buffers.

Differential Susceptibility to Acute Kidney injury in Heterogeneous Stock Rats**Authors:** Charles D, Xing B, Holl K, Kortess S, Houser D, Solberg-Woods L, Regner K**Project Mentor:** Kevin Regner, MD, MS

Ischemia-reperfusion injury (IRI) is a common cause of AKI in humans. Identification of genes that promote resistance to renal IRI may aid in the discovery of targets to therapeutically treat AKI in humans. Heterogeneous stock (HS) rats were derived from 8 inbred strains and allow fine mapping of complex traits to only a few Megabases. We hypothesized that HS rats will exhibit significant variability to experimental AKI and that each inbred HS parental strain will have strain specific responses to AKI via IRI protocol with renal function assessments by creatinine and tubular injury by histologic analysis at 24 hrs. Serum creatinine was 3.8±0.38 mg/dl in control SD rats and 1.89±0.77 mg/dl in HS rats (p<0.01). The results indicate that HS rats demonstrate significant variability in structural and functional response to renal IRI, suggesting the utility of HS rats for the identification of genes that promote resistance to AKI.

Clinical and Laboratory Phenotype Variability in Type 2M Von Willebrand Disease**Authors:** Doruelo A, Haberichter S, Christopherson P, Boggio LN, Gupta S, Lentz SR, Shapiro AD, Montgomery, R, and Flood VH**Project Mentor:** Veronica Flood, MD

Type 2M Von Willebrand Disease (VWD) is characterized by qualitative defects in Von Willebrand factor (VWF) that inhibit platelet attachment to subendothelium. Five novel VWF sequence variations were studied.

ISTH bleeding score assessed bleeding phenotype. Gene sequencing was performed. Each variant was placed into a recombinant VWF vector and expressed in HEK293T cells. ELISA assays analyzed variant expression, collagen binding, and platelet GPIIb/IIIa binding.

Bleeding scores were elevated for all subjects except for the p.P1162L and p.R1374C variants. All had reduced VWF ristocetin cofactor activity/VWF antigen ratios on plasma testing. Homozygous expression of variants p.D1283Y, p.R1349C, p.R1374C, and p.I1453N was consistent with type 2A VWD. Variant P1162L had normal VWF expression and function.

Though originally classified as type 2M VWD, the homozygous recombinant VWF variants don't fulfill 2M VWD diagnostic criteria. A better classification schema and improved testing for VWF variants is needed to effectively diagnose and treat affected patients.

Immunoprevention of Cancer Using Peptide Vaccines: In Vivo Proof-of-Concept in EGFR-Driven Non-Small Cell Lung Cancer**Authors:** Ebben JD, Gad E, Lubet RA, Disis ML, You M**Project Mentor:** Ming You, MD, PhD

We hypothesized that using molecular markers and known non-small cell lung cancer (NSCLC) driver proteins as part of a preventive strategy could prevent tumorigenesis. Approximately 10% of US lung cancer cases are driven by mutations in the Epidermal Growth Factor Receptor (EGFR), with higher mutation rates in selected populations. We used a multi-peptide vaccine targeting two separate regions of EGFR to evaluate this hypothesis. Mice expressing inducible mutant human EGFR commonly implicated in NSCLC development were prophylactically vaccinated with EGFR peptide vaccine prior to induction of the transgene. Vaccination decreased subsequent tumor development by >75% in vaccinated mice vs. adjuvant treated controls. We observed a robust increase in specific immune populations that correlated with the degree of response. This work provides proof-of-concept indicating that molecular understanding of disease can be translated into vaccines that can prevent tumor development when administered in the right context.

ASCL1 Knockdown Suppresses Neuroblastoma Growth Through induction of Apoptosis**Authors:** Erickson SS, Balamurugan M, Kunnimalaiyaan S, Gamblin TC, Kunnimalaiyaan M**Project Mentor:** T. Clark Gamblin, MD, MS

Introduction: Neuroblastoma is a leading cause of childhood cancer deaths. The transcription factor ASCL1 has been shown to be highly expressed in neuroendocrine tumors including neuroblastoma. Previous studies have suggested an oncogenic role for ASCL1. We hypothesized that ASCL1 reduction in neuroblastoma cells suppresses growth. Study Methods: Human NGP neuroblastoma cells were transfected with a doxycycline-inducible shRNA sequence against ASCL1. Western analysis was used to observe the effects of doxycycline treatment on levels of ASCL1, apoptotic proteins, and neuroendocrine tumor markers. Proliferation was measured by MTT assay. Results: Doxycycline treatment decreased ASCL1 protein levels in NGP-ASCL1 knockdown cells. ASCL1 knockdown decreased cellular proliferation at the 4, 6, and 8 day time points. Knockdown cells exhibited lower levels of neuroendocrine markers and anti-apoptotic proteins. Conclusions: ASCL1 knockdown in NGP neuroblastoma cells inhibits their proliferative abilities through apoptosis. Our data support the idea that ASCL1 is an attractive molecular target in neuroblastoma.

Prospective Study Investigating Marijuana Use on PTSD and Circulating Endocannabinoids**Authors:** Fagbemi O, Brandolino A, DeRoos Cassini T, Hillard C**Project Mentor:** Cecilia Hillard, PhD and Terri deRoos Cassini, PhD

Purpose: CB1 endocannabinoid receptors play a role in regulating behaviors relevant to posttraumatic stress disorder (PTSD). Marijuana contains the CB1 receptor agonist, delta-9-tetrahydrocannabinol. The goal was to evaluate marijuana use on PTSD and circulating levels of endocannabinoids. Procedure: Conducted at an urban Midwest level 1 trauma center. PTSD symptom severity (CAPS), self-reported marijuana use, and blood samples were at baseline (in-hospital) and 6 months post-injury. Analyses were run using SPSS. Results: 280 injury patients (mean age 40) were enrolled. Users were significantly younger ($r = .411$, $p = .000$) than non-users. 6 month users had significantly higher scores in PTSD total symptom severity ($t(154) = 2.702$, $p = .008$) and significantly lower ($t(94.704) = -2.807$, $p = .006$) 2-AG levels. Baseline and follow-up users were worse off than other users. Conclusions: Results clarify PTSD risks and may aid clinicians in responding to patients about marijuana use and PTSD self-treatment.

Peroxynitrite Produced Via Nitric Oxide Synthesis in Isolated Cardiac Mitochondria**Authors:** Gerdes H, Yang M, Heisner J, Camara AKS, Stowe DF**Project Mentor:** David F Stowe, MD, PhD

The presence of an endogenous nitric oxide synthase (NOS) isoform in cardiac mitochondria remains controversial. Our aim was to assess production of ONOO⁻ in isolated guinea pig cardiac mitochondria, and to determine if ONOO⁻ production is dependent on the presence of endogenous mitochondrial NOS. Western blot analyses showed that anti-eNOS antibody was detected in both the whole-heart and isolated mitochondria samples. Isolated mitochondria were treated with succinate, CaCl₂, and menadione, a redox cyclizer that generates large amounts of O₂•⁻. In physiological buffer, L-tyrosine is oxidized by ONOO⁻ to form the fluorescent dimer dityrosine (diTyr). Isolated mitochondria energized with succinate, CaCl₂, and menadione increased the diTyr fluorescence signal. Mitochondria incubated with the NOS inhibitors L-NAME/L-NNA, PTIO, an NO• scavenger, and TEMPOL, a superoxide dismutase (SOD) mimetic demonstrated decreased ONOO⁻ production. These results suggest that mitochondrial NOS is responsible for the production of ONOO⁻ during simulated oxidative/ nitrosative stress.

Mild Traumatic Brain Injury: Effects on Addiction-Related Phenotypes and Mesocorticolimbic Function**Authors:** Gerndt CH, Olsen C**Project Mentor:** Christopher Olsen, PhD

This study sought to elucidate the differences in drug addiction phenotypes in blast related mTBI subjects compared to sham subjects in order to more clearly define the relationship between mTBI and substance use disorders. Rats were exposed to a controlled blast shockwave to induce an mTBI. They were then tested for cognitive deficits followed by surgical implantation of a jugular venous catheter port. Subjects were subsequently taught how to use a self-administration system and then underwent 15 days of 2 hour cocaine self-administration followed by 10 days of 6 hour access. After an abstinence period they underwent extinction testing followed by reinstatement testing once they met criteria. Brain tissue was collected after completion of testing and IHC staining for neuro-inflammation markers was carried out to better understand the character of injury and the specific regions of the brain effected by blast TBI. Results are still being analyzed with statistics.

Roles for FoxO1 Protein in Human Hepatocyte Differentiation**Authors:** Giles KG, Cirillo LA**Project Mentor:** Lisa Cirillo, PhD

We investigated how forkhead box class O (FoxO) transcription factors contribute to human liver development as mediators of gene expression and metabolism in the differentiating hepatocyte. We hypothesized that FoxO1/3 proteins have two distinct roles in human liver development: 1) FoxO1 activates metabolic genes essential for mature hepatocyte function and 2) Liver development signaling pathways regulate FoxO1/3 transcription factor activity at target genes required for hepatocyte terminal differentiation. Using a human induced pluripotent stem cell model by which human hepatocytes are synchronously derived over the course of 20 days, expression of known FoxO1 target metabolic genes were evaluated. Our studies also confirmed that FoxO1/3 proteins are expressed at every stage of human hepatocyte differentiation and activity of cell-cycle regulatory genes targeted by FoxO1/3 can be altered by blocking signaling pathways predicted to regulate FoxO1/3 nuclear and cytoplasmic localization.

Construction and Characterization of a Model for Studying Bacterial Exotoxins**Authors:** Klinka M, Frank D**Project Mentor:** Dara Frank, PhD

Pseudomonas aeruginosa is a significant bacterial pathogen in immunocompromised patients, hospitalized patients, and those with CF. It produces a variety of exotoxins, of which ExoS and ExoU are associated with significant morbidity and mortality. Both ExoS and ExoU require eukaryotic cofactors in order to be active and produce significant cytotoxicity. We sought to create a model for studying these toxins in a prokaryotic surrogate by modifying *E. Coli* to produce toxin and cofactor. With the model established for ExoU, we proceeded to develop a high throughput screen using our model to test for inhibitors of ExoU. We were successful in creating a protocol compatible with robotic high throughput screening and detecting a known inhibitor of ExoU. Further work is ongoing to detect new inhibitors of ExoU by searching small molecule libraries.

Metabolic Shift During Cardiomyocyte Differentiation Promotes Survival During NAMPT Inhibition**Authors:** Kropp EM, Weerasekera R, Broniowska KA, Corbett JA, and Gundry RL**Project Mentor:** Rebekah Gundry PhD

Human pluripotent stem cells (hPSC) are a renewable source for the generation of cardiomyocytes (hPSC-CM). We have recently shown that inhibition of nicotinamide phosphoribosyltransferase (NAMPT) selectively eliminates remnant hPSC from hPSC-CM. NAMPT, the rate limiting enzyme in a salvage pathway for NAD synthesis, is important for maintaining sufficient NAD levels to support pluripotency. However, it is not understood how hPSC-CM develop resistance to NAMPT inhibition. This study tested how differentiation and maturation influence the mechanisms that control susceptibility to NAMPT inhibition. We found that with differentiation and maturation, cells survive extended periods of NAMPT inhibition and remain functional. Cell survival correlates with utilization of glycolysis and mitochondrial respiration to maintain ATP, despite a significant loss in NAD levels. These findings identify an important role for the NAMPT-dependent NAD synthesis pathway in hPSC and provide evidence to support a novel strategy by which unwanted cells can be removed from cardiomyocyte cultures.

Residual Cone Structure in Achromatopsia: Implications for Gene Therapy**Authors:** Langlo CS, Scoles DH, Fishman GA, Gamm DM, Struck M, Chiang J, Dubra A, Carroll C**Project Mentor:** Joseph Carroll, PhD

Achromatopsia (ACHM) is associated with absent or severely reduced cone photoreceptor function.

Current gene-replacement therapy trials will depend on understanding the residual cone

structure in these retinas. Here we used split-detection adaptive optics scanning light ophthalmoscopy (AOSLO) to measure cones throughout the ACHM retina. All subjects showed diminished or absent reflectivity. Presumed cone inner segment (IS) structures were observed to have mean diameter of 6.0, 6.3, 6.7 and 7.0 μm at 0.5, 5, 10 and 15 degrees from the foveal center, roughly double, equivalent, 10% less and 15% less than histologic values of cone IS. These findings confirm areas of decreased signal intensity contain cone structure, though with altered morphology. Though the cone population appears reduced compared to normal retinas, these residual cells are a potential target for gene therapy efforts.

Characterization of Tagap Mutant Cells and Their Role in DM1**Authors:** Lee J, Ciecko A, Khaja S, Chen YG**Project Mentor:** Yi-Guang Chen, PhD

T-cell activation Rho GTPase-activating protein (Tagap) has been identified as a potential gene involved in the progression of DM1. Our concurrent study from the diabetes incidence study suggest NOD mice with mutation in the Tagap gene (Tagap KO) are slightly protected. CD4 T cells from the spleen and macrophages from bone marrow of NOD and Tagap KO mice were cultured. The supernatant was collected and analyzed using ELISA tests for various cytokines. From the CD4 T cell cultures, Tagap KO produced higher levels of IL2 and lower levels of IL4, IL10, and IFN γ . From the macrophage culture, Tagap KO produced lower levels of TNF α and IL27. Cytokine studies indicate Tagap KO did not skew the development of helper T cells toward a specific subset. The elevated IL2 levels from Tagap KO mice could suggest that these mice have improved regulatory T cells, resulting in immune suppression and protection from diabetes.

Verifying Phosphorylation of Cyclooxygenase-2 in Prostate Cancer Cells By Fyn.**Authors:** Lopez H, Miller B, Wright K, Sorokin A**Project Mentor:** Andrey Sorokin, PhD

Cyclooxygenase-2 (COX-2) produces prostaglandins found elevated in inflammatory states and many cancers including prostate cancer, providing anti-apoptotic and aiding the tumorigenesis of these tumors. Current COX-2 inhibitors have severe cardiovascular side effects; new therapeutic approaches are needed. Previous studies show COX-2 can be phosphorylated on Y446 and Y120 by the kinases Fyn and Lyn respectively, increasing COX-2 activity. This study aimed to verify antibodies against these novel post-translational modifications of COX-2, and aimed to demonstrate these phosphorylation events in DU145 prostate cancer cells using these antibodies. We performed in vitro kinase reactions to characterize and select various antibodies, and subsequently performed in vivo studies to demonstrate the phosphorylation using the selected antibodies. We found that while the initial results proved promising, upon testing and analyzing the antibodies in vivo, we were unable to fully verify that the antibodies bind specifically to the pY120 and pY446 portions of COX-2.

Redox Profiling of Carvedilol and Propranolol in a Heart Model**Authors:** Marathe P, Thao M, Benjamin I**Project Mentor:** Ivor Benjamin, MD

Introduction: Carvedilol is highly effective against heart failure. Carvedilol, unlike propranolol, has direct antioxidant effects and is capable of mitigating oxidative stress in HF patients. Moreover, it has been suggested that carvedilol has an indirect antioxidant mechanism. Hypothesis: We hypothesized that carvedilol's indirect antioxidant mechanism may involve the nuclear factor erythroid 2-related factor 2 Nrf2/Keap1 pathway, which is a major antioxidant pathway. Methods: Using H9C2 cells, we confirmed the activation of the Nrf2/Keap1 pathway by detecting levels of downstream protein targets HO-1 and NQO-1. We transfected H9C2 cells with roGFP that targeted mitochondria or cytosol. Redox state changes were quantified by normalized roGFP intensity ratios. Results: In the short term, carvedilol oxidized both cellular compartments while propranolol did not. In the long term, carvedilol upregulated the production of HO-1 and NQO-1 while propranolol downregulated these antioxidant proteins. These results demonstrate that carvedilol's indirect antioxidant effect involves the Nrf2/Keap 1 pathway.

Effects of Cytokines on the Regulation of β -cell p21**Authors:** Markwardt JE, Oleson BJ, Corbett JA**Project Mentor:** John A. Corbett, PhD

Recently the cyclin-dependent kinase inhibitor p21 was implicated in pancreatic β -cell apoptosis and cell cycle arrest. However, it is unclear if p21 contributes to the cytokine-induced β -cell death characteristic of insulin-dependent diabetes mellitus (IDDM), a process mediated by intracellular nitric oxide (NO) generated by inducible nitric oxide synthase (iNOS). Rat insulinoma (INS 832/13) cells treated with proinflammatory cytokines (IL-1 β and IFN γ) for 0-48 hours exhibited a time-dependent downregulation of p21 protein, which was blocked by the iNOS inhibitor, NMMA. The reverse trend was observed in p21 mRNA. This suggests that NO inhibits p21 production at the level of translation, potentially via serine 51-phosphorylation of eIF2 α . eIF2 α mutant mouse embryonic fibroblast (MEF) cells treated with the long-acting NO donor DPTA/NO from 0-12 hours exhibited a time-dependent increase in p21 protein. NO may be delaying cytokine-induced p21-mediated apoptosis/cell cycle arrest, suggesting that the role of p21 in IDDM pathogenesis warrants further study.

Urinary RNA Expression Associated with Blood Pressure Response to Salt.**Authors:** Merchant PT, Liang M**Project Mentor:** Mingyu Liang, PhD, MB

Circulating RNA in biological fluids may be altered in disease states like hypertension. We hypothesized urinary RNA would be differentially expressed between subjects who did and did not have significant blood pressure increases in response to increased dietary sodium. Subjects were divided into salt-sensitive (SS; increase ≥ 10 mmHg systolic when dietary sodium increased from 50 mmol/day to 150 mmol/day) and non-salt-sensitive (NSS) groups. Urine samples from 24 subjects (12 SS, 12 NSS) were analyzed from when subjects consumed a low-sodium diet (LS; 50 mmol/day) and a high-sodium diet (HS; 150 mmol/day). Urinary RNA was extracted and quantified. The change in urinary RNA concentration when dietary sodium was increased ([urinary RNA, HS] - [urinary RNA, LS]) was not significantly different between SS and NSS individuals (+10.6 ng/mL vs. +36.8 ng/mL respectively, $p=0.54$). The extracted RNA is being sequenced to identify specific RNA molecules differentially expressed between SS and NSS individuals.

Function of IGE in Anti-Viral Immunity**Authors:** Raychaudhuri R, Kelly BT, Santoro JL, Rohlfing MM, Grayson MH**Project Mentor:** Mitchell Grayson MD

Severe respiratory viral infections early in childhood are associated with a markedly increased risk of asthma. Anti-viral IgE has been shown to be important in the pathogenesis of asthma in the Sendai virus (SeV) mouse model, however its role is not well understood. Using the Evans Blue Dye assay, we determined that IgE is important for the development of vascular leak during SeV infection. As IgE binds both mast cells and dendritic cells we sought to determine which cell type is responsible for this. KitW-sh (mast cell deficient) had attenuated leak, however reconstitution with bone marrow derived mast cells did not return the leak. Dendritic cells isolated from wt mice were transferred intranasally into Fc ϵ RI $^{-/-}$, which did reconstitute the leak. Our data suggests that both dendritic cells and mast cells are important for IgE mediated vascular leak but requires further work to confirm.

Elucidating Cellular Responses to Viral Infection in Autoimmune Diabetes Pathogenesis**Authors:** Shaheen ZR, Stafford JD, Christmann BS, Moran JM, Voss MG, Oleson BJ, Corbett JA**Project Mentor:** John Corbett, PhD

Viral infections are an environmental trigger proposed to stimulate β -cell damage and the development of autoimmune diabetes. Macrophage activation and expression of the cytokine interleukin-1 (IL-1 β) in response to virus has been hypothesized to mediate virus-induced β -cell damage in a manner dependent on β -cell production of nitric oxide. While IL-1 β -mediated production of nitric oxide is capable of stimulating β -cell death, nitric oxide is also classically an anti-viral molecule. These studies demonstrated that macrophage expression of inflammatory genes is dependent on the cell surface receptor CCR5, which regulates transcription through multiple pathways, and regulates translation through activation of mammalian target of rapamycin (mTORC1). Further, these studies provide preliminary evidence that β -cell production of nitric oxide protects islets from viral infection by attenuating viral replication and permitting the cellular expression of type I IFNs which prevent virus-induced death.

Cytokine and Cellular Composition of Circulation Tracks with Weight Morbidity Diagnosis**Authors:** Singh S, Jeschke J, Williams, CB**Project Mentor:** Calvin B. Williams, MD, PhD

Inflammatory bowel disease (IBD) affects more than 1.6 million Americans. Murine models of colitis provide useful tools to study inflammatory pathogenesis relevant to human IBD. The circulatory system acts as a distribution network for both cytokines and immune cells. We hypothesize that studying circulating T-cell populations in the serum will serve as a biomarker of disease in mice. Sera were isolated at weaning, 50, 100, and 150 day time points in wild type, 3A9 (transgenic mouse line which expresses a model antigen), and bigenic mice (express both model antigen and monoclonal transgenic helper T-cells which react to it). FlowJo software was used for gating analysis of FACS data of isolated lymphocytes. Study of the circulatory CD4⁺ T-cell compartment was successful in distinguishing bigenic mice from controls and also reflected the presence of a mucosal inflammatory response and correlated with the weight of juvenile mice.

Xanthohumol Inhibits Notch Signaling and Restricts Proliferation in Cholangiocarcinoma**Authors:** Walden D, Sokolowski K, Kunnimalaiyaan S, Gamblin TC, Kunnimalaiyaan M**Project Mentor:** Muthsamy Kunnimalaiyaan PhD

Cholangiocarcinoma (CCA) remains the second most prevalent hepatic neoplasm in the United States. We have shown that Notch1 alteration reduces CCA cell growth in vitro; therefore, suggesting the importance of Notch1 in carcinogenesis. More recently, we have reported xanthohumol (XN), a prenylated chalcone from hop plants, inhibits both hepatocellular and pancreatic carcinoma through Notch1 reduction. However, the effect and mechanism of XN on CCA proliferation is not defined. We hypothesize that XN inhibits CCA proliferation through reducing Notch1 signaling. Through a series of protein and DNA analysis we found that XN effectively inhibits CCA growth associated with a reduction in Notch expression. These findings along with reports in other organ-specific cancers provide further evidence on the importance of Notch signaling in carcinogenesis as well as XN as a novel anti-carcinogenic agent.

Site-Directed Methyltransferase Activity for Regulating Gene Expression**Authors:** Wang S, Harrison M, Geurts A**Project Mentor:** Aron Geurts, PhD

Epigenetic gene regulation is a mechanism affecting the expression of many disease-related genes. An example of such is methylation of CpG dinucleotides within promoter regions, which decreases gene expression. Our lab has developed fusion molecules for methylation of target sequences using a transcription activator-like effector (TALE) binding site fused to a methyltransferase (TALEM). We hypothesize that TALEM-directed methylation of the promoter region of a reporter gene will decrease expression. We co-transfected TALEM plasmids and reporter plasmids into Hek293T cells, measured luminescence after 48 hours, and performed bisulfite sequencing on luminescence-verified transfected cells to determine the methylation activity. The results showed increased methylation within 500 bp of the TALEM binding site as well as slightly increased methylation non-targeted region. In summary, our luminescence assay is insufficient to detect gene expression changes due to methylation, but we were able to show that TALEMs are effective at methylating DNA with moderate specificity.

Exposure to Near Infrared Light Alters Maturation Pathways in Osteoblasts**Authors:** Ninomiya JT, Weninger MR, Struve JA, Kolz J, Weihrauch D**Project Mentor:** James Ninomiya, MD, MS and Dorothee Weihrauch PhD, DVM

Estrogen receptor alpha (ER α) binds to estrogen responsive genes on DNA and communicates with the orphan nuclear receptor estrogen related receptor-alpha (ERR α).

Murine pre-osteoblasts were cultured and exposed to 670 nm and 4 J of NIR light. PCR arrays and assays were utilized to quantify mRNA expression. Fractionation followed by western blotting was used to determine the expression and translocation of both ER α and ERR α protein.

NIR light increased the mRNA expression of ERR α by 114%, 68%, and 82% on days 1, 2, and 10, respectively. Estrogen Receptor alpha (ER α) was decreased by 46% and 44% days 7 and 10. OPG expression was increased by 26% and 33% on days 1 and 10. The mRNA expression of RANKL was undetectable in both control and experimental groups. Lastly, NIR light enhanced ER α protein expression in both the cytoplasmic membrane and cytosol, while ERR α protein expression was enhanced in the nucleus.

High Glucose Upregulates PKC and Attenuates Insulin Signaling in Astrocytes**Authors:** Yu E, Rarick K, Harder D**Project Mentor:** David Harder PhD

The insulin cascade is one of the most studied pathways due to its importance in regulating metabolic functions. Protein kinase B (Akt) is a key kinase in the insulin pathway that upregulates growth factors. Protein kinase C (PKC) is known to inhibit the insulin pathway in hepatocytes and adipocytes of diabetic subjects. With recent recognition of the brain as an insulin sensitive organ, PKC's role in regulating insulin signaling in astrocytes is unknown. This study aims to determine the effects that different glucose concentrations have on astrocyte insulin signaling. Astrocytes were cultured in either a physiologic (NG, 5mM) or high (HG, 25mM) glucose media. In HG cells, we observed an increased expression of PKC and showed attenuated Akt activation when insulin stimulated. This inhibition was also demonstrated in NG astrocytes exposed to a PKC activator. These results suggest that PKC plays an inhibitory role in the insulin-Akt pathway.

Chemokine Signaling Mediates Hypersensitivity in Sickle Cell Disease Mice**Authors:** Zappia KJ, Sadler KE, O'Hara C, Hillery CA, Stucky CL.**Project Mentor:** Cheryl Stucky, PhD

Beyond the severe pain of vasoocclusive crises, nearly half of all individuals with sickle cell disease (SCD) develop chronic pain that can be debilitating, and many patients experience increased sensitivity to touch and cold. Previous studies revealed elevated plasma levels of inflammatory mediators, including chemokine (c-c motif) ligand 2 (CCL2), in SCD. Therefore, we hypothesized that this tonically pro-inflammatory state may contribute to chronic SCD-related pain. Using a transgenic mouse model of SCD, we show that inhibition of the chemokine receptor CCR2, but not CCR4, alleviates behavioral mechanical and cold hypersensitivity in SCD. Further, acute CCR2 blockade reverses both behavioral and in vitro responsiveness to an agonist of TRPV1, a neuronal ion channel previously implicated in SCD pain. These results provide insight into immune-mediated regulation of hypersensitivity in SCD, and could inform future development of analgesics or measure to prevent chronic pain.

Optimizing the Appropriate Use of Telemetry**Authors:** Byun J, Roddy J, Thapa B**Project Mentor:** Bipin Thapa, MD

Appropriate telemetry utilization outside the intensive care unit decreases cost of care, and reduces harms associated with restrictive stickers/wires and false alarms. Our quality improvement initiative was an educational intervention aimed at residents to help guide appropriate, protocol-based telemetry order placement and discontinuation. Pre and post intervention data of the percentage of patients with telemetry orders and the median telemetry duration were compared. Though there was a decrease in the percentage of patients with telemetry orders in our post-intervention period (pre: 45.5-72.4%, post: 47.6%), the median duration of telemetry monitoring was longer in post intervention period (pre: 32 hours, post: 42.5 hours). The next step will be to adjust the duration of telemetry utilization for severity indices. We also believe an educational intervention is not sufficient to reduce unnecessary use of telemetry monitoring. A system level intervention may be needed.

From Learning to Changing: Enhancing Patient Education in FGID Clinic**Authors:** Carpenter S, Carr K, Chelimsky G, Hainsworth K, Rausch S, Simpson P, Renov V, Chelimsky T**Project Mentor:** Thomas Chelimsky, MD

Purpose: Self-management is the predominant treatment for functional GI disorders (FGIDs). Patient compliance is low without self-motivation. This study will determine if education emphasizing self-management and goals improves treatment adherence and patient outcomes. Methods: 100 patients ages 12-18 with FGID and Functional Disability (FDI) score ≥ 13 were assigned to intervention or care-as-usual. The intervention group received one-on-one education and set short-term goals. Patient outcomes were measured by pre/post intervention FDI scores and other validated questionnaires assessing fear, catastrophizing, readiness to change, anxiety, and depression over three clinic visits. Results: Since October 2016, 157 patients were screened: 68 eligible, 53 interested, 37 enrolled (M:F = 6:31). 16 patients have completed initial follow-up. Average age/enrollment FDI was 15.8 years/30.3. Total average change in pre/post FDI on initial follow-up was -4.69 points: -3.83 (SD: 11.97) for intervention and -5.20 (SD: 11.97) for controls. Conclusions: No definitive conclusions. We will reassess after study completion.

Expediting Diagnosis of Diabetic Ketoacidosis in the Pediatric Emergency Department**Authors:** Baumer-Mouradian S, Chang F, Ferguson C**Project Mentor:** Catherine Ferguson, MD

Diabetic Ketoacidosis (DKA) is a serious condition seen in the pediatric emergency department (ED). Delay of care can lead to life threatening conditions associated with acidosis, therefore it is imperative that DKA is identified early and appropriate treatments are started promptly. At the Children's Hospital of Wisconsin ED, we aimed to reduce the average time to first bicarbonate level (a value used for diagnoses of DKA) in patients with high suspicion for hyperglycemia from 80 minutes to 30 minutes over 16 months. By modifying the electronic records system, implementing new point of care testing devices for bicarbonate levels, standardizing protocols, and allowing nurses to use point of care testing devices in triage, we observed a mean decrease of time to bicarbonate from 80 to 28 minutes.

Telephone Outreach to Improve Colorectal Cancer Screening Rates and Provide a Meaningful Role for Medical Students**Authors:** DeMarco KA, Krippendorf RL**Project Mentor:** Dr. Robert Krippendorf MD, MPH

It has been well documented that increased rates of colorectal cancer (CRC) screening have decreased disease related mortality. Previous studies have demonstrated that telephone outreach by a patient navigator have resulted in increases in screening rates. This study intended to explore if this method would be of use in the setting of our patient population. In addition, this study set out to provide medical students with a more meaningful role in patient care by participating as said patient navigator. The student contacted all patients in the clinic database with outstanding CRC screening needs and proceeded to document their responses. 55% of patients who were agreeable to a screening procedure followed through, which can be considered a successful interaction. As such, it would be of benefit moving forward to utilize a third party patient navigator, such as a medical student, to improve CRC screening rates in this patient population.

Comparison of Image Related Radiation Exposure in Pediatric Trauma Patients**Authors:** Derr T, Lerner EB, Gourlay D**Project Mentor:** David Gourlay, MD

PURPOSE: The purpose of our study is to determine the use of computed tomography (CT) in evaluating pediatric trauma patients and to compare the amount of radiation a patient receives in a pediatric trauma center versus a non-pediatric trauma center.

METHODS: A retrospective review of all blunt trauma pediatric patients that received CT imaging admitted to CHW from 2013 to 2014 was conducted. A chart review was performed to obtain radiation exposure. To analyze data, Microsoft Excel Version 14.4.3 Year 2011 was used. **RESULTS:** 237 patients were admitted to a pediatric trauma center and 215 were transferred from a non-pediatric trauma center. Non-pediatric trauma center patients had more scans and higher radiation exposure for head and c-spine CTs than pediatric center patients.

CONCLUSION: Patients who are transferred from non-pediatric centers compared to patients initially admitted to pediatric centers will undergo more CT imaging and higher radiation exposure from CTs.

Non-Specific Indicators of Intestinal Ischemia, and the Correlation to Surgical Intervention in Small Bowel Obstruction Patients

Authors: Franko J, Trevino C, Webb T

Project Mentor: Travis Webb, MD, MHPE

This is a retrospective study analyzing patients admitted or evaluated by an Emergency General Surgery Service (EGS) for possible small bowel obstruction. Patient age, vital signs, physical exam, laboratory values, and CT findings were analyzed. Abdominal tenderness demonstrated 3.8 times greater odds of EGS admission, while tachycardia demonstrated lower odds (OR=0.390). Surgical intervention was significantly associated with admission to EGS, abdominal tenderness, CT findings of free intraperitoneal fluid, œwhirl sign,• and poor bowel wall enhancement. Upon admittance to EGS, the odds of surgery were 6.0 times greater compared to that of consultation. In addition, the odds of surgery were 3.0 times greater for patients with CT findings of free intraperitoneal fluid. Patient age and laboratory variables have little predictive value for operations. However, abdominal tenderness is significant for admittance to the EGS, which subsequently increases the likelihood of surgery. Findings of free intraperitoneal fluid suggests future surgical intervention.

Want Better Pain Management? Ask a Nurse.

Authors: Friedbacher S, Waring W

Project Mentor: William Waring, MD

Spinal Cord Injury (SCI) patients admitted to inpatient rehab at Froedtert Hospital's SCI Center have unique pain management needs and the nature of this unit as a multi-disciplinary team of physicians, nurses, therapy, and behavioral medicine, among others, is an ideal setting for surveying staff on their specific needs to best manage patient pain. The prominent role of nurses in particular on the SCI Rehab team made them the logical focus of this Quality Improvement (QI) initiative. It is hypothesized that incorporating a specific interdisciplinary pain management plan into Epic (the electronic medical record) will better facilitate communication and better serve the needs of the nurses and other staff on the unit. To determine this, two weeks were spent shadowing nurses (Walking the Gemba) followed by the development, distribution, and analysis of a survey to the nurses on the unit who work with patients admitted to PM&R's service.

Surgical Instrument Utilization: Identification of Inefficiencies and Improvement Opportunities

Authors: Greaves SW, Stadler ME

Project Mentor: Michael Stadler, MD

Introduction: By identifying and eliminating frequently unused instrumentation, direct improvements in cost-efficiency and reduction of instrument related peri-operative delays could be attained. Methods: Interviews of surgical technologists and direct observation of 74 surgeries in otolaryngology, yielded data of baseline utilization patterns on 7,785 instrument types. Results: Across 207 surgical instrument trays, 30.6% of all instrument types were never used resulting in 15,516 wasted processing cycles or nearly 55,000 wasted instrument-processing cycles annually. Internal auditing indicates that 1 out of every 250 processing cycles yields a damaged or lost instrument which extrapolates to an overall inefficiency of \$7,203 in wasted labor and \$70,347.54 in direct costs - not including impacts on overall system productivity. Post-intervention monitoring indicates removal of these never-used instruments has not had a significant impact on clinical practice. Conclusion: Significant inefficiency exists within the surgical instrument processing cycle, which limits the surgeon's ability to provide efficient patient care.

Applying Quality Indicators in Adult Coarctation of Aorta Patient Care**Authors:** Magee A, Ginde S**Project Mentor:** Salil Ginde, MD

The provision of quality care to patients with Adult Congenital Cardiac Defects (ACHD) is a challenge to many cardiology groups. This work is a representation of the efforts of Children's Hospital of Wisconsin pediatric cardiology group specializing in the care of ACHD patients to improve the quality of care provided to their patients with Coarctation of Aorta (COA). This was achieved by applying 11 Quality Indicators (QIs) in a retroactive chart review to all COA patients seen by the team. These QIs were taken from two guidelines (Gurvitz et al and ACC/AHA) and modified per the team for application to their practice. This initial assessment elucidated certain deficits in care provided. Following an interprofessional discussion of causes, an intervention was enacted involving the electronic healthcare record and reassessment by sampling 6 months showed improvement in most QIs.

Increasing Influenza Vaccination Rates in Children with Inflammatory Bowel Disease on Biologics**Authors:** Mertens HR, Lerner DG**Project Mentor:** Diana Lerner, MD

Children with inflammatory bowel disease (IBD) who are on biologics are especially susceptible to infection because of their artificially suppressed immune systems, so it is crucial that these patients receive the intramuscular influenza vaccine yearly. Yearly influenza vaccination rates within this population at Children's Hospital of Wisconsin (CHW) are around 50%, with a rate of 54% for the 2013-2014 influenza season. The goal of this project is to increase influenza vaccination rates among pediatric patients with IBD on biologics to 70% by the end of the 2016-2017 influenza season. Plan-do-study-act (PDSA) cycles were used in order to implement new interventions and identify areas for improvement. Vaccination rates have seen an increase each year, with a rate of 64% for the 2015-2016 season. We conclude that, although the goal of 70% has not yet been achieved, the use of PDSA cycles and effective interventions may be helpful in increasing vaccination rates.

Evaluation of the Compliance of Salicylate Poisoning Treatment Through the WPC Relative to ACMT Standards**Authors:** Neeno J, Zosel A**Project Mentor:** Amy Zosel, MD

The purpose of this project was to evaluate the adherence of salicylate poisoning treatment by the Wisconsin Poison Center (WPC) relative to the standards set by American College of Medical Toxicology. For this project, cases of salicylate poisonings in 2014 in which the patient was seen in a hospital setting and received lab work were selected. The total number of salicylate poisoning in 2014 was 847, and 76 cases met inclusion criteria for this project. Cases were excluded if the patient was managed at home or if no laboratory tests were ordered. The variables that were measured were management points recommended by the ACMT: 1) two Aspirin levels obtained if the first was detectable; 2) if positive, two downtrending levels were documented prior to discharge; 3) was activated charcoal (AC) discussed; and 4) in severe cases, was the danger of intubation discussed with the care team.

Parent's Preferences and Perceptions of the Discharge Process**Authors:** O'Day P, Vepraskas S, Simpson P, Zhang L, Gage S**Project Mentor:** Sarah Vapraskas, MD

The goal of this study was to understand parents' concerns, goals and learning preferences in regards to hospital discharge in order to help guide the development of family-centered discharge interventions. A 9-question interview was conducted with 100 parents. Ninety parents said "yes" when asked if teach-back would make them feel more comfortable with what they had learned and ninety-seven said "yes" when asked if it would be helpful to begin learning about their child's home care before the day of discharge. When asked to rate the best way to learn how to give a new medication ninety rated demonstration as a 4 on a 1-4 scale. Additionally, the interview contained 3 open-ended questions. In multiple questions parents expressed the importance of preventing recurrence of the illness, understanding of the discharge plan and understanding of their child's clinical condition. This data adds to the growing literature on family-centered pediatric discharge.

The Characteristics, Function, and Reporting Structure of the (CMO) in Association of American Medical College (AAMC)**Authors:** Pattison RJ, Singh S, Orlowski J**Project Mentor:** Sid Singh, MD

Purpose: To provide an update to the 2006 Longnecker et al. paper on the current role, characteristics, responsibilities, and reporting structure of physician holding the title of chief medical officer (CMO), vice president of clinical affairs, or vice dean of clinical affairs in Association of American Medical Colleges (AAMC) member organizations. Method: An internet survey submitted to 383 physicians at 312 AAMC member institutions. The survey incorporated questions in regards to demographics, time commitments, compensation, qualifications, reporting structure, free response, and advisory board participation, among other questions.

Development and Evaluation of an Epinephrine Auto-Injector Training Module**Authors:** Rivera R, Gallagher J, Shepard K, Chiu A, Roushan T, Ahsan G, Ahamed SI, Wen C, Eldredge C**Project Mentor:** Christina Eldredge, MD, MS**Community Partner:** Marquette University Ubicomp Laboratory

Anaphylaxis poses a severe risk to the health of those with food allergies, especially adolescents. Individuals with documented food allergies are prescribed epinephrine auto-injectors (EAI) to carry with them at all times in the event that they experience an anaphylactic reaction away from the healthcare setting. However, studies have shown that individuals commonly fail to use their EAI's correctly. Our team designed a mobile healthcare app that provides education and assistance regarding various aspects of food allergy care as part of an effort to enhance quality of life and safety of affected individuals. One of the unique aspects of the app is a video training module that guides users step-by-step through the EAI injection process. In this experiment, we evaluate our video training module against written instructions located on EpiPens® by assessing volunteers on six components of proper EpiPen® use.

Opportunities for Interprofessional Input into Nurse and Physician Hand-off Communication**Authors:** Serksnys D, Nanchal R, Fletcher K**Project Mentor:** Kathlyn Fletcher , MD, MA

Objective: Hand-offs are a vulnerable period for hospitalized patients. Our objective was to identify the key information from each profession that would be of greatest use to the other's hand-off process, and to identify facilitators and barriers to obtaining that input. Interventions: Field observations of hand-offs and afternoon rounds were completed. Participants were interviewed using a semi-structured format. Measurements: Interviews transcripts field notes from observations were analyzed to identify themes of interest using a grounded theory approach. Results: Key areas of interest to both physicians and nurses from the other profession were identified. Physicians were primarily interested in obtaining patient data in context, family dynamics, and changing patient condition. Nurses were primarily interested in obtaining details about the plan of care and anticipatory guidance. Conclusions: There are key areas of content that both physicians and nurses would like from the other profession in order to enhance their hand-off communication.

Addressing Gender Disparities in Emergency Department to Admission Wait Times**Authors:** Torres SY, Singh S**Project Mentor:** Geoffrey Lamb, MD

Objective: Investigate the gender disparity in emergency department (ED) to hospital admission wait times among patients who contributed to the 2015 University Health System Consortium (UHC) Quality and Accountability Performance scorecard. Methods: Chart review completed on 399 patients randomly sampled from the UHC data who were evaluated in the ED, admitted and discharged between April and December 2014. Wilcoxon two-sample testing completed for statistical analysis of secondary drivers. Results: Median ED to admission wait time for females was 51.5 minutes longer than males. A larger number of females (18%) were triaged as being less acutely ill and given Emergency Severity Index (ESI) level 3 scores when compared to males (12.5%). Conclusions: It is unclear whether females presenting to the ED are actually less sick than males or perceived as being less sick leading to downstream delays in their care and longer ED length of stay. Implicit bias should be considered.

The Use of Potentially Confusing Language During Family Centered Rounding**Authors:** Wichman H, La Berge C, Scanlon MC**Project Mentor:** Matthew Scanlon, MD

Background: Family Centered Rounds (FCR) have been identified as a standard of care for optimizing communication. However, the use of confusing language by healthcare professionals may undermine the effectiveness of communication during FCR. The purpose of this study was to measure use of jargon and medical terminology during FCR. Methods: This prospective study was performed in the 72-bed intensive care unit of a free-standing children's hospital. FCR was recorded, transcribed and analyzed for the use of Jargon and Medical Terminology. Results: Five sessions of FCR were recorded. An average of 149 (SD 32) uses of jargon/medical terminology were used per FCR session. The use of medical terms was twice as frequent as that of jargon. Discussion: Potentially confusing language was used commonly on FCR. Independent of the issues of non-English speakers and health literacy, the choice of language used by providers may interfere with communication meant to optimize quality care.

An Evaluation of the Efficacy of the Seeking Safety Program for Women in Street Sex Work**Authors:** Akauola S, Young S**Project Mentor:** Staci Young, PhD**Community Partner:** Benedict Center

The Seeking Safety program has been proven to reduce PTSD symptoms in women with co-occurring substance abuse disorders. This study seeks to evaluate the efficacy of the Seeking Safety program for street-sex workers in the northern Milwaukee district. The efficacy of the program will be evaluated using the PCL-5 survey where a reduction in PCL-5 scores reflects a reduction in PTSD symptoms. Scores were monitored over a 5 month course indicating a reduction of 25 between the second month of treatment and the fifth. Moreover, women who have been in the program for years show overall lower scores. The results suggest that Seeking Safety is an efficacious program for this population of women.

MCW Online Video Dissector**Authors:** Biggs P*, Pierce D*, Hoagland T *contributed equally**Project Mentor:** Todd Hoagland PhD

We have created an online library of dissection videos to further aid MCW Clinical Human Anatomy (CHA) students in their work. Our goal is to help students perform better in the CHA course. In addition, the video library can be used at satellite locations to assist remote anatomy faculty. Methods. We dissected a male and female cadaver following the M1 dissection manual and made videos. The finished dissection videos have been uploaded to an Amazon S3 server. These videos are accessible through computer, tablet, or smartphone. Results. Lab group efficacy data will be collected via survey and compared to previous years' data. Additional objective indicators include website requests timestamped by the Amazon server, practical exam scores, and dissection grades. Conclusion/Discussion. We hope that our project results in a very useful resource for students during dissection and for anatomy exams.

Improving Surgical Quality: Risks and Impacts of Readmission**Authors:** Bohr MT, Burns E**Project Mentor:** Edith Burns, MD

Unplanned hospital readmissions following surgical procedures are linked with poor patient outcomes and increased mortality. Reducing such readmissions is a way of increasing efficiency and quality of care while improving patient outcomes and reducing costs. Semi-structured interviews were administered to patients undergoing elective surgery at the Milwaukee VA prior to discharge and following discharge or upon readmission. The interviews assessed cognitive and functional status, caregiver support, adherence to discharge instructions, and caregiver and patient perceptions of surgery and recovery. We found that many patients underestimated the time it would take to fully recover, even though they reported positive views of physicians' descriptions of recovery. Many patients were unable to list all comorbidities or distinguish which symptoms are caused by which condition, which may contribute to unnecessary readmission. This data suggests that better explanations of the recovery process may lower rates of readmission and improve surgery outcomes.

Dietary-Texture Progression is Not Diagnostic of Eosinophilic Esophagitis in Young Children with Feeding Disorders**Authors:** Brichta CE, Feuling MB, Delaney AL, Silverman A, Larson-Nath C, Goday PS**Project Mentor:** Praveen Goday, MD

Objectives: To describe the progression of dietary-textures in children diagnosed with Eosinophilic Esophagitis (EoE) compared to children with a feeding disorder. Methods: Single-center, retrospective analysis of 61 children with EoE from January 2006-June 2014. Dietary recall and feeding surveys provided information about food acceptance patterns for smooth puree, textured puree, mashed, easily dissolvable, combination, diced, toddler, and general diet foods. Results: Children with EoE presented more often with abdominal pain ($p=0.008$), vomiting ($p=0.016$), and atopic diagnoses for eczema ($p=0.002$), environmental ($p<0.0001$) and food allergies ($p<0.0001$). There was no significant difference between EoE patients and their matched controls for any of the food texture categories. Conclusions: Young children with EoE who present with feeding disorders are more likely to report vomiting, abdominal pain, and a history of eczema, environmental and food allergies. Both children with EoE and control subjects with feeding disorders present with similar texture advancement and refusal patterns.

Influences of a Faith-Based Intervention on Falls Risk Among Community-Based Seniors**Authors:** Briggs M, Morzinski J, Ellis J**Project Mentor:** Jeffrey Morzinski, PhD, MSW

Purpose. Prior studies illustrate community-based programs decrease falls risk in older adults and that faith-based programs improve health behaviors. A partnership between urban churches, a nursing school and a medical school developed a study with three objectives: determine health concerns associated with falls, implement a nurse-led, faith-based health education initiative for African American seniors, assess pre- to post-program fall frequency. Methods. Study team implemented eight, monthly, nurse-led educational health sessions promoting self-care and health support at ten churches. Descriptive and comparison statistics were analyzed. Results. Senior data at baseline found high rates of polypharmacy and physical imbalance. While not statistically significant, falls "in prior year" decreased pre-to post-program. Conclusions. Study findings reveal high rates of polypharmacy, mobility and balance concerns among seniors, indicating the need for continued attention to fall risks. Health partnerships between churches and academic health centers can positively influence screening and prevention of falls among at-risk seniors.

Parental Health Literacy, Parent-Provider Relationships, and Non-Urgent Pediatric ED Visits**Authors:** Choi A, Morrison AK**Project Mentor:** Andrea Morrison, MD, MS

In the U.S., non-urgent usage of the pediatric ED (PED) contributes to higher costs. Such usage has been associated with low parental health literacy (HL) and poor parental satisfaction and relationship with the pediatrician. Thus, we examined the association between parental HL and parent-provider satisfaction with non-urgent ED use. We assessed 450 caregivers of patients at a Midwestern children's hospital ED on HL and parent-provider relationship using the Newest Vital Sign and a questionnaire regarding primary care, respectively. Low parental HL was significantly associated with non-urgent PED use ($p=0.024$). Dissatisfaction in obtaining appointments and getting questions answered over the phone were significantly associated with low parental HL ($p=0.011$, $p=0.041$) but not with non-urgent PED use ($p=0.650$, $p=0.646$). Parent-provider relationships were not significantly associated with HL or non-urgent PED use. Our study showed parent-provider relationships do not affect PED usage, but parental HL remains significant in how healthcare is accessed.

Acceptability of Disseminating HIV Prevention Information Through Mobile Applications to MSM**Authors:** Czarny H, Broaddus M**Project Mentor:** Michelle Broaddus, PhD

Geosocial networking (GSN) applications could deliver HIV prevention information to thousands of at risk men who have sex with men (MSM); however, user acceptability is unknown. 224 MSM at the 2015 Milwaukee, Wisconsin Pridefest completed a survey measuring acceptability of receiving HIV intervention information through GSN apps. Generally, all forms of information were found acceptable; while self-seeking information within an app was the most acceptable delivery method. Acceptability did not correlate to demographic information, frequency of use, or number of partners met through apps. Continued research focusing on the feasibility of incorporating HIV preventative information within GSN apps is needed.

Patient Perceptions of Weight Loss: Implications for Patients, Providers and Trainees**Authors:** Dyer AJ, Nelson DA, Ruffalo LA, Nelson KH**Project Mentor:** David Nelson, PhD, MS**Community Partner:** Waukesha Family Practice & Residency Program

Objectives: The prevalence of overweight and obese individuals in the United States is growing and primary health care represents a setting in which weight can be addressed by providers with their patients. The qualitative exploration in this study sought to investigate patients' perceptions of the barriers and facilitators they encountered in their weight loss journeys. **Methods:** Participants completed a 60-90 minute guided interview. Interviews were transcribed verbatim and analyzed using open-coding techniques. **Results:** Two primary themes emerged from a grounded theory model. The first theme centered on individual knowledge, attitudes and behaviors to lost weight. The second theme emphasized that societal relationships serves as both a barrier and facilitator to weight loss. **Conclusion:** The overarching conclusion of this study is that individuals often have the knowledge to make positive health behaviors changes, but many lack a conducive environment to appropriately put their knowledge to action.

Moms Program at Columbia St. Mary's Family Health Center**Authors:** Franklin B, Koch P**Project Mentor:** Paul Koch, MD, MS

Introduction The MoMS Program aims to provide a support system for pregnant mothers and establish a continuity of care experience for students. This abstract reports on the implementation of the program. **Methods** Students followed patients during prenatal care, delivery and postpartum visits. A questionnaire was sent to participants to evaluate the program. **Results** Survey response rates were 66% (4/6) students, 40% (2/5) residents and 100% (2/2) staff. Mean 5-point Likert scale results: Student satisfaction = 2.75. Students felt orientation was informative = 3.25. Residents agreed the program benefited their patient = 3.5. Staff said the program is well organized = 3.5. Staff said the program is a good fit for the patient population = 3.5. Qualitative comments were solicited. **Conclusions** The MoMS program was successfully implemented at CSMFHC. Questionnaire responses informed us to write a protocol to facilitate students contacting their patients. Limitations were participant size and survey response rate.

Psychosocial Outcomes in Violently-Injured Youth: A Systematic Review**Authors:** Hallberg TC, Melzer-Lange M**Project Mentor:** Marlene Melzer-Lange, MD

PURPOSE This systematic review aims to summarize psychosocial outcomes associated with violent victimization in youth in order to guide future research and interventions. **METHODS** Searches of OVID/Medline, Scopus, Eric, and PubMed Clinical Queries were performed. Selected articles investigated psychosocial outcomes in violently-injured youth (aged 10-24) longitudinally. Due to heterogeneity of data across studies, a narrative synthesis was conducted. **RESULTS** Thirteen studies (2002-16) were reviewed. Nine articles evaluated outcomes related to revictimization (e.g. reinjury, receiving threats, mortality); eight investigated high-risk behaviors (e.g. substance use, retaliatory attitude, weapon carriage); eight involved legal/social outcomes (e.g. criminal involvement and scholastic/workforce engagement); two described protective measures pertaining to quality of life. **CONCLUSION** Several studies describe high recidivism rates and other adverse outcomes in this vulnerable population. Assessment of protective outcomes is scarce. Continued evaluation of psychosocial sequelae after injury will inform ongoing efforts to intervene on the cycle of violence.

Education Module for Healthcare Providers in Combating Sex Trafficking**Authors:** Hansen SJ, Rabbitt A, Melzer-Lange M, Simpson P, Nugent M**Project Mentor:** Angela Rabbitt, DO

Sex trafficking (ST) of a minor is when anything of value is exchanged for any sexual act with a person less than 18 years old. ST is common and creates devastating health consequences. However, many healthcare providers do not feel confident in their ability to identify and care for victims and feel that additional training is needed. The objective of this educational project is to empower providers and medical students to perform thorough and victim-centered medical assessments for youth at risk for ST by developing an interactive, educational module. We assessed the effectiveness and usability of the module by analyzing pre, post, and 3-month follow-up surveys and found significant improvements in aspects of confidence, knowledge, and awareness for both medical students and providers following the module. Participants commented positively on the module and 98% felt strongly that education on ST should be a routine part of medical education.

Cadavers as Educators: Utilizing Body Donors for Health Behavior Education**Authors:** Huerta MA, Swartz JL, Stauder EA, Marcdante K, Hoagland TM**Project Mentor:** Todd Hoagland, PhD**Community Partner:** Nicolet High School

Health behaviors acquired in adolescence have an impact on long-term health. Cadavers As Educators is a health education curriculum that utilizes body donors to teach adolescents the physical consequences of unhealthy behavior, as well as general human anatomy. It is believed that increased awareness of the physical consequences of risk behaviors will increase their perceived harmfulness and influence participants against engaging in those behaviors in the future. In this study, high school students (n=43) were surveyed before and after their participation in the curriculum regarding their knowledge and attitudes towards specific risk behaviors. Results showed there was a significant change in the perceived harmfulness of alcohol use following the curriculum. Students also endorsed a positive experience with the curriculum overall. This curriculum capitalizes on student's prior interest in health education and has the potential to be replicated at other institutions.

Investigation of Cancer Services Provided Through Nationwide Specialty Access Programs**Authors:** Jorgenson J, Stolley M**Project Mentor:** Melinda Stolley, PhD

Introduction: Underinsured Americans are less likely to get cancer screening and have a higher late-stage incidence and mortality compared to those who are insured. Many of these patients receive care through safety-net clinics, which tend to lack accessible specialist services. Specialty access programs exist to address this barrier by connecting underinsured patients with specialist care. It is not well understood what cancer services are available or how they are delivered through specialty access programs. The goal of this study was to better understand cancer services available through specialty access programs nationwide. Methods: Nine representatives from programs nationwide were identified and a phone interview conducted Results: The majority of programs provide care by facilitating relationships between safety-net clinics and specialists after abnormal cancer screening. Conclusions: These findings suggest that specialty access programs serve a vital role by linking safety-net clinics and specialists to provide underinsured patients with needed cancer care.

Investigation of Cancer Services Provided Through Nationwide Specialty Access Programs**Authors:** Jorgenson J and Stolley M.**Project Mentor:** Melinda Stolley, PhD

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Assessing Patterns of Smoking Cessation in a Community Based Veteran Sample**Authors:** Kar A, Franco Z, Ahamed I, Roushan T, Hooyer K, Ruffalo L, Flower M, Curry B, Whittle J**Project Mentor:** Zeno Franco, PhD**Community Partner:** Dryhooch of America

Veterans with Post Traumatic Stress Disorder (PTSD) have a harder time quitting smoking than other populations. Furthermore, veterans returning from combat are often socially isolated, with dysfunctional family relationships and difficulty with social reintegration. This study was designed through the Dryhooch Partnership for Veteran Health to better understand how perceived social support can modulate smoking cessation in veterans. Validated instruments including the PTSD Check List, Deployment Risk and Resiliency Inventory, and Stages of Change were administered as part of a larger study examining the impact of peer support on veterans. Data from 43 veterans show a significant relationship between increased social support and increased number of quit attempts ($\chi^2=3.7574$, $p=0.0526$) and readiness to change ($\chi^2=7.2307$, $p=0.0269$). However, PTSD severity did not correlate with readiness to change. These data suggest that social support may play an influential role in improving motivation to quit smoking among Wisconsin veterans, even those with PTSD.

Promoting Breast Education and Screening Mammography for Women with Barriers**Authors:** Krause K, DeNomie M, Sahr N, Banerjee A, Kamaraju S**Project Mentor:** Sailaja Kamaraju, MD

Access and adherence to breast cancer screening guidelines is challenging for women with language, cultural and financial barriers. We report the results of our community-academic partnership model for women of various ethnic backgrounds. We partnered with several community sites in Milwaukee, the Wisconsin Well Woman Program, and a mobile mammography unit to organize monthly workshops with the help of a multilingual navigators and community health workers. We obtained demographic surveys, session evaluations, and prior screening. Descriptive statistics were used to summarize and analyze data. Over 12-months, 195 women of several ethnicities attended the workshops. 49% of women were ≥45 years old and 47% were insured. Women reported impediments such as lack of trust in screening tests, language, fear of disease, transportation, and religious beliefs, that were addressed in the small group focus sessions. Our experience indicates a greater need for culturally competent breast health education for women with multiple barriers.

The Pediatrician's Influence in Promoting Reading Among Parents**Authors:** Willis E, Maingrette M**Project Mentor:** Earnestine Willis, MD, MPH

Parents who read aloud to their children can make major contributions to improving their children's language, speech, and cognitive skills, thereby better preparing them for success in school. Factors with predictive potentials of reading frequency were assessed among 202 parents and children presenting to eight pediatric clinics in low income neighborhoods in the Milwaukee area – clinics which also participate in the Reach out and Read (ROR) program. This study attempts to compare and analyze reading frequency between two groups of parents at these clinics: those who have received books from the pediatrician promoting the ROR program (ROR participants, n = 100) and those who have not (non ROR participants, n = 102). The results show that participation in the ROR program makes a small but notable contribution to increasing reading frequency as reported by the parents.

A Comparison of Self-Reported Physical Activity and Performance Assessment in Older Adults**Authors:** Mercer M, Whittle J, Erdmann M, Lans D, Dhaliwal T, Burns E**Project Mentor:** Jeff Whittle, MD, MPH

Background: Functional decline associated with aging leads to loss of independence and reduced quality of life. Short Physical Performance Battery (SPPB) and 7-item International Physical Activity Questionnaire Short Form (IPAQ-SF) are widely used measurements of physical function and physical activity. Study objective is to determine which measure is better at predicting functional status, measured by 12-item Short Form (SF-12). METHODS: Cross sectional analysis was conducted among male veteran ages 65-89 recruited from the VA-Medical-Center. Measurements of IPAQ-SF, SPPB, and SF-12 were collected and scored. Multivariable regression was used to determine the relationship of SPPB and IPAQ-SF to SF-12. RESULTS: Significant evidence supported that a higher SPPB score will result in a higher SF-12 score ($p < 0.0001$). The IPAQ-SF was not significantly associated with SF-12 when SPPB was present. CONCLUSION: SPPB is a more powerful predictor of functional status. Future studies should examine whether the SPPB can be incorporated into clinical practice and change outcomes.

Prevalence of Adverse Life Events in an Urban Primary Care Clinic**Authors:** Moore J, Briggs M, Barry C, Franco Z, Hamberger K**Project Mentor:** Courtney Barry, PsyD and Kevin Hamberger, PhD

Traumatic life experiences are associated with adverse health outcomes. We aim to estimate the prevalence of trauma at All Saints Family Care Center to support a trauma-informed care model. A 27 item survey was distributed to 200 English-speaking patients 18 and older (n=199). The survey was based on the Adverse Childhood Event study and other trauma instruments. Respondents indicated whether they experienced 12 trauma types including emotional, physical and sexual abuse, neglect, household challenges, unintentional trauma, and military trauma. Preliminary analyses in RedCAP and Excel show 89% of respondents reported at least one traumatic experience prior to age of 18 and 87% reported at least one trauma type occurring after the age of 18. The most common trauma type experienced before age 18 was household challenges and after 18 was someone treated violently. Traumatic experiences are prevalent among patients at this clinic, informing the development of a trauma-informed care program.

Opioid-Restrictive Strategy Decreases Admissions in High-Utilizing Adults with Sickle Cell Disease**Authors:** Amy Mager, Kristin Pelot, Kathryn Koch, Lawrence Miller, Collin Hubler, Anisah Ndifor, Canice Coan, Cynthia Leonard, Joshua J. Field.**Project Mentor:** Joshua Field, MD, MS

Abstract Background: A subset of adults with sickle cell disease (SCD) command a disproportionate number of ED and Hospital admissions. The objective of the study was to determine the efficacy of a multi-disciplinary strategy to meet the unmet needs of high-utilizing SCD adults. **Methods:** We conducted a prospective cohort study with 12 adult SCD subjects with more than 10 ED and hospital admissions per year. A multi-disciplinary team determined their predominant unmet needs and implemented an interventional plan to address them as well as, limit their opioid use. Pre-intervention and post-intervention admission rates and opioid use was compared. **Results:** There was a 40% decline in ED admissions ($P=0.03$) and a 37% decrease in intravenous opioid use ($P=0.02$) and 10% decrease in oral opioid use ($P=0.04$). **Conclusion:** Limits on the use of opioid as part of a multi-faced interventional plan involving high-utilizing adults with SCD, decreased admission rates and opioid use.

Treatment of Pulmonary Disease Post HCT with High Dose Steroids at Children's Hospital of Wisconsin**Authors:** Newsom, S, Bock A, Broglie L, Leveque M, Talano JA**Project Mentor:** Julie-An Talano

Stem cell transplantation (HCT) is used to treat a variety of disorders. Pulmonary complications are a leading cause of post-transplant morbidity and mortality. High-dose-corticosteroid-pulse-therapy (HDCS) is one treatment strategy that has been implemented at our institution. Preliminary data suggests a reduction in morbidity and mortality using this approach. This retrospective case series describes the course and outcomes of seven patients undergoing HCT and later diagnosed with pulmonary complications, who were treated with HDCS. FEV1 and O2 saturations were compared at time points before and after pulse treatment. Treatment led to stabilization of function in four patients, with a median survival of 6.75 years. Oxygen saturation above 96% was achieved in all surviving patients one-year post therapy. Those patients with more severe disease at diagnosis had poorer outcomes than those diagnosed with milder disease. Future prospective studies are needed to further evaluate this strategy as a safe alternative to systemic corticosteroids.

Evaluation of Health Education Talks at Highland Gardens**Authors:** Olander EM, Burns E**Project Mentor:** Edith Burns, MD**Community Partner:** SET Ministry

In 2009, an MCW medical student began to meet monthly with residents at Highland Gardens, a low-income apartment complex in downtown Milwaukee, to discuss health questions and take blood pressures. This program, made possible by a partnership with SET Ministry, soon evolved into a large-group health education session. Now first to third year medical students present monthly health education talks on resident-chosen topics such as mental health, joint issues and diabetes. Throughout the past year, this program was evaluated for its effectiveness and resident satisfaction. The methods used included an attendance log, observations of the residents (reactions, questions asked, assumed interest) and a satisfaction survey. The results of the survey showed that 55% of residents were completely satisfied with the current talks while the remaining 45% identified several areas for improvement. The use of this data will help guide changes in future presentations at Highland Gardens.

Factors Influencing the Decision to Pursue Rural Practice in Wisconsin**Authors:** Olesiak SJ, Ruffalo L**Project Mentor:** Leslie Ruffalo, PhD, MS**Community Partner:** Wisconsin Academy of Family Physicians

As rural physician shortages are projected to rise, it is critical to develop new approaches for growing this workforce. For example, identifying “best fit” individuals for rural practice early in the medical training process to achieve a higher rate of recruitment and retention of rural physicians. This project focused on investigating factors that impact one's decision to practice in rural communities at every level of medical training. In partnership with the WAFP, we conducted a survey and focus groups with medical students, residents and physicians to gather demographics, characteristics, and attitudes related to rural practice. A total of 183 respondents completed the survey and 14 participated in focus groups. We found that participation in a rural training track ($p=0.003$) and being patient-centered ($p=0.04$) was positively associated with interest in rural practice. The goal is to use this information to provide admission recommendations to recruit students interested in rural practice.

Early IUD Discontinuation at an Underserved Family Medicine Clinic**Authors:** Wei Lin OuYang, Mary Bacsik, Camille Garrison**Project Mentor:** Camille Garrison, MD

Objective: The study aimed to explore reasons for high early IUD discontinuation and estimate the financial impact this has on the healthcare system. **Method:** The first part of the study was a retrospective cohort study of women who had an IUD implanted and removed between 2007-2014. The second part of the study calculated the the financial impact of a high IUD discontinuation rate. **Result:** Overall, the satisfaction scores among our subjects were poor. The most common reason for discontinuation was “other” with abdominal pain and desire for pregnancy being the second and third most common. The estimated cost of this high IUD discontinuation ranges from \$199,680-\$479,232 per year. **Conclusion:** The study demonstrated various reasons for the high IUD discontinuation rate and the burden that having a high IUD discontinuation rate has on the healthcare system. Further study needs to be conducted to explore reasons that fall under the “other” category.

Development and Use of a Web-Based Human Dissection Video Library at MCW**Authors:** Biggs P*, Pierce D*, Hoagland T *contributed equally**Project Mentor:** Todd Hoagland, PhD

Anatomy lab resources available to students are the Netter anatomy textbook and a printed dissection manual. To supplement this, we are creating dissection videos to further aid students in their work. Our goal is to help students better understand what they are looking for in the cadavers and to help them dissect more efficiently, freeing free up more time to study. We dissected a cadaver following the dissection guide and shot instructional video footage at discrete points. The finished dissection videos have been uploaded onto an Amazon S3 cloud system where they can be accessed by students through a simple online portal that we have created. These videos are accessible through computer, tablet, or smartphone. Dependent variables to study include practical exam scores and dissection grades at the Milwaukee and Green Bay campuses. Data collection from the most recent academic year's CHA class will be compared to previous years' data.

Aortic Dilation After Fontan is Common and Associated with Increased Risk for Aortic Regurgitation**Authors:** Quinn CL, Loomba RS, Ginde S, Goot BH, Woods RK, Cava JR, Earing MG**Project Mentor:** Michael G Earing, MD

Background: Patients with single ventricle congenital heart disease palliated with the Fontan operation may be at risk for aortic dilation, however, the exact prevalence and clinical significance for this outcome are unknown. Aim: Utilize cardiac magnetic resonance imaging (CMR) to determine the prevalence and risk factors for aortic dilation, and its relationship with aortic valve insufficiency (AI). Methods: Clinical data, CMR measurements, and aortic valve regurgitant fraction calculations were obtained. Results: Greater than moderate AI was present in 5% of patients. The relationship between aortic sinuses of Valsalva z-score >3 and risk for >moderate AI was significant. Risk factors for z-score >3 include history of DKS prior to Fontan and history of aortic arch intervention after Fontan. Conclusions: Dilation of ascending aorta is common after Fontan, and is associated with risk for AI. Further studies are needed to monitor long-term significance and clinical impact on this high-risk patient group.

Creating a Health Care Pipeline at James Madison Academic Campus**Authors:** Roberts CJ, Meurer L**Project Mentor:** Linda Meurer, MD, MPH**Community Partner:** Milwaukee Area Health Education Center

Minority groups are underrepresented among practicing physicians in the United States. Each year Medical College of Wisconsin (MCW) medical students partner with the Milwaukee Area Health Education Center's Youth Health Service Corps (YHSC) to hold 6 monthly sessions for a select group of high school students from James Madison Academic Campus (JMAC) who are interested in biology and health careers. JMAC serves a predominantly lower-income, African-American community of students with unique barriers that prevent consistent attendance and participation at after school activities. Using input from previous program cohorts and a needs assessment of current JMAC students, hands-on enrichment activities and field experiences were held during school hours to overcome attendance barriers in the hopes of increasing attendance and participation at these monthly sessions. Overall, levels of attendance and participation during the 2015-2016 academic year were significantly increased from prior years of the program.

Nurses' Attitudes Regarding Implementing Expedited Partner Therapy (EPT) at Keenan Health Clinic**Authors:** Rodrigues Pereira SG, Magliocco KJ, Hunter P**Project Mentor:** Paul Hunter, MD

Expedited partner therapy (EPT) is the practice of treating partners of patients diagnosed with chlamydia, trichomonas, and gonorrhea without them getting tested by giving a medication or a prescription to the patient to distribute to their partner(s). It has been shown to reduce the reinfection rate of chlamydia, trichomonas, and gonorrhea. The project's goals were to determine nurses' attitudes and knowledge of EPT at Keenan Health Center (KHC) in Milwaukee through a survey and semi-structured in-depth interview. A total of eight nurses were individually interviewed. They first completed a survey and then their specific concerns were documented. The interviews showed that many nurses did not express a strong understanding of EPT, and many of them voiced hesitance in implanting its practice. This demonstrates a need to better educate the nurses about EPT and its possible utility at KHC in order to smoothly implement EPT into practice.

Clinician Agreement on Assessing Microaneurysms with Optical Coherence Tomography Angiography in Diabetic Retinopathy**Authors:** Russillo MC, Han DP, Carroll J, Kim JE**Project Mentor:** Joseph Carroll, PhD

Purpose: Evaluate clinical agreement on the detection of microaneurysms (MAs) in diabetic retinopathy (DR) using Optical Coherence Tomography Angiography (OCTA). Methods: 6x6mm scans of 12 eyes with DR were obtained with OCTA. True MAs were identified on fluorescein angiography (FA) and scaled on OCTA scans to identify corresponding locations. 180 locations on OCTA with 105 being true MAs were randomly selected. Two masked retina surgeons identified MAs- true positive was when they identified MA on OCTA also present on FA. Results: Both examiners identified 19.8% (21 of 105) true MAs and 66.2% (49 of 74) true non-MAs on OCTA. Cohen's κ coefficient of 0.33 indicates fair inter-observer agreement. Positive agreement index was 0.49 and negative agreement index was 0.81. Conclusion: OCTA has utility in retinal imaging that precludes use of fluorescein dyes as in traditional angiography. But a standardized understanding to interpret structural anomalies like MAs still needs delineation.

Improving the Detection of Child Abuse**Authors:** Schmidt TJ, Cox J**Project Mentor:** John Cox, MD

Child Abuse is a well-recognized problem in the world, especially physical abuse. Although physical abuse tends to have visual signs, it can often go unnoticed and thus unreported. Current state guidelines require licensed childcare companies to complete mandatory training on abuse and reporting every 2 years. Research has shown a positive correlation between further training opportunities with involvement in preventative activities and completing high-risk referrals. This paper aims to review various training programs and discuss the potential benefit of additional education about abuse. Through a presentation, childcare workers in the Milwaukee County area were asked if the session provided additional benefit. In review, a majority of workers reported that the session made them more knowledgeable and more confident in addressing future cases of abuse. Overall, the long-term benefit remains unclear, but in the short-term this extra training session appears to have a positive impact on the detection of child abuse.

Using Veteran Perspectives to Develop An Enhanced Peer Mentor Training Curriculum**Authors:** Schneiderman M, Ruffalo L**Project Mentor:** Leslie Ruffalo, PhD**Community Partner:** Dryhootch

Background: There are 21.8 million living military Veterans in the U.S.--many of whom experience reintegration challenges. It is critically important to understand Veterans' perceptions of the ways in which military culture facilitates or prevents successful reintegration into civilian society. Methods: We conducted two focus groups with 12 Veterans that served in the current conflicts to collect stories about their reintegration challenges. Focus groups were audio recorded, transcribed verbatim, and transcripts were qualitatively open-coded to elicit themes. Results: Focus groups analysis revealed six themes, including military sexual trauma, the struggle of explaining PTSD to loved ones, and the pressure to behave against the moral values of some veterans while in the service. Conclusion: Understanding the Veterans' reintegration process is paramount in implementing and evaluating initiatives that help Veterans during life's transitions. Our findings can serve to assist others in the design of programs aimed at supporting U.S. Veterans.

Wellness Wednesdays with the Neulife Community Learning Center**Authors:** Sehloff J, Meurer L**Project Mentor:** Linda Meurer, MD, MPH**Community Partner:** Neulife Community Center

Working with the Neulife Community Center to help create a curriculum, 8 lessons plans pertaining to various health/wellness topics, such as sleep, healthy eating, exercise, and hygiene, were developed and implemented into "Wellness Wednesdays" as part of their summer programming. Instructions and materials were given to teachers who delivered the weekly lessons to students in grades K3 - 5th grade. Students were assessed at the beginning and end of the program to determine whether subject knowledge improved. Pre and post assessments did not demonstrate an increase in knowledge. However, the curriculum was received well by both instructors and students and the Neulife Community Center plans on utilizing the curriculum again in future summer programs. Individuals involved in the project have recognized the value in the development of a partnership between MCW and Neulife, as well as value in the instruction of these important health-related topics.

Early Literacy Promotion: The Impact of Reach Out and Read On Low-Income Populations**Authors:** Serna B, Glatt K, Willis E**Project Mentor:** Earnestine Willis, MD, MPH

Reading from an early age is a driving force shaping literacy by stimulating reading comprehension and reading skills that result in a positive impact on school readiness. (Mol & Bus, 2011) This quantitative study explored Milwaukee's low-income families' behavior toward reading rituals and literacy exposure. This study examined the effects of ROR-Milwaukee on: the number of books in the home, number of days parents read to their children per week, and differences in milestone achievement when comparing ethnicity and language spoken at home. A 25-item questionnaire was administered to a convenience sample of primarily Black and Latino caregivers with children between the ages of 6-71 months. English speaking parents were more likely to report owning more of books and reading more often during the week than bilingual and Spanish speaking parents of any race. Spanish speaking parents reported substantially less milestone achievement, especially in the 6-12 month category.

Improvement in Quality of Life in Youth After An Intervention**Authors:** Levas M, Shah R**Project Mentor:** Michael Levas, MD, MS

The goal for this study was to use objective patient-reported quantitative measures to assess the health related quality of life (HRQOL) of youth who have been violently injured and attended a violence intervention program. While studies support the necessity of violence intervention programs for youth, this is the first study to quantitatively measure quality of life in youth victims of violence. Eight to eighteen year old youth who attended a violence intervention summer camp over a two-year period participated in a HRQOL survey at baseline and 6 weeks later at the end of programming. Consented youth used an electronic platform to answer validated HRQOL measures. The results indicated that a community-based summer intervention program involving violently injured youth and their relatives lead to an overall improved HRQOL. This was particularly significant in the school, anxiety and emotional domains, with only anger scoring more poorly after the intervention.

Evaluation of the Tour De Force Adaptive Dance Ballet Program**Authors:** Teich M, Zvara K, Evans M**Project Mentor:** Kimberley Zvara, M.D.**Community Partner:** Milwaukee Ballet

The purpose of this project was to evaluate the Tour de Force adaptive dance ballet program using quality of life (QoL) and goal attainment. Tour de Force is a joint program between Children's Hospital of Wisconsin and the Milwaukee Ballet that provides dance classes for children with disabilities. 5 children and their parents participated in this study by filling out pre- and post- Pediatric QoL surveys. They also came up with three goals to work toward throughout the program and were asked to assess to what degree goals were achieved upon conclusion of the program. All but one of the children's goals were achieved, and the overall quality of life among the children improved by an average of 8%. The results of this study emphasize the importance of extracurricular participation among children with disabilities and the need for more programs like Tour de Force in Milwaukee.

Service Dogs for PTSD in Veterans: a Literature Review and Qualitative Inquiry**Authors:** Hooyer K, Thorne BD**Project Mentor:** Katinka Hooyer, PhD**Community Partner:** Hounds and Veterans Empowered Now (HAVEN)

With the return of veterans from recent wars, the prevalence and awareness of posttraumatic stress disorder (PTSD) has increased. Interest in alternative treatments, especially psychiatric service dog therapy, has risen among veterans. But what literature exists to support psychiatric service dog therapy for veterans with PTSD? I conducted a literature search and interviewed 4 veterans at various stages of service dog therapy to compare the research findings with lived experience. Limited data exists on treating PTSD with service dogs. Previous studies lacked in standardizing dog training and ensuring well-being of both humans and animals. Many case studies anecdotally report qualitative benefits to veterans. Veterans interviewed endorsed many of the findings of the literature review. The difference in effect of trained service dogs versus untrained animals (pets) is unquantified. Psychiatric service dogs may be beneficial for veterans, but more evidence is needed to support this conclusion and elucidate specific effects.

Understanding Barriers and Increasing Compliance with Colorectal Cancer Screening Guidelines**Authors:** Watson A, Kos A**Project Mentor:** Madelaine Tully, MD**Community Partner:** Progressive Community Health Centers

Colorectal cancer (CRC) is the second leading cancer killer in the US, yet the most preventable. In mid-2014, the CRC screening rate at Progressive Community Health Centers (PCHC) was only 38.6%. An ACS grant, funded by Walgreens, was obtained to increase compliance with screening guidelines. Beginning in June 2015, all patients not meeting the screening guidelines were contacted and educated. From the end of March 2015 to the end of August 2015, PCHC's CRC screening compliance rate increased from 45.5% to 53.6%. 87% of patients who got screened said that their provider motivated them the most, and 61.5% reported that they didn't get screened before due to lack of knowledge: they didn't know they needed screened or they didn't know the screening options. 55% of patients were most fearful of possible cancer, and thus were apprehensive about the screening process. 100% report that the experience was better than expected.

Dispatcher CPR Instructions Across the Age Continuum**Authors:** Weinmeister KW, Lerner EB, Guse C, Ateyyah KA, Pirrallo RG**Project Mentor:** E. Brooke Lerner PhD

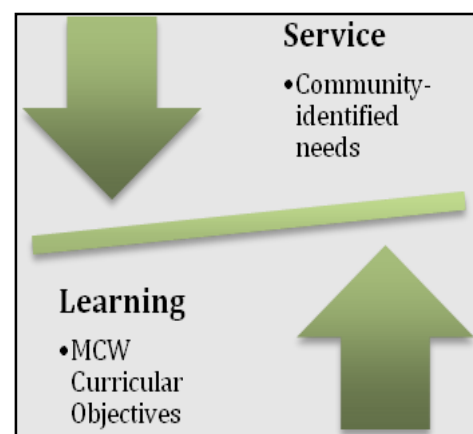
Background: Cities with dispatcher-assisted bystander CPR (DACPR) have higher rates of bystander CPR and survival after cardiac arrest. It is not known what effect age has on bystander CPR rates. Objectives: To determine if bystander CPR rates differ based on patient age when DACPR instructions are available. Methods: A retrospective chart review of EMS records was performed in three cities with DACPR instructions. Age was stratified into three groups; chi square was used to compare bystander rates. Results: Cardiac arrest occurred in 2,062 patients; the overall bystander CPR rate was 10%. The highest rate occurred in the 0-12 age group (17%) and the lowest was in the > 55 age group (9%). There was significant difference between groups ($p < 0.04$). Conclusions: The overall bystander CPR rate was low. CPR rates differed significantly based on patient age. Future studies should modify dispatcher instructions so that bystander compression rates will improve.

Community Engagement in Pathways

Service Learning is “a structured learning experience that combines community service with preparation and reflection. Students engaged in service-learning provide community service in response to community-identified concerns and learn about the context in which service is provided, the connection between their service and their academic course work, and their roles as citizens and professionals.” (LCME IS-14-A)

Key Features of Service Learning

- Curricular – results for academic credit
- Places equal value on community -defined service objectives, and curricular learning objectives
- Is planned and implemented in a 3-way partnership – student, faculty member and site-based community staff



Pathway students serve the community around MCW while learning how to connect future patients to supportive community resources, and partner with local agencies to promote health.

Service Learning

Community partners provide service learning and community-engaged scholarship opportunities that help stimulate critical thinking, civic engagement and cultural understanding.

Site Visits

Students in GH and UCH Pathways visit organizations that provide health care, resources and social service programs to underserved communities. Visits provide experiential learning through hearing firsthand about services and programs, and meeting the people involved.

Core Sessions

Some Pathway sessions are held at community sites and include tours and presentations by the host agency. Some sessions at MCW include our partners and patients as educators and facilitators.



| Service | Service Learning | Learning |
|---|--|--|
| Emphasis on meeting a community need: <ul style="list-style-type: none"> ➤ Volunteerism ➤ Community Service | Balances community need with learning objectives | Emphasis on meeting student's learning objectives: <ul style="list-style-type: none"> ➤ Field Education ➤ Clerkships |
| Primary beneficiary: service recipient | Both student and service recipient benefit equally | Primary beneficiary: student |
| Extra or Co-curricular – no specified structure | Curricular Structure includes: <ul style="list-style-type: none"> ➤ Orientation ➤ Preparation ➤ Service ➤ Reflection | Curricular – structure defined per course requirements |

Community Collaborations

A special thank you to our community partners for providing input and expertise to Pathway planning, core sessions, site visits, advising and service learning projects.

| | | |
|---|---|---|
| AIDS Resource Center of Wisconsin | James Madison Academic Campus | Nicolet High School |
| All Saints Family Care Center | Journey House | Philippine Center Medical Clinic |
| American Cancer Society | La Causa Charter School | Planned Parenthood Wisconsin |
| American Heart Association | Marquette University | Prevent Suicide of Greater Milwaukee |
| Benedict Center | Marquette University, Ubicomp Laboratory | Project Ujima |
| Bread of Healing Clinic | Milwaukee Academy of Science | Sebastian Family Psychology Practice |
| Bruce Guadalupe Community School | Milwaukee Area Health Education Center | SET Ministry, Inc, |
| Columbia St. Mary's Family Care Center | Milwaukee Ballet | Sojourner Family Peace Center |
| DryHootch | Milwaukee Center for Independence | St. Joseph's Free Medical Clinic |
| Feeding America | Milwaukee Fetal Infant Mortality Review | United Community Center |
| Fight Asthma Milwaukee (FAM) Allies | Milwaukee Health Department | University of Wisconsin Milwaukee, College of Nursing Institute for Urban Health Partnerships |
| Fondy Food Center | Milwaukee Pridefest | University of Wisconsin Milwaukee, School of Freshwater Sciences |
| Friedens Community Ministries | Milwaukee Women's Center | Walker's Point Youth & Family Center |
| Guest House Milwaukee | Muslim Community Health Center at the Islamic Center of Milwaukee | Walnut Way Conservation Corp. |
| Highland Gardens | Neighborhood House | Waukesha Family Practice & Residency Program |
| Hounds and Veterans Empowered Now (HAVEN) | NeuLife Community Development | Wisconsin Academy of Physicians |

Milwaukee Regional Medical Center (MRMC) affiliates:



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