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Abstract Booklet

ABSTRACTS

Oral Presentation Abstracts

Presenters are indicated with "*" next to their names.

O.01

THERAPEUTIC DRUG-INDUCED HYPOTHERMIA IN TRAUMATIC SPINAL CORD INJURY. Kevin Kim*, Amrita Sarkar*, Orest Tsymbalyuk, Vladimir Gerzanich, and J Marc Simard, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Spinal cord injury (SCI) is a devastating neurological injury, and immediate interventions to prevent long-term disability and improve neurological outcomes are lacking. Previously, the neuroprotective effects of physical hypothermia (PH) have been established in animal models of SCI. Beneficial effects of systemic and local hypothermia was also shown in human SCI patients. However, pharmacologically induced hypothermia may be a more practical and clinically feasible method to quickly reduce systemic temperature in patients after injury. Drug-induced hypothermia has been researched as a therapy in the field of cardiac arrest, but it remains to be explored as a potential therapy for SCI. This project examined drug-induced hypothermia as a therapy to improve functional outcomes after SCI. In a rat model of traumatic SCI, hypothermia induced by intravenous dihydrocapsaicin (DHC) was compared to PH or normothermic controls. Rats underwent cervical hemicord contusion SCI and were subsequently treated with intravenous DHC or physical cooling to induce hypothermia for 4 hours. Using an implanted transmitter, telemetry was used to monitor body temperature and heart rate of all rats during cooling. Following treatment, neurological and physiological function were monitored over 6 weeks, with assessments including body weight, evaluation of ptosis, bladder size by ultrasound, and motor performance, including the modified Basso, Beattie and Bresnahan (mBBB) locomotor scale, beam balance, Rotarod, and grip strength. DHC was found to reliably produce systemic cooling after SCI similar to PH. In addition, DHC treated animals were found to preserve body weight, recover ptosis, and improve in motor performance similar to PH animals. Both hypothermia groups displayed neurological and physiological improvements, as well as higher survival rates, when compared to normothermic controls. These results for the first time indicate the potential neuroprotective benefits of DHC-induced hypothermia as a therapy after SCI, and future analyses of lesion volume and inflammatory markers in spinal cord samples will further illuminate the effects of this novel treatment for traumatic SCI.

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O.02

PREDICTORS OF INCREASED LENGTH OF STAY AFTER SPINE SURGERY FOR THORACIC AND LUMBAR TRAUMA. Justin Kung*, Jael Camacho[1], Jacob Bruckner[1], Eugene Koh[1], Daniel Gelb[1], and Steven Ludwig[2], [1]Division of Spine, [2]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

With the recent shift in healthcare to value-based models, reimbursement programs strategically incentivize hospitals and providers to reduce excessive resource use, such as extended length of stay (LOS) after surgery. Extended LOS has been shown to be correlated with increased risks of readmission and of developing healthcare-acquired infections, both frequent targets of hospitals for

cost reduction. The objective of this study was to identify preoperative, operative, and postoperative factors associated with increased length of stay for patients who undergo spine surgery after thoracolumbar trauma. A total of 197 patients, 150 males (76.1%) and average age 45.9±19.7 years, were included in this study with a median LOS of 7 days. Bivariate analyses between LOS and various preoperative, operative, and postoperative factors were performed to identify significant associations and independent predictors. For preoperative and trauma variables, LOS was significantly associated with Charles Comorbidity Index (rs=0.24), Glasgow Coma Scale, American Society of Anesthesiologists (ASA) score, loss of consciousness, fracture level, fracture morphology, neurological status, head trauma, neck trauma, abdomen trauma ($p < 0.05$). For operative variables, LOS was significantly associated with surgical technique, estimated blood loss (rs=0.28), length of surgery (rs=0.35), and number of instrumented segments (rs=0.31). LOS was significantly associated with cardiac, pulmonary, gastrointestinal, renal/genitourinary, and skin postoperative complications. LOS was not significantly associated with readmission or reoperation. Multivariate analysis of log-transformed LOS identified eight significant independent predictors: T1-T9 fracture level, GCS, ASA, neurological status, assisted ventilation, and pulmonary, genitourinary, and skin complications. This study should help identify patient populations at risk for increased length of stay, and also help guide future interventions to decrease LOS in traumatic thoracolumbar spine patients.

O.03

EARLY PREDICTORS AMONG EMERGENCY DEPARTMENT PATIENTS WITH SUSPECTED SPINAL INJURIES FROM NEAR SHORE AQUATIC ACTIVITIES. Tucker Lurie* and Quincy Tran, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

Spinal injuries (SI) causing neurological damage can pose significant burden to patients and families. Early surgical intervention (<8 hours from trauma) improves neurologic outcomes, while delay in surgical intervention has been associated with interhospital transfer. Therefore, it is crucial to identify these patients so they can be taken to an appropriate care center. This study aimed to identify patient-centered factors associated with risk for SI to assist providers in their decision-making process in transport and management. We performed a multicenter retrospective study of adults transported from the beach in Ocean City, MD to Emergency Departments (ED) for evaluation of suspected spinal injury (SSI) from 2006-2017. Patients were included if lifeguards determined a patient had SSI. We excluded patients if they could not report symptoms or ED records were missing. Primary outcome was any SI (bony, ligamentous, cord), secondary outcome was spinal cord injury (SCI). Multivariable logistic regression was performed for association of factors and outcomes. 445 adults were transported for SSI over the 12-year period to three hospitals. 278 of these records were available across the three sites. 101 patients were diagnosed with any SI, including 39 sustaining SCI and 68 with spinal bone injuries. Patients with SI were more likely to be older (48 vs 39) and male (90% vs 70%), with a pre-existing spinal condition (58% vs 33%) and injury caused by shallow-water diving (11% vs 2%). Multivariable logistic regression showed older age, shallow water diving, and increased wave height were associated with any SI, while older age, numbness or tingling in the extremities, and diving were associated with SCI. We identified a few risk factors for any SI and SCI from near shore aquatic activity and larger study is necessary to confirm our observation. Older patients, shallow water diving and larger waves were most at risk for any SI. If similar patients reported numbness or tingling, they were at increased risk for SCI. As a result, providers should consider expediting these patients' transfer to a trauma center with neurosurgical capability.

Funding provided by the University of Maryland Department of Emergency Medicine.

O.04

GENE EXPRESSION CORRELATES IN A RAT MODEL OF GULF WAR ILLNESS. Stephen Semick*, Kaspar Keledjian, Orest Tsymbalyuk, Seung Woo, Vladimir Gerzanich, and J. Marc Simard, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Veterans deployed in the Persian Gulf War are more likely to experience diverse symptoms including fatigue, sleep disturbances, and memory problems collectively termed Gulf War Illness (GWI). The etiology of GWI is unknown, but chronic stress and exposure to pyridostigmine-bromide (prophylactic against nerve agents) and lipopolysaccharide (LPS, abundant in desert sand) may play a role. Here, we investigated the gene expression effects of chronic unpredictable stress (CUS), pyridostigmine, and lipopolysaccharide (GWI-model) in adult rat frontal cortex (FC) and lateral amygdala (LA) with Clariom S microarrays. We found 138 transcript clusters (TCs) in LA and 38 TCs in FC differentially expressed between our GWI-model (N=2) and control group (N=3, FDR<10%). These TCs included genes involved in inflammation such as *Fosb* (p_{min}=1.02e-5), *Junb* (p_{min}= 1.13e-5), and *Slpil2* (p_{min}=4.24e-6). Gene ontology analysis found enrichment of differentially expressed genes in "T cell differentiation" (p_{min}=8.71e-05) and "response to organophosphorus" (p_{min}=1.74e-8), among other categories. Lastly, we found preliminary evidence of reversing gene expression changes from our GWI-model by using rosiglitazone treatment (in LA: 115/138 [83.3%] TCs with partial reversal, $\chi 2$=61.33, p=4.82e-15). Overall, these results suggest our model of Gulf War Illness is associated with gene expression changes related to neuroinflammation and these molecular changes may be reversible with rosiglitazone (PPAR-γ selective agonist) treatment.

O.04A

NEXT GENERATION SEQUENCING AND CLINICOPATHOLOGIC ANALYSIS OF 135 PULMONARY INVASIVE MUCINOUS ADENOCARCINOMAS. Sharon Amir*, Hira Rizvi, Michael Offin, and Charles Rudin, Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, NY.

Invasive mucinous adenocarcinomas (IMAs) are a histological subset of lung cancers that comprise 5% of lung adenocarcinomas. These are indolent, slow growing, cancers that unfortunately tend to lead to multifocal unresectable disease with poor clinical outcomes for patients. IMAs typically harbor KRAS mutations (about 80%) or NRG1 gene fusions. The distinct features of these molecular subsets have not been well characterized. We hypothesize that IMAs with KRAS mutations have distinct clinical, pathologic, and molecular features from those with NRG1 fusions. For this study, a cohort of 135 IMA cases will be retrospectively annotated for clinical variables, such as staging, sites of disease, survival outcomes, molecular features, and a detailed pathology review. These patients have all undergone targeted next-generation sequencing of their tumors using the MSK IMPACT assay, a gene sequencing test for up to 468 oncogenes. 67% of these patients tested positive for KRAS mutations. The remaining patients who were KRAS wild-type were tested with Archer, an RNA sequencing assay that detects fusions; of this cohort, 17% were found to be positive for NRG1 fusions. The Kaplan Meier method will be used to compare outcomes, Fisher's exact test will be used for comparisons between two groups, and Mann- Whitney U will be used to compare continuous variables. We expect that KRAS mutant IMAs are clinically and pathologically distinct from NRG1 fusion positive IMAs and these distinctions may help guide future treatment options and influence prognosis in this patient population.

O.05

CAUSES AND CHARACTERISTICS OF COOKING BURNS IN PEDIATRIC PATIENTS: ANALYSIS OF THE WHO GLOBAL BURN REGISTRY. Joseph Puthumana*, LediBabari Ngaage, Sheri Slezak, and Yvonne Rasko, Division of Plastic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Burns, particularly cooking burns, remain among the most prominent and preventable injuries to children around the world. This study analyzes data from the Global Burn Registry to evaluate characteristics and causes of burns across pediatric age groups. De-identified demographic and clinical characteristics were queried from the Global Burn Registry, from its earliest submission in January 2018 to October 2019. Multivariate Kruskal-Wallis and subsequent Mann-Whitney tests were performed to identify factors associated with increased total body surface area involved in burns. Of the 1276 cases reported, burns occurred most commonly to infants and toddlers under 2 years (n=569, 44.6%) and decreased with age. This age group was also more likely to incur serious burns that covered more total body surface area than children of all other age groups ($p<0.001$). The most prominent cause of all burns were flames (n=665, 52.1%), which also resulted in larger burns than electricals, hot liquids, hot surfaces or chemicals ($p<0.001$). Many of these injuries, particularly those caused by flames or hot liquids, occurred while cooking (n=341, 26.7%). Burns in adolescence (n=72, 42.6%) and middle childhood (n=65, 31.0) tended to involve cooking more than in early childhood (n=60, 25.3%) and infancy (n=144, 26.7%). Children were most often exposed to cooking burns due to accidental movement (n=206, 16.1%), but explosions in the cooking area resulted in more significant cooking burns than accidental and deliberate movement ($p<0.001$). An important and actionable risk factor was the type of fuel used for cooking; households that used kerosene to cook were most at risk of severe burns, compared to natural gas, liquefied petroleum, and wood ($p<0.003$). These damaging kerosene burns were most prominent in infants (n=37, 6.5%) compared to early childhood (n=6, 1.8%), middle childhood, (n=2, 1.0%), or adolescence (n=6, 3.6%). Other factors did not affect TBSA, like whether or not the cooking area was separate from the living area ($p=.271$) or whether cooking took place at a height over or under 3 feet from the ground ($p=.779$). Analysis of global burn data reveals important trends in the types of cooking burns affecting children. Flame and fuel characteristics are significant determinants of total body surface area involved in pediatric burns, and should lead to further study towards actionable global health policy change.

O.06

PLAYGROUND SAFETY AND PLAYGROUND INJURIES THAT PRESENT TO URBAN PEDIATRIC EMERGENCY DEPARTMENTS. Mary Melati* and Michael Tunik, Division of Pediatric Emergency Medicine, Department of Pediatrics, New York University School of Medicine, New York, NY.

In the United States, more than 200,000 children are treated in hospital emergency departments (EDs) for playground-related injuries every year. Previous retrospective studies using national databases have described the majority of playground injuries to occur in 5-9 year olds due to falls resulting in injury to the upper extremity or head, and many that result in fractures or require hospitalization. We aim to compare the epidemiology of pediatric playground injuries that present to two urban pediatric EDs with that of national data, and to assess the association between playground safety problems and playground injuries in our cohort. This is a prospective cohort study of pediatric playground injuries that present to two urban pediatric EDs and an observational study of the safety profile of playgrounds in which the injuries occurred. A total of 16 children who presented with playground injuries to Bellevue Pediatric Emergency Services and New York University Tisch Emergency Services were enrolled, and clinical data was collected using a survey

that included variables identified from previous national studies. The safety of the playgrounds implicated in the injuries was evaluated using the Playground Safety Standardized Survey. It was found that the epidemiology of playground injuries in our cohort was consistent with that of national data. Damaged playground surface was found to result in a higher likelihood of fractures, and the absence of posted rules regarding playground behavior was found to result in a higher likelihood of imaging and consultation needed in the ED to treat the playground injury.

O.07

ELUCIDATING THE ROLE OF GDF-15 IN INTRAMYOCARDIAL CELL-BASED THERAPY FOR HYPOPLASTIC LEFT HEART SYNDROME. Lauren Levy*, Sunjay Kaushal[1], David Morales[2], and Rachana Mishra[1], [1]Division of Cardiac Surgery, [2]Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Hypoplastic left heart syndrome (HLHS) is a single ventricle physiology congenital heart disease (CHD) characterized by underdevelopment of the left heart, including hypoplasia of the left ventricle (LV), aortic and/or mitral valves, ascending aorta, and aortic arch 1. HLHS is universally fatal due to the incapability of the underdeveloped left-heart structures to adequately perfuse the systemic circulation. Current therapeutic options are limited to heart transplantation or a three-stage palliative surgery that converts the heart into a single ventricle pump (Fontan procedure) 2. In the latter, the right ventricle (RV) is rerouted such that deoxygenated venous blood returns directly to the pulmonary circulation and subsequent oxygenated blood is pumped through the RV to systemic circulation. However, the five-year transplant-free survival rate for babies born with HLHS following a Fontan procedure is 70% due to RV heart failure, highlighting a need for long-term therapies to augment RV function through adulthood 3,4. Stem cell-based therapies have recently gained traction for the treatment of a multitude of conditions, including acute myocardial ischemic events in adults 5 —improved ejection fraction and reduced infarct size—and CHD. Recently, intramyocardial injection of human mesenchymal stem cells (MSCs) in a swine pressure overload model mimicking the pathology observed in post-Fontan procedure showed, for the first time, a regenerative effect that preserves RV function and attenuates pathophysiological processes 6. The proposed project stems from this latter work, which was conducted in the Kaushal lab. MSCs appear to confer an improvement in RV ejection fraction in pressure-induced overload, and the MSC secretome notably contains the antihypertrophic factor GDF15. However, the molecular mechanism through which MSCs preserve RV function has yet to be determined. We propose that therapeutically injected MSCs augment RV function and attenuate pathological hypertrophic tendencies by secreting GDF15, which acts on resident c-kit+ cardiac stem cells. To confirm the presence of and tissue-level effect of GDF15 on heart biopsy specimens from myocardium treated with GDF15-secreting MSCs, GDF15 knock-down MSCs, exosome knock-down MSCs, and saline (no cell) control, we performed immunoblotting; histology on biopsied myocardium for cardiomyocyte hypertrophy, active mitosis, and increased vascularity in treated myocardium; and gene expression analysis via PCR for cardiogenic factors in total RNA isolates from heart biopsy specimens. This work is integral for linking the preliminary large-animal ECHO data showing MSCs directly injected into the RV in porcine RV dysfunction models do indeed preserve RV function and the RNA sequencing data showing elevated levels of GDF15 and its downstream effector SMAD2/3 in MSC-treated myocardium to prove our hypothesis that the mechanism by which MSCs exert an anti-hypertrophic therapeutic effect is via a GDF15 axis. Ultimately, our work will provide support for the use of MSCs in pediatric HLHS patients who develop RV dysfunction after Fontan procedures.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.08

DYNAMIC REGULATION OF SMYBP-C VIA PHOSPHORYLATION AND SUBSEQUENT EFFECTS ON MYOSIN BINDING. Aishwarya Iyer* and Aikaterini Kontrogianni-Konstantopoulos, Department of Biochemistry and Molecular Biology, University of Maryland School of Medicine, Baltimore, MD.

Myosin Binding Protein-C Slow (sMyBP-C) is a modular cytoskeletal protein expressed in slow and fast twitch skeletal muscles. Previous work in this laboratory has demonstrated that sMyBP-C plays structural and regulatory roles in skeletal muscles by contributing to the assembly and maintenance of myosin thick filaments and regulating actomyosin cross-bridges. Moreover, several dominant missense mutations were recently identified in sMyBP-C resulting in a new form of myopathy characterized by muscle weakness, hypotonia, skeletal deformities, and tremor of possibly myogenic origin. Importantly, sMyBP-C is subjected to PKA- and PKC-mediated phosphorylation that likely regulates its ability to dynamically interact with myosin and actin filaments. I hypothesize that phosphorylation regulates the ability of sMyBP-C to bind thick myosin and thin actin filaments, which can be analyzed using isothermal calorimetry (ITC). ITC is a quantitative technique that measures the binding affinity between two or more molecules. In order to generate the myosin protein, I successfully cloned the myosin gene from Mus musculus gastrocnemius muscle tissue into a pET30a(+) vector, which was subsequently transformed into BL21 (DE3) expression cells. Additionally, I performed mutagenesis on a previously cloned construct of sMyBP-C gene in pGEX-4T-1 vector. In the future, the myosin and sMYBP-C proteins will be expressed, isolated, and purified using affinity chromatography. The purified proteins will then be used for ITC binding assays to determine how phosphorylated sMyBP-C affects binding to myosin. I predict that the presence of phosphorylation in sMyBP-C alters its biochemical and/or biophysical properties, as well as its ability to bind to actin and myosin.

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O.09

ASSOCIATION OF FEEDING PATTERNS WITH INTESTINAL BARRIER FUNCTION IN PREMATURE NEONATES. Lisa Roskes*, Rose Viscardi[1], Alexandre Medina de Jesus[2], and Sripriya Sundararajan[1], [1]Division of Neonatology, [2]Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Necrotizing enterocolitis (NEC) is a devastating intestinal complication that affects premature infants, especially those born earlier than 30 weeks gestation. Besides harmful intestinal bacteria, abnormal intestinal barrier function predisposes newborns to high intestinal permeability (IP), which is associated with NEC. Previous studies have shown that breast milk (BM) offers protection against NEC by aiding the maturation of the intestinal barrier. While the protective effects of BM are well-documented, little is known about the modulating effect of other types of enteral feeds on intestinal barrier function. We hypothesized that the type of enteral feeds impacts the IP and gut microbiota. The primary objective of the study was to determine the relationship between types of enteral feeds and changes in IP, as measured by relative intestinal uptake of Lactulose (La) and Rhamnose (Rh) in premature infants 24^0–32^6 weeks at the UMMC NICU. The secondary objective is to establish a stool-based screening test to detect infants at risk for NEC, based on the stool microbial composition of infants with high IP. Following IRB approval, a La/Rh solution was administered enterally between postnatal days 7 and 10, and the urinary La/Rh ratio was measured by HPLC. Additionally, stool samples were collected prospectively until postnatal day 21 for microbiota analysis. Enteral feed volume, type of enteral feeds (exclusive mother's BM (MBM), donor BM, formula, or combinations of these), use of fortification, growth parameters (weight, length and head circumference) and maternal delivery characteristics, including type of delivery and antibiotics

exposure, were determined. Of the 37 subjects with measured IP thus far, >95% received MBM, suggesting a high rate of maternal compliance with feeding MBM. 10 of the 37 subjects had high IP (La/Rh>0.05). Preliminary analysis indicates that smaller infants (i.e. lower birth weight and earlier gestational age) have higher IP. As we continue with our analysis, we hope to establish factors that cause increased IP in larger infants, and to correlate IP with stool microbial composition.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.10

IMPACT OF DEXAMETHASONE GLIOBLASTOMA IMMUNOTHERAPY AND STRATEGIES TO AVOID STEROID-INDUCED T-CELL SUPPRESSION. Huanwen Chen* and Mark Gilbert, Neuro-Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD.

Glioblastoma (GBM) is one of the deadliest cancers in humans, and patient survival is typically less than two years despite the current standard of care. Given the success of immune checkpoint inhibitors, adoptive T-cell therapies, and tumor vaccines in other human cancers (e.g. metastatic melanoma, hematological malignancies, prostate cancers, etc.), immunotherapeutic agents have been proposed as potential candidates for novel GBM treatments. While pre-clinical studies of GBM immunotherapies have yielded promising results, clinical trials have been negative. One potential roadblock for immunotherapies to achieve optimal success in GBM patients is the common administration of dexamethasone (a steroid medication known to reduce perioperative mortality in GBM patients by reducing cerebral edema). Dexamethasone has well-known immunomodulatory effects which may hinder the activity of immunotherapeutic agents. Using both animal GBM models and human samples, our preclinical data demonstrated that dexamethasone preferentially inhibits proliferation, differentiation, and maturation of naïve T-cells via attenuating the CD28 co-stimulatory pathway by upregulating CTLA-4. Interestingly, our findings suggest that once T-cells are primed with tumor antigens allowed to progress past the naïve stage, dexamethasone's immunosuppressive effects are significantly reduced. Together, these data suggest that the timing of dexamethasone in relation to the initiation of immunotherapy may be a worthwhile consideration when designing future immunotherapy clinical trials. Elucidating the in vivo effect of dexamethasone on GBM patients is an ongoing effort in our laboratory.

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O.11

EVALUATING NEURO-QOL SHORT FORM AS A TOOL FOR DETECTING NEUROCOGNITIVE FUNCTIONAL DECLINE AMONG PATIENTS WHO HAVE UNDERGONE BRAIN TUMOR RADIOTHERAPY. Sung Choi*, Mark Mishra, and Emily Kowalski, Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

Around 76,000 people are diagnosed with a brain tumor each year, many receive radiotherapy (RT) as treatment.1,2 Patients undergoing RT are at risk for cognitive decline. The National Institute of Neurological Disorders and Stroke (NINDS) has developed and validated neurological quality of life (Neuro-QOL) short forms which measure many dimensions including cognitive function.3 While previous investigators have published the form's utility in diseases such as Parkinson's and Epilepsy, literature to date does not support the validity of this form for patients undergoing radiation therapy for brain tumors.4,5 For the past 4-5 years, the University of Maryland Department of Radiation Oncology has been administering these Neuro-QOL short forms to our

patients who have undergone RT for brain tumors. In our study, we performed a retrospective chart review to determine the utility of Neuro-QOL short form to evaluate cognitive function, assessed based on the level of consistency between the Neuro-QOL indications and clinical assessments. We report in our study that there is consistency between Neuro-QOL short forms and clinical assessments regarding cognitive function, possibly more so for patients experiencing moderate levels of cognitive function decline. Finally, we discuss the limitations in our study and our future plans that include multivariate analysis.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research, and Radiation Oncology Summer Fellowship, University of Maryland Radiation Oncology Department.

O.12

IDENTIFYING PSYCHOSOCIAL, DEMOGRAPHIC, AND ECONOMIC DISPARITIES FOR CANCER PATIENTS UNDERGOING RADIATION THERAPY IN AN URBAN UNDERSERVED POPULATION.

Dahlia Kronfli*, Melissa Vyfhuis[1], Pranshu Mohindra[1], Kaysee Baker[2], and Laurie Waldo[3], [2]Division of Clinical Research Operations and [3]Division of Social Work, [1]Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

There is a paucity of data quantifying the psychosocial, demographic, and economic disparities affecting patients undergoing cancer treatments. Our study seeks to characterize these factors in the setting of a tertiary care radiation oncology clinic. A prospective cross-sectional analysis was performed of patients undergoing curative intent radiation therapy for head and neck, lung, gynecological or gastrointestinal malignancies among University of Maryland Medical Center, Maryland Proton Treatment Center, and Baltimore Washington Medical Center. Patients were administered a consolidated questionnaire synthesized from pre-validated survey tools. The questionnaire was distributed to patients who were pre-treatment, one, six or twelve-months out from therapy. Data was stored on REDCap software. Chi-square analysis was used to determine significance ($p < 0.05$) in contingency tables. Since June 2019, a total of 125 out of 146 enrolled patients completed the survey. With a median age of 65 years (range: 18-91), 37% of the cohort had a gastrointestinal primary and the majority were seen pre-treatment (43%). Most patients self-identified as white (68%), were women (51%), claimed some religion (89%) and attended at least high school (37%). When compared to the non-black cohort, black patients were more interested in obtaining resources about transportation to and from medical visits (64.6% vs. 17.1%, $p <0.001$), managing finances (27.6% vs. 7%, $p=0.014$), healthier eating (76.6% vs. 48.3%, $p=0.069$) as well as quitting smoking (34.5% vs. 9.6%, $p=0.004$). When stratified by timing of survey, patients who were pre-treatment were more likely to want information on transportation ($p=0.001$), help managing pain ($p<0.001$), relaxation/stress management ($p=0.005$), help overcoming fears ($p<0.001$) and finding hope ($p=0.008$) than patients at follow-up. Psychosocial needs in oncological patients are rarely static, changing depending on treatment status and influenced by demographic and economic disparities. From this preliminary analysis, greater efforts should focus on the mental, spiritual and logistical welfare of patients seen before therapy begins, with continued assessments during follow-up.

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O.13

PRIMARY TUMOR CLEARANCE VS. NODAL CLEARANCE AS A PREDICTOR OF ONCOLOGIC OUTCOMES IN ESOPHAGEAL AND GASTROESOPHAGEAL JUNCTION MALIGNANCIES. Melanie Berger*, Cristina DeCesaris, and Jason Molitoris, Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

Esophageal and gastroesophageal junction (E/GEJ) cancers are aggressive malignancies with poor survival rates. The standard of care for locally advanced E/GEJ cancer is neoadjuvant chemoradiation (CRT) followed by esophagectomy (trimodality therapy). Pathologic complete response (pCR), or eradication of both primary and nodal disease, following neoadjuvant CRT is the most important prognostic factor for determining long-term survival; however, pCR rates in E/GEJ cancer are only 30%. When investigating predictors of oncologic outcomes, studies to date have focused on overall pCR after neoadjuvant treatment; however, little is known, about the prognostic significance of pathological clearance of the primary tumor (ypT0) versus pathological clearance of the lymph nodes (ypN0) in patients not achieving both. Patients within a single institution with a primary E/GEJ cancer who received definitive trimodality therapy were retrospectively analyzed. Cancer and demographic features were collected; chi-square analysis was performed. The Kaplan-Meier method and Cox regression were used to estimate oncologic outcomes between cohorts and to analyze whether primary tumor or nodal clearance is a better predictor of oncologic outcomes in patients who did not achieve pCR. Three-hundred and seventy six patients with E/GEJ cancer treated at UMMC between June 2006 and June 2019 were screened for inclusion. Seventy-seven patients were included in the final analysis; 18 (23.4%) had a pCR, 5 (6.5%) had ypT0N+ disease, 25 (32.5%) had ypT+N0 disease, 29 (37.7%) did not have clearance of either site. Median age was 60.0 years. 70 (91.4%) were adenocarcinomas, 7 (8.6%) were squamous. There was no significant difference in two-year locoregional ($p = 0.667$) and distant control rates ($p = 0.558$) between patients who did and did not achieve nodal clearance, and no significant difference in two-year locoregional ($p = 0.506$) and distant control rates ($p = 0.967$) for patients with or without primary tumor clearance. There was a trend towards improved overall survival for the pCR cohort; but this did not reach significance ($p=.424$). In a competing risk model, nodal clearance trended towards an improvement in overall survival though did not reach significance (HR 0.637, CI .362-1.12, $p=.12$). In a population of patients with E/GEJ cancers undergoing trimodality therapy, there were trends towards improved OS in patients achieving pCR or nodal clearance.

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O.14

DOSIMETRIC ANALYSES IN PATIENTS UNDERGOING TOTAL BODY IRRADIATION (TBI). Philip Damron*, Santanu Samanta, Yannick Poirier, Narottam Lamichhane, Byong Yong Yi, and Pranshu Mohindra, Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

Total Body irradiation (TBI) is a key component of the conditioning regimen for hemopoietic stem cell transplantation that involves delivery of a uniform dose of radiation to the whole body of the patient. Accurate dose calculation and delivery is essential in TBI to ensure adequate immunosuppression for successful stem cell engraftment and to also ensure the dose to critical organs, particularly the lungs and kidneys, is kept within tolerance to avoid injury. Lung and kidney shielding using partial transmission blocks is used in many treatment centers to reduce the dose delivered to these organs. TBI dose calculation is traditionally based on the point-dose calculation

approach based on estimates of body separation at different levels with the umbilicus as a reference point. This homogenous dose calculation technique does not take into account patient specific differences such as body shape and tissue density. Advancements in CT-based treatment planning systems (TPS) used in other radiotherapy techniques account for these differences but have not yet been incorporated into TBI protocols. Our retrospective study involved dose calculations of 24 patients (Gender: male-11, female-13; Age range: 23-60 at time of TBI; Diagnosis: AML-7, ALL-8, HL-1, NHL-6, MDS-2) treated with a prescribed dose of 12 Gy in six fractions delivered over three days using a translating couch AP/PA technique with lung and kidney shielding (transmission blocks to achieve < 7 Gy point dose) and for whom CT data had been acquired. The Varian Eclipse TPS was used to calculate the 3D dose distribution to the lungs, kidneys, and heart. Contrary to expected dose (< 7 Gy), the TPS simulated dose range over all patients was 9.16-11.91 Gy for the lungs and 7.94-10.51 Gy for the kidneys. TPS doses for the heart were 9.58- 12.61 Gy. OSLD dose measurements at the umbilicus during the first fraction of treatment ranged from 1.99-2.19 Gy. Our next steps will involve evaluation of pulmonary and renal complications in relation to these TPS dose calculations. Revised TBI techniques may be considered given the deviation between the expected dose delivered to the lungs and kidneys and the TPS measurements.

This project was funded by the Radiation Oncology Summer Research Fellowship through the Department of Radiation Oncology and the Office of Student Research at the University of Maryland School of Medicine.

O.15

CHARACTERIZING THE RELATIONSHIP BETWEEN THE VAGINAL MICROBIOME, THE METABOLOME, AND ADVERSE SYMPTOMS IN WOMEN. Madeline Alizadeh*, Michael France[1], Pawel Gajer[1], Hector Corrada Bravo[2], and Jacques Ravel[1], [1]Institute for Genome Sciences, University of Maryland School of Medicine, Baltimore, MD, and [2]Department of Computer Science, University of Maryland, College Park, College Park, MD.

The vaginal microbiome is critical to maintaining a healthy protective environment for women. Over time the often Lactobacillus (lacto) dominated microbiome has a dynamic composition, as does the metabolome. However, no information is available on the temporality of the changes in the metabolome and that of the microbiome. The onset and presence of adverse symptoms that can drastically impact quality of life for women is thought to be a result of those dynamic changes, but again, the subject is unexplored. Using various biostatistical methods to develop a model, we attempted to observe both shifts in functional metabolomic output and in vaginal microbiota composition that could be related to adverse vaginal symptoms such as odor, burning, and itching. Utilizing a large omics dataset (metabolome and 16s) established on a cohort of 135 women who self-collected daily vaginal swabs for 10 weeks, stability along with additional divergence metrics (primarily Jensen Shannon divergence, JSD) among participants and between samples were assessed. Additionally, categorical descriptive variables were utilized to develop multiple regression models describing aspects of the relationship between the microbiome, the metabolome, and the presence of symptoms. Stability assessment (described by Yue & Clayton in 2005) revealed that the metabolome is significantly more stable than the microbiome in non lacto dominated communities while both are, on average, fairly close to stable in lacto dominated communities. Shifts in the microbiome (measured via JSD) were found to have an inverse linear relationship with the stability of the metabolome, as was the converse relationship between the metabolome divergence and microbiome stability, suggesting the stability of one is highly dependent on the other. Additionally, changes in symptom status (from presence to absence or vice versa) were found to be associated with increases in JSD, suggesting that the onset of certain symptoms are associated with and

potentially a result of a compositional change in metabolome. This suggests the presence of a microbiome-adverse symptoms relationship, highlighting a potential therapeutic target longterm.

This research was supported by the Bill and Melinda Gates Foundation, NIH -- R01 NR015495.

O.16

SALMONELLA OUTER MEMBRANE VESICLE LIPID A STRUCTURE IS INFLUENCED BY BAMA AND PAGL. Casey Hofstaedter*, Thanh Pham[1], James E. Galen[1], and Robert Ernst[2], [1]Department of Medicine, University of Maryland School of Medicine and [2]Department of Microbial Pathogenesis, University of Maryland School of Dentistry, Baltimore, MD.

As the prevalence of antimicrobial-resistant infections increases, there has been a greater effort to develop novel vaccines to protect vulnerable populations. Recently, outer membrane vesicles (OMVs), spherical vesicles that bud off from the outer membrane of gram-negative bacteria, have been investigated for their use as vaccine adjuvants as they have been shown to elicit a more comprehensive immune response compared to traditional adjuvants. Because LPS, but more specifically lipid A, is a predominant immunogenic component in the outer membrane, understanding its structure in OMVs is crucial for its safe use as an adjuvant. The structure of lipid A is directly related to its immune activity, and it has been shown that altering the structure via endogenous outer membrane beta-barrel enzymes can result in highly varied immune responses which make its role in novel adjuvant development important. We hypothesized that when transforming bamA, a beta-barrel assembly machinery enzyme into *S. typhimurium*, the lipid A structure would be modified as a result of more beta-barrel enzymes, such as PagL, a lipid A acyltransferase, being transported to the outer membrane. Further, as the goal of this work is to study the immunogenicity of OMVs for their use as adjuvants, we investigated the structure of lipid A in OMVs from these strains. Using matrix-assisted laser desorption/ionization time of flight mass spectrometry (MALDI-TOF MS), we were able to show that BamA and PagL in *S. typhimurium* leads to a unique lipid A profile in OMVs that is distinct from whole cells. This work shows that the lipid A content of OMVs can be different from that of whole cells and may suggest a role for lipid A in OMV formation. Before OMVs can be safely used as adjuvants, further characterization of the lipids present in OMVs should be done.

O.17

PHARMACOGENOMICS OF GLP1 RECEPTOR AGONISTS IN TYPE 2 DIABETES. Ashley Yuen*, May Montasser, Elizabeth Streeten, Amber Beitelshees, and Simeon Taylor, Division of Endocrinology, Diabetes, and Nutrition, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Glucagon-like peptide 1 (GLP1) receptor agonists are an important class of drugs for the treatment of type 2 diabetes (T2D). They combine substantial glucose-lowering activity with clinically significant weight loss, but like many anti-diabetic drugs, there is considerable variation in how well individual patients respond. Unfortunately, there is limited scientific data to guide identification of the best drug for each individual T2D patient. To address this knowledge gap, we conducted a pharmacogenomic study in the Old Order Amish to determine if genetic variants in two candidate genes, *GCGR* (glucagon receptor) G40S and *GIPR* (glucose-dependent insulinotropic peptide receptor) E354Q, are associated with response to a GLP1 receptor agonist, exenatide. Based on preliminary data from the Amish Family Diabetes Study, we hypothesized that homozygosity for either variant would be associated with an impairment in the pancreatic beta cell's response to the incretin-like action of exenatide. Research subjects (n=60) were homozygotes for either the common "wild type" alleles, G40S, or E354Q variants. Subjects underwent a randomized crossover study and were treated with either saline or exenatide during two separate visits prior to undergoing

frequently sampled intravenous glucose tolerance tests (IVGTT) to assess insulin secretion and rate of glucose disappearance. We assessed 1) variation among individuals in response to exenatide and 2) the effects of these two variants on an individual's response to exenatide. Our results demonstrated substantial variation in response to exenatide among research subjects. Though statistical analyses are pending, our preliminary data suggest that *GCGR* S40S homozygotes have a less robust response to exenatide compared to the wild type and *GIPR* Q354Q homozygotes. Preliminary data also suggest that there are no major differences between the responses to exenatide of the wild type and *GIPR* Q354Q homozygotes. This study has the potential to provide important insights into determining which T2D patients will derive the most benefit from GLP1 receptor agonists in the long-term.

This research was supported by NIH NIDDK SPORT Grant T35DK095737 and supported by American Diabetes Association Grant 1-16-ICTS-112.

O.18

EVALUATING DIABETES SCREENING METHODS IN EARLY PREGNANCY. Lucille Martin*, Emad Elsamadicy, Tabitha Quebedeaux, Andrea Desai, Jerome Kopelman, and Sarah Crimmins, Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Current recommendations call for individuals with risk factors for gestational diabetes mellitus (GDM) to be screened in early pregnancy. However, there is currently no clear consensus on a specific screening modality. This study compares the 1-hour 50-gram glucose screening test (GST) and hemoglobin A1c (HbA1c) completed on the same individual in early pregnancy. We hypothesized that the GST will be the superior screening modality when compared to HbA1c. This is a prospective observational trial at a single tertiary referral center of women with at least one risk factor for GDM who were screened at 94, 179, 154, and 139 mg/dL for fasting, 1-hour, 2-hour, and 3-hour values respectively, GST >200 mg/dL, or HbA1c >6.5%. The data was then analyzed to determine the superior screening method, the value of a contingent screening method, and the associations between test results and clinical outcomes. A total of 366 patients met inclusion criteria. A GST >129 mg/dL had a sensitivity and specificity of 100% and 93.4% respectively (P5.6% had a sensitivity and specificity of 83.3% and 80.6% respectively (P

This research was supported by The Summer Program in Obesity, Diabetes and Nutrition Research Training under NIH award number T35DK095737.

O.19

FACTORS INFLUENCING WOMEN'S PERCEPTIONS OF SHARED DECISION MAKING DURING PRENATAL CARE. Sarah Vogel*, Rachel Breman[1], Jenifer Fahey[2], and Sarah Crimmins[3], [1]Department of Partnerships, Professional Education & Practice, University of Maryland School of Nursing and [3]Division of Maternal and Fetal Medicine, [2]Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Shared decision-making is central to providing patient centered care and is associated with increased patient satisfaction, decreased healthcare costs and improved health outcomes. Women, however, from different socio-economic, racial, and ethnic backgrounds may differ in their perceptions about the medical community and engagement in care. We sought to determine how patients perceived prenatal shared decision-making in an inner-city hospital serving a predominantly black population. In an IRB approved observational cross-sectional study at two different inner-city prenatal clinics, English-speaking women between 28 and 42 weeks' gestation completed a survey assessing shared decision-making. Maternal demographics and preferences towards prenatal

education resources were collected. Our primary outcome was a participant's independence or dependence on a provider to make decisions about their care. Secondary outcomes included patient and providers perception of choices. Pearson Chi Square was used for analysis. Surveys were collected from 150 gravidas. Black women were more likely to be an independent decision maker in their care in comparison to whites (25(30.1%) vs 4(8.9%), P=.015)) No other factors demonstrated significance. Seven participants (4.6%) had not considered they had choices in their care. All of these participants were enrolled in government assistance programs (P=.007). No differences were seen in the likelihood of provider discussing options for care with participants (P>.05 for all variables). Maternal race and socio-economic factors may significantly influence patients' perceptions of shared decision making. Results from this research will help guide the development of an educational tool to provide adaptive discussions to improve the quality of patient-centered care.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.20A

LONGEVITY OF OUTCOMES FOLLOWING REDUCTION MAMMOPLASTY. Carly Rosen*, Yvonne Rasko[1], Jennifer Bai[1], LediBabari Ngaage[1], Colton McNichols[1], and Sheri Slezak[2], [1]Division of Plastic Surgery, [2]Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Reduction mammoplasty has been shown to provide wide-ranging benefits for patients including improved quality of life in terms of physical function and mental health. However, most existing studies have been limited to the one-year postoperative period. The aim of this study was to investigate long-term outcomes after reduction mammoplasty. Patients who underwent reduction mammoplasty at a single institution were identified retrospectively and grouped into three categories based on time since surgery: i) 5 to 10 years, ii) 10 to 15 years, and iii) >15 years. A telephone survey was administered to measure satisfaction and symptom relief following reduction mammoplasty. A total of 124 patients completed the survey and were included in the study. The majority of patients in all three groups reported marked symptoms relief (75% vs 82% vs 82%, p=0.84). Overall satisfaction after reduction mammoplasty was high in all three subgroups and did not significantly decrease over time (4.16 vs 3.97 vs 3.7, p=0.216) despite high proportions of patients reporting an increase in breast size since surgery (40% vs 70% vs 51% respectively, p=0.0297). Overall, reduction mammoplasty has long-lasting benefits for patients with macromastia. Overwhelmingly, patients report satisfaction with the procedure and marked symptom relief which is sustained for as long as 15 years after surgery.

O.21A

POST-ABDOMINAL TRANSPLANT HERNIA: WHAT INCREASES RISK? Brooks Knighton*, Ledibabari Ngaage, and Yvonne Rasko, Division of Plastic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Abdominal organ transplant is a life-saving treatment for numerous conditions. However, the resulting post-incisional weakening of the abdominal muscle leaves these patients susceptible to post-transplant abdominal hernia, which can have significant impacts on quality of life. Obesity, smoking, and diabetes mellitus have been identified as risk factors. However, the literature is void on the impact these risk factors have on onset and severity of hernia. We performed a retrospective chart review of all post-abdominal transplant hernia patients since 2012 at a single academic institution. We collected details on patient demographics, transplant operation, hernia repair, and post-repair complications. Interquartile ranges (IQR) are reported with median values. Standard deviation (SD) is reported with mean values. 31 patients were identified with a near equal

representation by gender (M=48%, n=15; F=52%, n=16). The average patient was 56 years old (IQR: 47-63) and obese (BMI 30.6 ±6.3). Smoking (38%, n=14) and diabetes (52%, n=16) were also prevalent within the cohort. Four transplant types were represented within our cohort (renal n=30; simultaneous pancreas-kidney n=5; liver n=1; simultaneous kidney-liver n=1). The median time from transplant surgery to hernia occurrence was 53 months (IQR:12.5-110). Two thirds of patients experienced a complication after hernia repair (63%, n=19) and 16% required re-operation. The presence of risk factors (obesity, smoking or diabetes mellitus) did not significantly shorten the time interval between transplant and hernia occurrence nor were they associated with increased hernia size. Obesity, smoking, and diabetes mellitus are not prognostic of severity of post-transplant incisional hernia. However, due to their association with hernial occurrence, providers should consider further precautions during initial transplant. Additionally, patients should be counseled on the potential impact of these risk factors. Large cohort studies would be valuable for determining predictive factors of severity of hernia and its association with surgical methods.

O.22

ACADEMIC PRODUCTIVITY ACROSS PLASTIC SURGERY SUB-SPECIALTY FELLOWS. Katie McGlone*, LediBabari Ngaage, and Yvonne Rasko, Division of Plastic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Subspecialty training in plastic surgery is associated with greater career advancement and academic promotion. Thus, applications for fellowships are highly competitive. It is unknown whether any single subspecialty is more competitive than others. Academic productivity is an objective metric that can be used to compare candidates. This study aims to evaluate inter-subspecialty differences in academic profiles of plastic surgery fellows, and whether these have changed over time. We performed a cross-sectional analysis of the plastic surgery fellows in the United States from 2014 to 2018. Subspecialty fellowships included microsurgery, aesthetic, hand, and craniofacial. Lists of all fellowship programs were obtained from the San Francisco Match website. We collected details of all plastic surgery fellows from individual program websites. Bibliometric data, including h-index, number of publications, number of first author publications, and publication types, were collected from the Scopus website. Interquartile range (IQR) is reported with median values. We identified 235 fellows for inclusion, of which the majority were hand fellows (70, 30%), followed by microsurgery (65, 28%), craniofacial (59, 25%), and aesthetic (41, 17%). Between subspecialties, there was a significant difference in the median number of publications at the time of fellowship application ($p=0.0067$). Hand fellows held the greatest number of publications (6.5, IQR: 3-16), followed by microsurgery (5, IQR: 2-11), and craniofacial (5, IQR: 3-10). Aesthetic fellows had the lowest median number of publications (3, IQR: 1-6). There was no significant change in the number of publications over time in any of the subspecialties. All plastic surgery fellows have highly qualified academic profiles at the time of fellowship application. Our study indicates that there is a significant difference in the academic productivity between successful applicants in these subspecialties. Further studies are needed to assess whether this correlates to increased competition within subspecialty fellowship applications.

This research was supported by the Stueber Scholarship.

O.23A

STRUCTURAL CHANGES AFTER ANGLE SURGERY COMPARED TO TUBE SHUNT PLACEMENT IN INFANTS AND CHILDREN. Jennifer Drechsler* and Janet Alexander, Division of Pediatric Ophthalmology and Strabismus, Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Glaucoma is one of the leading causes of blindness in the world. In the U.S., approximately 1 in every 10,000 babies is born with glaucoma, while about 1 in every 8,000 children are diagnosed with the disease. Primary congenital glaucoma accounts for the majority of childhood cases, and it is usually diagnosed within the first year of life. There are currently treatments that can be used to treat children with glaucoma, such as angle surgery (goniotomy) and tube shunt placement, which function to reduce eye pressure and control the physical changes of the eyes. The goal of this research project is to summarize the anatomical changes of the eye before and after the two surgical procedures. The research hypothesis is that the two most common types of congenital glaucoma surgery (angle surgery and tube shunt placement) result in statistically significant measurable structural changes in 27 different parameters in the anterior segment of the eye when compared among the following three groups: Pre-surgery glaucoma eyes, Post-angle surgery eyes, and Post-tube shunt implant eyes. Six patients (12 eyes) underwent ocular imaging using ultrasound biomicroscopy. Among these patients, three patients (5 images of eyes) are controls, four patients (6 images of eyes) underwent goniotomy, and four patients (7 images of eyes) had tube shunt placement. Ultrasound biomicroscopy images were measured according to a standardized protocol and each measured parameter was compared among the three groups. Following imaging, a direct comparison of the pre-operation and post-operation images was assessed to determine each eye's anatomical changes as a result of the two procedures. The structural differences between surgical outcomes of the two procedures were assessed to determine which variables in each procedure exhibited differences in outcome. Between tube shunt placement and angle surgery, it was found that ParaCT, CICD, TCPD, ID1, and Theta5 were the five parameters that were found to have a progressive change in both procedures. Further data analysis can be conducted to determine the significance of these trends in the identified parameters, as well as those parameters that did not produce distinct trends.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.24A

IDENTIFYING AND REDUCING ERRORS IN PERIOPERATIVE ANESTHESIA MEDICATION DELIVERY: THE ROLE OF TECHNOLOGY. Caroline Schlee*, Myrtede Alfred[1], and Ken Catchpole, Department of Anesthesia and Perioperative Medicine, Medical University of South Carolina, Charleston, SC.

Errors occur in approximately 1 in 20 anesthesia medications, potentially resulting in adverse events. Interventions designed to reduce anesthesia medication errors have tended to focus on specific types of errors, behavioral changes, or individual technologies. However, these studies may not consider how systems factors work in combination to create or prevent errors. In this study, we examined how provider and technology together support or hinder medication safety in the operating room. Observations of anesthesia providers were conducted for eight weeks. Semi-structured interviews with anesthesia residents and certified registered nurse anesthetists (CRNAs) were then conducted to understand how these devices are used and the perceptions of the reliability and utility of the devices. Over 80 hours of observations and 12 interviews (6 Residents, 6 CRNAs) were conducted. Three main themes that emerged were: (i) Preparation for Medication Delivery: differences were found in preparation depending on the specific type, complexity and length of case (ii) The Use of Devices identified technology that providers find helpful and reliable (eg. Alaris pump), while other devices were less trusted and generated conflicting information (eg. BIS monitor) (iii) Avoiding Errors showed that providers often defined errors differently, but agreed that patient harm was not required to define an error. It was also observed that CRNAs appear to take a more step-wise approach to decision making, while residents relied on a general approach to decide

how to proceed with each situation. However, a large range in years of experience could contribute to this difference in approach. Effective anesthesia medication delivery is dependent upon the case context, knowledge and trust of different devices, and awareness of the potential for error, all of which vary with providers. Thus, one set of solutions may not fit all situations in preventing errors in medication delivery. Instead, interventions need to be considered within wider system contexts (eg. patient, provider, technology).

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Poster Presentation Abstracts

Presenters are indicated with "*" next to their names.

P.00

EXPANDING ACCESS TO MEDICATION ASSISTED TREATMENT FOR OPIOID USE DISORDER VIA TELEMEDICINE IN RURAL MARYLAND. Alexandra Berthiaume*, Eric Weintraub[1], Christopher Welsh[1], Annabelle Belcher[2], Shelby Goodwin[2], and Amna Zehra[3], [1]Division of Addiction Research and Treatment, [2]Department of Psychiatry, [3]University of Maryland School of Medicine, Baltimore, MD.

In 2015, several University of Maryland physicians began providing medication assisted treatment (MAT) via telemedicine for opioid use disorder (OUD) patients in Hagerstown who had recently lost their provider. In the four years since then, this program has expanded to four sites across rural Maryland and provided care to over 600 patients. This study analyzes and reports the data garnered by a comprehensive chart review of patient files from this program. The primary outcome of this analysis was treatment retention, defined as the number of days between the first and last appointment with a provider. Retention rates are as follows: 91.1% at 7 days, 74.4% at 30 days, 46.9% at 90 days, 20.3% at 180 days, and 8.1% at 365 days. These numbers are comparable to retention numbers reported in large multi-center studies of in-person MAT (Hser et al. 2014; Eibl et al. 2017). Though more comprehensive study is needed on this subject, these data add to a growing body of literature which indicates the potential for telemedicine to expand access to MAT throughout rural America without sacrificing quality of care.

This work was partially supported through funds from the University of Maryland MPowering the State Opioid Use Disorders Initiative.

P.01

IMPLEMENTATION OF EPILEPSY GUIDELINES FOR MOOD SCREENING UTILIZING THE EMR. Jonathan Popham* and Jennifer Hopp, Division of Epilepsy, Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

Depression is one of the most common comorbid conditions associated with epilepsy and may affect 20-55% of people with this disorder. Unrecognized and untreated mood disorders can worsen quality of life in these patients and may lead to increased morbidity and suicide. Appropriate screening for depression is paramount in the process of recognizing symptoms, making an accurate diagnosis, and implementing appropriate treatment. In 2017, the American Academy of Neurology (AAN) implemented a quality measure to improve annual screening of epilepsy patients for psychiatric or behavioral health disorders. Based on review of records performed as part of routine clinical care, we hypothesized that many patients with epilepsy may not be routinely screened for depression in the outpatient setting. Our second hypothesis was that implementation of a standardized template that allows utilization of embedded depression screens in the current EMR will also improve screening and ultimately, diagnosis of depression in patients with epilepsy in a tertiary care setting. We screened 194 consecutive patient notes from the University of Maryland Neurology, Division of Epilepsy outpatient practice from 6/3/19 to 7/3/19. Inclusion criteria were notes in the defined time period written by an attending physician. The patient also had to be cognitively able to answer mood screening questions. Of those 194 notes, 165 met inclusion criteria. Of those patients, 58 notes (35%) included documentation of screening for mood. 57 charts (34%) included documentation of mood screening in the body of the text, and 8 (5%) notes included an EMR-embedded mood screen (PHQ-2 and PHQ-9, a 2 question and 9 question, respectively, screen for depression). Of the 165 patient records we reviewed, 48 patients (29%) had a diagnosis of a

depressive disorder and 36 patients (22%) had a diagnosis of an anxiety disorder. Phase II of our study is now ongoing and will test the hypothesis that implementation of a standardized template that allows utilization of embedded depression screens (PHQ-2 and PHQ-9) in the current EMR will also improve screening to meet AAN quality guidelines.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.02

EVALUATING PERI-ICTAL CHANGES IN MOOD IN PATIENTS WITH EPILEPTIC SEIZURES. Cristiana Salvatori*, Jennifer Hopp[1], Lauren Kasoff[2], and Jonathan Popham[2], [1]Division of Epilepsy, Department of Neurology, [2]University of Maryland School of Medicine, Baltimore, MD.

Epilepsy is associated with several comorbid psychiatric conditions, the most common of which is depression. The lifetime prevalence of depression among epileptic patients is 30-35%, which is almost twice that of the general population. This can have a significant impact in worsening quality of life and may increase the risk of suicide if left untreated. There is a large body of research supporting the bidirectional relationship between epilepsy and depression, however little is known about changes in mood in the period surrounding a seizure. Based on the parallels between focal-onset seizures and electroconvulsive therapy (ECT) used to treat depression, we hypothesize that patients with depressive symptoms at baseline would report mood improvements in the peri-ictal period. We also expect that patients with focal onset seizures would be most likely to have depressive symptoms and changes in mood after seizures as depression is more commonly seen with patients with temporal lobe epilepsy. To test this hypothesis, we enrolled patients who were admitted to the Epilepsy Monitoring Unit (EMU) for continuous video-electroencephalography monitoring at the University of Maryland Medical Center as part of routine clinical care. Patients completed two validated mood questionnaires (Beck Depression Inventory-II and Beck Anxiety Inventory) at baseline as well as at four time points following seizures (4 hours, 12 hours, 24 hours, and 2-weeks). To date, 135 eligible patients have been enrolled in the study. 34 of these patients have had epileptic seizures and 34 patients have had non-epileptic seizures during their stay in the EMU. Based on analysis for 123 patients, those with epilepsy reporting mild or moderate levels of depression showed mood score improvement in the 24 hours following an epileptic seizure (BDI: -5.56, $p = 0.017$) but changes in mood returned to baseline levels after 2 weeks. Patients with focal-onset seizures showed a greater improvement in depression and anxiety scores following an event (BDI: -7.27, $p=0.022$; BAI: -4.44, $p=0.013$) compared to those with generalized seizure onset. These findings suggest that patients with depressive symptoms at baseline experience transient mood improvements in the peri-ictal period and that this pattern is more commonly seen in patients with focal epilepsy. The transient nature of the mood changes highlights the need for careful screening of patients for depressive symptoms and attention to timing of these assessments.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.03

THE EFFECT OF GLIBENCLAMIDE ON MACROPHAGE AND MICROGLIA INTERNALIZATION OF & GRAPHICS GROUP HEMOGLOBIN IN INTRACEREBRAL HEMORRHAGE. Serban Negoita*, Vaishnavi Katragadda, Orest Tsymbalyuk, Seung Kyoon Woo, Vladimir Gerzanich, and J. Marc Simard, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Intracerebral hemorrhage (ICH) accounts for nearly 15% of all strokes and is associated with greater mortality than other stroke subtypes. Primary injury following hemorrhage is characterized by mechanical compression from extravasated blood, while secondary injury is characterized by edema, inflammation, and toxic biochemical effects arising from free iron and hemoglobin. Infiltrating macrophages and microglia have been described to phagocytose both extravasated erythrocytes and free hemoglobin and are thought to be key promoters of hemorrhage resolution and potential targets for novel pharmacological interventions. Glibenclamide, a sulfonylurea antagonist, has a SUR1 receptor target on macrophages and microglia and has been associated with reduced ICH volumes in both preclinical rodent models and in human prospective trials[1]. Here we hypothesized that glibenclamide induces macrophage and microglia erythrophagocytosis and hemoglobin uptake to promote hemorrhage clearance. In experiment one, glibenclamide-treated macrophage cell cultures displayed greater levels of internalized hemoglobin after two hours of incubation with erythrocytes. Peak hemoglobin uptake was determined to occur after four hours of incubation with erythrocytes, with diminishing levels of hemoglobin uptake noted at greater incubation periods. In experiment two, ICH was induced in rats via striatal collagenase injection and macrophages and microglia were isolated from lesion sites through either density centrifugation or CD11B immunoprecipitation. Hemoglobin was not detected in either macrophages and microglia isolated from either methods, indicating the need for new approaches to quantify in vivo phagocytosis prior to hemoglobin degradation. Isolated macrophages and microglia featured greater SUR1 expression immediately after isolation from the hemorrhage site rather than after overnight incubation in a quiescent medium, reflecting the potential for glibenclamide mediated effects.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.04

STEROIDS HAVE MILD TRANSIENT EFFECTS ON HEADACHE IN PATIENTS WITH SUBARACHNOID HEMORRHAGE. Arshom Foroutan*, Matthew N. Jaffa[1], Nikhil M. Patel[1], Michael J. Armahizer[2], and Nicholas A. Morris[1], [1]Division of Neurocritical Care, Department of Neurology, University of Maryland School of Medicine and [2]Department of Pharmacology, University of Maryland School of Pharmacy, Baltimore, MD.

Headache is the most common complaint of patients presenting with subarachnoid hemorrhage (SAH). Few studies address disease specific headache management. Corticosteroids are considered by many to be an efficacious adjuvant therapy in the management of SAH-induced headache. We performed a retrospective chart review of patients treated for SAH in the neurocritical care unit at a tertiary care center from January 2018 through February 2019 who received steroids. Dexamethasone (4 mg every 6 hours) is typically administered for 2-3 days in patients with headache refractory to acetaminophen and oxycodone. Nursing documented numeric (0-10) pain scores were collected every two hours. We used paired t-tests to compare maximum daily pain scores on the day before, each day of therapy up to day 4 and the first day following steroid administration. Fisher exact and Mann-Whitney tests assessed for factors associated with steroid responsiveness defined as improvement of 3 or more points in max daily pain scores from each of the first 3 days compared to the day prior to therapy initiation. There were 64 patients (68% female, median age of 55, median Hunt-Hess grade 2, median modified Fisher score 3). Thirty-seven (58%) were classified as steroid responsive. Max daily pain scores decreased during steroid administration but returned to near pre-therapy levels one day after treatment was completed. Responders reported higher pre-treatment pain scores (8.0 vs 5.8) and non-responders saw increasing pain scores over the course of therapy. No demographic or clinical characteristics were associated with steroid responsiveness. A subset of

patients with SAH induced headache have a favorable, albeit, transient response to steroids. Further study will explore alternative dosing patterns and influence on opioid requirements.

P.05

HEMORRHAGIC PROGRESSION OF CONTUSION AFTER DECOMPRESSIVE CRANIECTOMY: A RETROSPECTIVE, PROPENSITY-SCORE MATCHED STUDY. Stephen Semick*, Matthew Kole, Gary Schwartzbauer, and J. Marc Simard, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Decompressive craniectomies (DCs) are surgical procedures often performed to control intractable intracranial hypertension, midline-shift, or mass effect in traumatic brain injury (TBI) patients, but there is concern that DCs increase risk of a dangerous condition, hemorrhagic progression of contusion (HPC). To determine whether DC associates with greater frequency and severity of HPC, we retrospectively reviewed the charts of patients, from the UMB Shock Trauma database (2008-2015), admitted with blunt force head trauma. Propensity score matching produced a cohort balanced on age, sex, Glasgow Coma Scale (GCS), and other metrics of admitting trauma severity. DC patients did not differ significantly from non-DC patients in admitting clinical characteristics, common laboratory values, or anticoagulant use. We populated a neuroimaging database with non-contrast head CT scans taken within 168h of admission (N=2,000 scans; mean number of scans per patient: non-DC=3.84, DC=5.01, p=6.75e-13) and performed preliminary volumetric analysis of contusions with semi-automated (Slicer) and fully-automated (random-forest, RF) approaches, with reasonable concordance between methods (Pearson's r =0.928, p<2.2e-16, N=76 scans). On admission, DC patients had more frequent contusions (>1ml, non-DC: 23.9%, DC: 44.3%, OR=3.97, p=2.22e-4) and larger contusions (RF mean volume: non-DC=1.45ml, DC=13.0ml, p= 7.59e-5, N=137 patients), but admitting contusion volume was not associated with mortality (p=0.7). Decompressive craniectomy also associated with a higher frequency of large peak contusions (>10ml, non-DC: 14.9%, DC: 62.9%, OR=9.46, p=9.82e-9) and larger contusion volumes were associated with greater mortality (mean volume: survived=14.8ml, expired=44.7ml, p=0.00570, N=137 patients). These findings highlight the need for further study into the possible role of decompressive craniectomies in raising the risk of hemorrhagic progression of contusion.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.06

ABCC8 POLYMORPHISMS AND CEREBRAL EDEMA IN NON-LACUNAR STROKE. Arlinda Deng*, Huichun Xu[1], Ona Wu[2], Anne-Katrin Giese[3], Natalia Rost[3], and Steven Kittner[4], [1]Division of Endocrinology, Diabetes and Nutrition, Department of Medicine and [4]Division of Stroke & BAT, Department of Neurology, University of Maryland School of Medicine, Baltimore, MD and [2]Department of Radiology and [3]Department of Neurology, Massachusetts General Hospital, Boston, MA.

The purpose of the study is to determine whether polymorphisms of the *ABCC8* gene which encodes SUR1 is associated with acute infarct size in non-lacunar strokes. Sulfonylurea receptor 1 (SUR1) is a key ion channel regulator involved in cerebral edema (CE) in large ischemic strokes. Sulfonylurea drugs, which inhibit SUR1, have demonstrated promising results in reducing edema in this setting, though the role of SUR1 in smaller non-lacunar strokes has not been elucidated. Importantly, *ABCC8* polymorphisms found in key structural regions of SUR1 have been associated with CE and clinical outcomes in severe traumatic brain injury. A repository of MRIs of acute ischemic stroke patients enrolled through 12 international sites in the MRI-GENIE study was used to obtain automated diffusion-weighted imaging (DWI) lesion size and genotype data. A multivariate

linear regression model with allelic dose of the 4 different *ABCC8* tag SNPs (rs7105832, rs2237982, rs11024286, rs4148622) adjusted for age, sex and population stratification with log DWI volume was performed. The final analysis included 2094 subjects with 0, 1 or 2 copies of alleles for SNPs rs7105832, rs2237982 and rs4148622, and 2035 subjects for the SNP rs11024286. Both rs7105832 and rs2237982 demonstrate a nonsignificant trend towards association with decreased log DWI ($p= 0.053$, 0.078 respectively); rs110024286 and rs4148622 SNPs demonstrate no association with log DWI ($p=0.28$, 0.61). The four *ABCC8* tag SNPs were not significantly associated with acute infarct size in non-lacunar strokes. The hyperacute nature of MRI imaging in the MRI dataset (≤48 hours from last seen well, and many within the first 8 hours), may be insufficiently sensitive for assessing CE. Imaging at later time points (>48 hours) or multiple time point comparisons may be required to detect CE associated with SUR1 activity. Future directions may also include assessing the association of *ABCC8* tag SNPs with functional outcome.

This research was supported in part by the Leslie B. Barnett Memorial Student Fellowship through the Department of Neurology.

P.07

OBESITY PHENOTYPE AMONG AFRICAN AMERICAN AND WHITE BREAST CANCER SURVIVORS: EXPLORING DIFFERENCES BY TUMOR CHARACTERISTICS AND TREATMENT TYPE.

Rohan Singh*, Katherine Tkaczuk[1], Paula Rosenblatt[1], Rajrupa Ghosh[2], Nancy Tait[3], and Cher Dallal[2], [1]Division of Hematology and Oncology, Department of Medicine, University of Maryland School of Medicine and [3]Department of Hematology and Oncology, University of Maryland School of Nursing, Baltimore, MD and [2]Department of Epidemiology and Public Health, University of Maryland, College Park, College Park, MD.

Breast cancer (BC) is known to affect roughly one in every 8 American women. While death rates have decreased, racial disparities in breast cancer mortality persist with African American (AA) women experiencing worse outcomes than their white counterparts. Moreover, AA women have the highest rates of obesity when compared to any other racial/ethnic/gender group. AA women also display increased risk of more aggressive forms of BC, namely triple negative BC. Previous studies that have examined obesity as a potential explanation for racial disparities in BC mortality have been limited to using body mass index (BMI) as an assessment of obesity phenotype. Android-gynoid (A/G) body fat percentage ratio and waist-hip circumference (WHR) measurements are other measures that can be used to assess obesity phenotype. The main objective of this pilot study is to explore the variations in obesity phenotype based on race, tumor characteristics, treatment type, physical activity, and sedentary behavior in BC survivors. To test the hypothesis that obesity phenotypes will vary by race, biological and behavioral factors, AA and white postmenopausal BC survivors were recruited from the UMGCCC Breast Evaluation and Treatment Program Clinics. Eligible patients were within five years of their initial diagnosis of BC and six months from completion of radiation or chemotherapy. Self-administered electronic questionnaires captured information regarding physical activity, historical weight, family history of cancer, comorbidities, and other health conditions. Obesity phenotype measures include A/G body fat percentage ratios assessed using dual-energy x-ray absorptiometry, WHR measurements, and BMI. To date, 21 BC survivors have completed the study and participant recruitment is ongoing. Based on preliminary analysis, BC survivors had a median age of 67 years (Range: 58-75), median BMI of 29.0 (Range: 20.7-61.9) and median A/G ratio of 0.93 (Range: 0.68-1.12). Further descriptive analyses (correlations, t-tests, chi-square test) are ongoing to assess relationships between BC treatments and behaviors (exposures) and obesity phenotype (outcome). Complete data analysis is forthcoming.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.08

PYRUVATE IN PROSTATE CANCER LEADS TO INCREASED ACTIVATION OF MITOCHONDRIAL ENZYMES MTOR AND AMPK. Aidan Kennedy*, Ian Qian, Dexue Fu, and Mohummad Minhaj Siddiqui, Division of Urology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Prostate cancer is the second leading cause of cancer death in men. While there are diagnostic tools available, such as MRI, that observe tissue characteristics, these techniques are limited in terms of their sensitivity. Current treatment for aggressive prostate cancer includes surgery, hormone therapy, radiation and chemotherapy. Using western blotting, we may observe the protein expression of different prostate tumor strains. We hypothesize that differences in mitochondrial protein expression will correlate to different prostate cancer cell lines. The objective of this study is to determine the mitochondrial protein pathways upregulated in LNCaP tumor cells in the presence of androgens and pyruvate, and determine how these pathways are impacted by medications such as Metformin and Enzalutimide (MDV). These results will improve our ability to differentiate and treat prostate cancer tissue using proteins as biomarkers. Protein expression was analyzed in depth for the androgen sensitive prostate cancer cell line LNCaP. LNCaP cells were biopsied from consenting hospital patients, then maintained and harvested using RPMI medium. Cells were treated and processed for analysis of proteins by Western blotting. Through our analysis, we found that LNCaP tumor cells treated with Dimenthyltryptamine (DHT, an androgen) increases phosphorylation of AMPK, Akt, and mTOR, and decreases the phosphorylation of eIF2A, indicating increased mitochondrial activity. Additionally, we found that introduction of pyruvate demonstrated increased expression and phosphorylation of AMPK, Akt, and mTOR, as well as decreased phosphorylation of eIF2a. MDV (androgen inhibitor) and Metformin increase phosphorylation of AMPK, AKT, and eIF2a but decrease phosphorylation of mTOR. LNCaP tumor cells treated DHT show increased mitochondrial activity via enhanced protein expression. LNCaP cells treated with pyruvate similarly demonstrated increased expression and phosphorylation of mitochondrial proteins. Both Metformin and MDV increase phosphorylation of eIF2a, promoting tumor cell death. This information will improve our understanding of prostate cancer and our ability to treat prostate cancer using mitochondrial proteins as therapeutic targets.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.09

MRI AND ULTRASOUND CHARACTERIZATION OF PROSTATE ANATOMIC FEATURES TO OPTIMIZE TARGETED BIOPSY PROSTATE CANCER DETECTION. Alexa Van Besien*, Adrianna Lee, Linhan Xu, Michael Naslund, and Mohummad Minhaj Siddiqui, Division of Urology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Approximately 165,000 men in the United States were newly diagnosed with prostate cancer in 2018, comprising 9.5% of all new cancer cases. The standard of care for diagnosis of men with clinical suspicion for prostate cancer is a transrectal ultrasonography-guided biopsy, also known as random biopsy of the prostate. Bleeding, lower urinary tract symptoms, and infection are risks that exist after random biopsy, in addition to rare erectile dysfunction and mortality. Additionally, random biopsy is associated with under detection of high-grade prostate cancers and over detection of clinically insignificant cancer. Recent advances in medical imaging techniques has led to Multiparametric Magnetic Resonance Imaging(MP-MRI)/ultrasound fusion-guided biopsy (targeted biopsy) becoming increasingly utilized. Targeted biopsies have been shown to increase detection of high-risk prostate cancer. Still, targeted biopsies have a false-negative rate for significant cancers of

approximately 5-15%. Therefore, the primary aim of this study is to examine if certain anatomic features including size, location, lesion visibility, and volume discordance between MRI and ultrasound influence the accuracy of targeted biopsy detection of clinically significant prostate cancer. Data including prostate size, lesion location, echogenicity of lesion, pathology from biopsy, and other characteristics have been collected from over 364 patients with a history of fusion biopsy in the University of Maryland Medical System EPIC system and entered into RedCap database. Results from analyzed data will be directly utilized to refine targeted biopsy technique based on characteristics of prostate lesion, and also to improve the treatment of patients with negative targeted biopsies with such features if significant.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.10

DIFFERENTIATING METABOLIC RESPONSE TO TREATMENTS IN ANDROGEN-SENSITIVE AND -INDEPENDENT PROSTATE CANCER TISSUE SLICES. Ian Qian*, Aidan Kennedy, Dexue Fu, and Mohummad Minhaj Siddiqui, Division of Urology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Treating prostate cancer (PCa) comes with the risk of overtreatment and ineffective treatment due to tumor properties (e.g., androgen sensitivity). Determining the efficacy of androgen-deprivation therapy (ADT) can take months. Screening the metabolic response to therapies in PCa tissue biopsies is a promising method of rapidly and proactively predicting the efficacy of therapies. However, existing PCa metabolic characterization in research is mostly limited to cell cultures, which do not always reflect the complex in vivo metabolic behavior of a 3D tumor block. Our objective was to differentiate the effects of MDV (FDA-approved ADT agent enzalutamide), metformin, and rapamycin on the metabolic responses in androgen-sensitive (LNCaP) and androgen-independent (CSS90) PCa tissue slices. Within 72 hours of PCa tissue collection from engrafted mice, the PCa tissue slices were metabolically characterized by oxygen consumption rate (OCR, a measure of mitochondrial respiration) with the Seahorse XF Analyzer. We demonstrated that, in the presence of pyruvate, the OCR difference between MDV and DHT treatment is significantly greater in LNCaP (OCR under MDV is 700±300 pmol/min/mg protein less than the OCR under DHT) than in CSS90 (OCR under MDV is 10±60 pmol/min/mg protein less than the OCR under DHT). In the presence of pyruvate, metformin and rapamycin significantly decrease OCR in LNCaP tumors by 1100±300 pmol/min/mg protein and 1300±200 pmol/min/mg protein respectively, but not in CSS90 tumors (OCR changed by +10±30 pmol/min/mg protein and -0±30 pmol/min/mg protein respectively). These results suggest that existing PCa ADTs (i.e., enzalutamide) and potential PCa therapies (i.e., metformin and rapamycin) inhibit mitochondrial respiration in androgen-sensitive PCa tissue but not in androgen-independent PCa tissue. We established that screening for these effects on mitochondrial respiration in PCa tissue slices can be completed within days. In future studies, the goal is to demonstrate that metabolic screening of human PCa tissue biopsies can predict whether a PCa treatment like enzalutamide will be effective for a specific PCa patient before treatment begins.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.11

INSURANCE COVERAGE, STAGE AT DIAGNOSIS, AND TIME TO TREATMENT FOLLOWING DEPENDENT COVERAGE AND MEDICAID EXPANSION FOR MEN WITH TESTICULAR CANCER. Stephen Jan*, Adam B. Weiner[1], Ketan Jain-Poster[1], Oliver S. Ko[1], Anuj S. Desai[1], and Shilajit D. Kundu[2], [1]Division of Urology and [2]Division of Urologic Oncology, Department of Surgery, Northwestern Feinberg School of Medicine School of Medicine, Chicago, IL.

Testicular cancer is the most common cancer among adolescent and young adult men. Recent reports show young men aged 20-34 also have the highest incidence of being uninsured and diagnosed with testicular cancer. Epidemiological studies demonstrate lack of insurance in patients with testicular cancer increases risk of presenting with advanced stage disease, which is associated with worse mortality. This makes young men with testicular cancer a vulnerable population, yet likely to benefit from insurance expansion due to the Affordable Care Act Dependent Coverage Expansion and Medicaid expansion. As of the 2017 fiscal year, 12.6 million Americans were newly eligible and received coverage, decreasing rates of cancer patients without insurance. However, the relationship between expanded coverage and outcomes for testicular cancer in young adults has not been assessed. Using a US-based cancer registry, we performed adjusted difference-in-difference analyses comparing outcomes between men age 19-25 and 26-64 pre- (2007-2009) and post-ACA-DCE (2011-2016; n=41,329) and between men in states that expanded Medicaid to men in those that did not (n=4,561) pre- (2011-2013) and post-Medicaid expansion (2015-2016). In ACA-DCE analyses, rates of uninsurance decreased 5.64% (95% CI -7.23 to -4.04%, $p<0.001$) among men aged 19-25 relative to older men. There was no change in advanced stage at diagnosis (stage≥II; $p=0.6$) nor orchiectomy more than 14 days after diagnosis ($p=0.6$). Men who received delayed chemotherapy/radiotherapy decreased 4.84% (CI -8.22 to -1.45%, $p=0.005$). In Medicaid expansion states, rates of uninsurance decreased 4.20% (95% CI -7.67 to -0.73%, $p=0.018$) while men receiving chemotherapy or radiotherapy more than 60 days after diagnosis decreased 8.76% (CI -17.13 to -0.38%, $p=0.04$). No significant DIDs were seen for stage ($p=0.8$) or time to orchiectomy ($p=0.109$). Overall, ACA-DCE and Medicaid expansion were each independently associated with decreases in rates of no insurance, but no association with stage at diagnosis was found. Both expansions were associated with improved time to treatment in men whose first treatment was chemotherapy or radiotherapy.

P.13 (Non-Presenting)

LIMITED ROLE FOR PREOPERATIVE RESTAGING AFTER NEOADJUVANT THERAPY IN LOCALLY ADVANCED RECTAL CANCER. Ilaria Caturegli* and Andrea Bafford, Division of General and Oncologic, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Neoadjuvant chemoradiotherapy in the management of rectal cancer can cause decreased tumor burden or interval disease progression. Many clinicians therefore perform restaging imaging following neoadjuvant therapy and before surgery. The purpose of this study was to examine the impact of imaging restaging on surgical management and overall survival in patients with locally advanced rectal cancer who receive neoadjuvant chemoradiotherapy. We performed a retrospective review of patients with stage 2 and 3 rectal adenocarcinoma treated with neoadjuvant chemoradiotherapy and surgery at the University of Maryland between 2005 and 2017. Patient and disease characteristics, imaging results, treatment strategy, and outcomes were determined using the hospital's electronic medical record. The Kaplan-Meier product limit method was used to estimate overall survival (OS) and freedom from recurrence (FFR) rates. Predictors of OS and FFR were determined with Cox regression univariate and multivariate analysis. The incremental cost

effectiveness ratio and number needed to change management for each imaging modality was computed. A total of 153 consecutive patients were included, of which 101 (66%) patients underwent restaging imaging. Disease progression was detected in 7 patients, either by computed tomography or positive emission tomography with computed tomography, leading to a change in management in 6 (5.9%). There was no difference in FFR (p=0.141) and OS (p=0.977) between cohorts. Elevated carcinoembryonic antigen at presentation, non-definitive radiation dose delivered, and 3D-conformal radiation led to increased risk of death or disease recurrence. The average incremental cost effectiveness ratio per patient of performing restaging was $31,966 per change in management plan and $75,809 per year of life. Imaging restaging following neoadjuvant CRT in patients with locally advanced rectal cancer is costly and leads to few changes in treatment and no improvement in FFR and OS. Selective reimaging in patients at higher risk of disease progression should be considered.

P.14

COMPARISON STUDY OF RADIOEMBOLIZAION THERAPY VERSUS PROTON BEAM THERAPY FOR HEPATOCELLULAR CARCINOMA. Hee Bae*, Osman Siddiqui, Svetlana Kudryasheva, Robert Miller, Adeel Kaiser, and Jason Molitoris, Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

Hepatocellular carcinoma (HCC) is the sixth the most common cancer internationally and is the third most common cause of cancer-related deaths. While HCC often presents at advanced stages, early-stage disease can be cured with transplantation. Local treatments for HCC have evolved rapidly due to the need to control disease while waiting for a transplant or in case of ineligibility for a transplant. Options for local therapy include stereotactic body radiation therapy (SBRT), transarterial chemoembolization (TACE), transarterial radioembolization (TARE), and proton beam therapy (PBT). Both TARE and PBT are relatively new therapies with encouraging results. However, there is a lack of evidence for optimal clinical situations for these treatments and no comparative effectiveness reports. The aim of this study is to perform a retrospective cohort study to compare outcomes and toxicity in transplant-eligible HCC patients treated with either TARE and PBT. The study hypothesizes that PBT will provide improved local control (LC) with improved toxicity and outcome to TARE in transplant-eligible HCC patients. All patients treated with TARE at the UMMC between 6/2016 and 6/2019 were retrospectively selected as cohort for the study (n=146). The inclusion criteria for TARE and PBT group are 1) diagnosis of HCC, 2) meeting the Milan criteria for transplant eligibility or having a single HCC lesion, and 3) receiving either TARE or PBT, respectively. Exclusion criterium is prior PBT or TARE for HCC, respectively. Of the total 146 TARE patients, 53 (36%) patients met the eligibility criteria while 93 (64%) patients were ineligible (21 not diagnosed with HCC, and 72 outside the Milan criteria). For each eligible TARE patient, baseline tumor characteristics and outcome data including toxicities, follow-up imaging, failures, additional treatment, occurrence of transplant, and survival were collected. We will retrospectively select eligible PBT patients treated at UMMC between 01/2016 and 06/2019 and collect the same parameters. We will then compare baseline tumor characteristics of TARE and PBT via chi-squared analysis for imbalances, then outcomes via Kaplan-Meier method.

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P.15

REPURPOSING AND CHARACTERIZATION OF HDAC AND PROTEASOMAL INHIBITORS TO CIRCUMVENT EGFR TKI RESISTANCE IN HUMAN LUNG ADENOCARCINOMA. Lavanya Garnepudi*, Tapan Maity, and Udayan Guha, [1]Thoracic and GI Malignancies Branch, Department of National Cancer Institute, National Institutes of Health, Bethesda, MD.

Lung adenocarcinoma, a subset of Non- Small Cell Lung Cancer (NSCLC) comprises of 80-85% of all lung cancers. Epidermal growth factor receptor (EGFR) kinase domain mutations occur in almost 10-30% of lung adenocarcinoma. To impede the effects of this driver oncogene, osimertinib, a 3rd generation EGFR tyrosine kinase inhibitor (TKI) is used to treat patients, though resistance over time is inevitable. Subsequently, there is a need for novel therapies. While developing a new drug takes an enormous amount of time, money, and effort, researchers are now looking to discover novel uses for already approved drugs. Through a high throughput screen of FDA approved drugs, romidepsin, an HDAC inhibitor approved for treatment of cutaneous T- cell lymphoma (CTCL), and carfilzomib, a proteasomal inhibitor approved for treatment of recurrent multiple myeloma, showed promising results against osimertinib resistant human lung adenocarcinoma cells generated in the laboratory. In this study, cell survival assays were conducted using 3 patient- derived isogenic osimertinib resistant lung adenocarcinoma cell lines to understand the efficacy of romidepsin and carfilzomib in overcoming TKI resistance. Western blot analysis was also performed of cell extracts treated with romidepsin and carfilzomib to detect and quantify proteins involved in cell survival and apoptosis. Results indicated that osimertinib resistant cells lines exhibited nanomolar sensitivity to romidepsin and carfilzomib in vitro (EC_{50}) as single agents, and in combination with 2 μM of osimertinib. Future studies include flow cytometry analysis to characterize the biochemical mechanisms by which romidepsin and carfilzomib induce cell death.

P.17

DEATH AGONIST ANTIBODY AGAINST TRAILR2/TNFRSF10B/DR5 ENHANCES BIRINAPANT ANTI-TUMOR ACTIVITY IN HPV-POSITIVE HEAD AND NECK SQUAMOUS CELL CARCINOMAS. Yi An*, Zhong Chen, and Carter Van Waes, National Institutes of Health, Bethesda, MD.

Head and neck squamous cell carcinomas (HNSCC) induced by human papilloma virus (HPV) have increased recently in the US. Analysis of HNSCC TCGA datasets provide evidence for distinct alterations in expression of NF-□B components and death pathways in HPV(+) HNSCC. Previously, we have found that Birinapant, a novel SMAC mimetic that inhibits inhibitor of apoptosis proteins (IAPs), exhibits single agent activity and sensitizes a subset of HPV(-) HNSCC cell lines to death agonists like TNF-α and TRAIL. Birinapant exhibited anti-tumor effects in vivo for HNSCC with FADD amplification. However, Birinapant alone exhibited minimal activity against HPV(+) tumor in vivo. To explore how to enhance the sensitivity of HPV(+) cells to Birinapant, we treated a panel of cell lines with Birinapant alone, and in combination with TRAIL or TNF-α in vitro. Birinapant sensitized HPV(+) cell lines UPCI-SCC-90 and UM-SCC-47 to TRAIL or TNF-α. The IC50 for Birinapant was under 50nM when combined with TRAIL or TNF-α for UPCI-SCC-90 and UM-SCC-47 cell lines. To explore the therapeutic potential of enhancing TRAILR mediated death signaling in HPV(+) HNSCC cells, we investigated the effects of an agonistic polyclonal TRAILR2 antibody. Anti-TRAILR2, TRAIL, or TNF-□ alone showed little or no inhibitory effect on proliferation of UPCI-SCC-90 and UM-SCC-47 cells in vitro. However, a combination of Birinapant and TRAILR2 antibody, and triple combination of Birinapant, TRAIL, and TRAILR2 antibody showed additive or synergistic effects to inhibit cell density in a dose dependent manner. Combination of Birinapant with TRAIL, TRAILR2 antibody, or triple combination led to cell death

and subG0 DNA fragmentation, as demonstrated by propidium iodide staining and flow cytometry. To further analyze the mechanism of cell death, we treated cells with the inhibitor of pan-caspase (ZVAD), caspase-8 (ZIETD), or RIPK1 (necrostatin) inhibitors. In both UPCI-SCC 90 and UM-SCC 47 cells, caspase inhibition (ZVAD and ZIETD) completely abolished the effects of Birinapant treatment in combination with TRAIL, TRAILR2 antibody, and triple combination, whereas RIPK1 inhibition (necrostatin) did not reverse the effects significantly. Our data suggest that Birinapant and TRAIL receptor mediated cell death is predominantly caspase 8 dependent. Taken together, our study indicates that TRAIL or TRAILR2 agonist antibody enhances Birinipant anti-tumor activity, and triple combination exhibits the strongest synergistic effects. The triple combination of targeting death pathway by TRAIL and TRAILR2 antibody with Birinapant could be a potent strategy to treat aggressive subset of HPV(+) HNSCC, and warrants the testing in future clinical trials.

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P.19

ECHOCARDIOGRAM FINDINGS IN MORBIDLY OBESE PREGNANT WOMEN AND THE ASSOCIATION WITH OBSTETRIC OUTCOMES. Andrea Lin*, Miranda Gibbons[1], Allison Enterline[1], Bhavani Kodali[2], Peter Rock[1], and Megan Anders[1], [2]Division of Obstetric Anesthisiology, [1]Department of Anesthesiology, University of Maryland School of Medicine, Baltimore, MD.

Maternal obesity is increasing exponentially over the years. Because maternal obesity is associated with labor and delivery complications including cardiovascular and respiratory failure, morbidly obese pregnant women at University of Maryland Medical Center (UMMC) routinely undergo echocardiograms to establish cardiovascular function during pregnancy. Echocardiography provides insight into cardiac abnormalities such as ventricular hypertrophy, heart valve regurgitation, and functional status of ventricles. Information obtained from this test may be used to optimize cardiovascular function to decrease cardiovascular and respiratory complications during labor and delivery. The diagnostic yield of this screening program is unknown, and the association between abnormal echocardiograms, treatment decisions, and complications is not well established. We hypothesize that morbidly obese pregnant women with abnormal echocardiograms may have more complications compared to morbidly obese pregnant women with normal echocardiograms. To test the hypothesis, we performed a retrospective chart review on 216 patients who delivered at UMMC between 11/01/2015 to 03/31/2019. Out of the 216 patients, 73 had abnormal echocardiograms, 46 had normal echocardiograms, and 97 did not receive an echocardiogram. Bivariate analysis using chi-squared test and Fisher's exact test was performed on the 119 patients who received an echocardiogram. There was no statistically significant difference between patients who had abnormal echocardiogram findings and those who had normal echocardiogram findings in terms of type of anesthesia received (general vs. regional, $p=0.283$), delivery method (Cesarean vs. vaginal, $p=0.807$), and occurrence of ICU admission (no ICU vs. ICU, $p=0.158$). Further analysis of the data may be able to reveal subtle differences between patients with abnormal echocardiograms from patients with normal echocardiograms in terms of blood loss during delivery, duration of labor, postpartum infection, and neonatal outcome.

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P.20

A NOVEL METHOD OF CALCULATING STROKE VOLUME USING POINT-OF-CARE ECHOCARDIOGRAPHY. Ehson Aligholizadeh*, Rajan Patel, Syeda Fatima, Daniel Haase, Peter Olivieri, and Sarah Murthi, Division of Trauma, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Point-of-care transthoracic echocardiography (POC TTE) is an essential part of shock management. Cardiac stroke volume (SV) and output (CO) can be accurately measured with TTE using the left ventricular outflow tract diameter (LVOTD) and the left ventricular velocity time integral (VTI). The focused rapid echocardiographic evaluation (FREE) is a POC TTE which assesses SV and CO. The LVOTD is difficult to obtain, requires technical skill, and is a primary source of error. In patients in whom it cannot be measured, the body surface area (BSA), or modifications of the BSA, are used as a surrogate measure. To date there are no models of LVOTD that consider other patient characteristics nor has the accuracy of different BSA based methods calculating the SV been determined. FREEs performed in intensive care unit (ICU) patients were reviewed. TTEs with ideal images of the LVOT were identified. The age, sex, height, and weight were recorded. The LVOTD was measured by a human expert. For the generation of the computer model estimator of the LVOTD (CM LVOTD), the data was split into training and testing sets. A support vector regression estimator was used to predict the LVOTD based on the demographic data. For all assessments, SV = π (LVOTD/2)2 * VTI was used. The reference SV was calculated with human expert measurement (SV HE) of the LVOTD. For SV1, the BSA in cm was used. For SV 2, if the patient's BSA was < 1.8 m2, 1.8 cm was used, if it was 1.8-2.2 the BSA was used, and if it was greater than >2.2, 2.2 cm was used; this is the method used in the FREE. In SV3, CM LVOTD was used. SV1, SV2 and SV3 were compared to the SV HE. Pearson coefficient was used to determine correlation, and Bland-Altman was used to assess agreement between estimated and measured LVOTD. 1120 TTEs performed over a three-year period were reviewed. 288 with ideal images of the LVOT were identified. SV1 and SV2 were calculated. The model of the LVOTD was created and the estimator was used to determine SV3. CM LVOTD was the best method of SV measurement with a correlation of 0.84. The modified BSA had a correlation of 0.73, and BSA had a correlation of 0.51. Root mean square error for CM LVOTD, modified BSA, and BSA respectively were: 15.0, 27.6, and 38.1. Bland-Altman for CM LVOTD demonstrated a bias of 5.6. LVOTD is difficult to measure in critically ill patients. The BSA is not an accurate surrogate of the LVOTD and produces significant error in the calculation of SV. Computer modeling of the LVOTD based on patient characteristics shows better correlation and agreement in measurement of SV when compared to alternative methods. Further research is needed to validate this and other tools to enhance the quantitative capabilities of POC-TTE. Replacement of human measurement of the LVOTD will make POC TTE assessment of SV and CO easier, more accurate and more reproducible.

P.21

PREVALENCE OF SECONDARY CAUSES AMONG THOSE DIAGNOSED WITH POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS). Michael Gould* and Geoffrey Rosenthal, Division of Pediatric Cardiology, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Postural Orthostatic Tachycardia Syndrome (POTS) is a commonly assigned diagnosis in pediatrics used to describe numerous symptom constellations. Current diagnostic criteria often do not distinguish POTS from orthostatic intolerance or other symptoms due to identifiable causes. The purpose of this study was to determine if a diagnosis of POTS (or the most common symptoms: dizziness, palpitations, presyncope, weakness, dyspnea, chest pain, and nausea) was

predictive of a primary condition. To that end, we reviewed the record of 178 "POTS" patients to determine if a potential external cause of their reported symptoms was present in current medications or past medical history. We recorded each patient's demographics, presenting symptoms, diagnostic criteria, medication list, and concurrent medical conditions at the time of their diagnosis. Patients with an identifiable external cause of their specific presenting symptoms were classified as "Secondary," and those without were classified as "Primary." We defined "external cause" as conditions and medications that have been shown to cause a patient's specific presenting symptoms. An external cause was found in 137 (77%) of the 178 patients. If we expanded our definition of "external cause" to include medications that could cause any POTS symptoms, we found an external cause in 169 (95%) patients. The presence of palpitations should prompt closer investigation, as palpitations were more likely to be associated with a primary condition (odds ratio=3.32, p=0.02). Nausea (OR=0.093, p=0.005) and dizziness (OR=0.300, p=0.001), however, almost never occurred without an identifiable explanation. None of the other common symptoms of POTS in the literature are able to discriminate a primary condition. Successful treatment of these symptoms should include consideration of underlying conditions and side effects of concurrent medications. Such consideration is often lacking, leading to misdiagnosis, unnecessary referral, and delay in effective treatment.

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THE EFFECTS OF PROCESS CHANGES IN MANAGEMENT FOR INFANTS WITH HYPOXIC ISCHEMIC ENCEPHALOPATHY. Hannah Smith* and Colleen Driscoll, Division of Neonatology, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Therapeutic hypothermia (TH) is a time sensitive, efficacious treatment for newborns who experience perinatal hypoxic ischemic encephalopathy. Evidence supports early treatment for improving outcomes; however, overcooling presents an increased risk for complications of therapy. Stringent initiation and management of patient temperatures during TH has the potential to optimize newborn outcomes while reducing side effects. This quality improvement project aimed to determine whether system-based changes in the delivery of TH decreased the time to initiation of effective treatment and improved temperature stability during TH. The time to achieve target temperature, the percent of core temperatures outside of the target range, and the difference between core and peripheral temperatures were compared over a 41-month period. During the study period, system-based changes in TH delivery included a change from passive to active hypothermia on transport and utilizing the Smartmode/Gradient Variable setting on the cooling device. Measures of health status and presence of side effects were compared over time as balancing measures. The TH protocol changes resulted in a significant reduction of time to goal temperature from 1.67 to 0.48 hours, in the percent of temperature readings outside for goal range from 12.6% to 6.3%, and in the average difference between core and peripheral temperatures from 1.77 to 1.46 degrees Celsius. There were no unintended health outcomes as a result of the protocol changes, but vasopressor use significantly decreased with each protocol change. The initiation of active cooling with a servo-controlled device on transport, and the change to a mode that uses more gradual temperature fluctuations during treatment for infants with hypoxic ischemic encephalopathy resulted in earlier effective treatment and improved temperature control. There were no adverse effects demonstrated, and the need for vasopressors may have been reduced with these system-based changes.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

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FLAWS IN AV VALVE FORMATION ASSOCIATE WITH SMALL PLACENTAS IN CHROMOSOMALLY NORMAL FETUSES. Mary Mangione*, Halis Ozdemir, Ozhan Turan, and Shifa Turan, Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Abnormalities in placental development have been associated with cases of congenital heart defect (CHD). Common genetic and molecular pathways have been identified, as these organs develop concurrently. Upregulation of vascular endothelial growth factor (VEGF) has been associated with abnormal placental findings and incidences of cardiac malformation, particularly in heart valves. We hypothesize that measures of placenta development will differ in CHD groups compared to controls; furthermore, we expect these measures to differ in AVSD patients compared to other CHDs. In this single cohort study, control patients (n=447) consisted of singleton fetuses of normal pregnancies whose birth weight was between 10th –90th percentile. CHD patients were classified according to embryological development: 1) left-sided abnormalities (n=44), 2) right-sided abnormalities (n=52), 3) atrioventricular septal defect (AVSD, n=13), 4) double-outlet right ventricle (DORV, n=13), and 5) transposition of great arteries (TGA, n=16). Subjects were excluded if there was a chromosomal or syndromic diagnosis. Placental weight multiple of median values (PW-MoM), birth weight z-scores (BW), placenta weight-to-birth weight ratios (PW/BW), pulsatility index z-scores for umbilical artery (UA-PI), middle cerebral artery (MCA-PI), and uterine artery (UtA-PI) doppler indices, and cerebroplacental ratio (CPR) z scores were compared between controls and CHD groups using a Mann-Whitney test. Maternal preeclamptic status was compared between controls and CHD groups using chi-squared analysis. PW-MoMs of groups 1 and 3 and BWs of groups 2 and 3 were significantly smaller than controls ($p < 0.05$). PW-MoMs of group 3 were significantly smaller than group 5; BWs of group 3 were significantly smaller than group 1, 4, and 5. No significant difference was found in PW/BW ratio, UA-PI, or UtA-PI. While not statistically significant, mothers of AVSD patients were almost four times more likely (18.2% vs 4.8%) to develop preeclampsia than mothers of control patients. These results indicate the association between placental development and heart valve formation.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.24

EVALUATING PARENT ENGAGEMENT IN A WEB-BASED COMPONENT OF A PRESCHOOL OBESITY PREVENTION PROGRAM. Marie Ezran*, Maureen Black[1], Angela Trude[1], and Allison Hepworth[2], [1]Division of Growth and Nutrition, Department of Pediatrics, University of Maryland School of Medicine and [2]University of Maryland School of Social Work, Baltimore, MD.

Parents play an important role in children's obesity risk in part through parent role modeling of health behaviors (e.g., eating and physical activity). Thus, it is important to understand how to engage parents in evidence-based programs that aim to reduce childhood obesity risk by promoting healthful role modeling. This study assessed parent engagement in a web-based component of a 3-arm child care-based obesity prevention program called CHAMP (Creating Healthy Habits Among Maryland Preschoolers). Parents, whose preschool-age children received nutrition and physical activity curricula in child care centers, received access to an interactive website (CHAMP+ arm) containing parenting infographics, healthy recipes, informational videos, and family activity challenges (i.e., CHAMP challenges). The focus of this study was to evaluate parent engagement in CHAMP+, which we defined as the: 1) total number of views of the child care center webpage, 2) average time spent on the child care center webpage, and 3) number of CHAMP challenges

completed. Pearson correlations, bivariate linear regression, and Poisson regression models assessed associations between demographic characteristics and parent engagement both at the individual-level and child care center-level. Multilevel models assessed associations between parent engagement and change in parent role modeling of healthy behaviors before and after the intervention. The total number of webpage views was associated with centers that had a higher proportion of parents who were White, had a higher income, and had an education beyond a college degree. Centers with a higher proportion of parents who were African American or Black, had a higher body mass index, and participated in federal assistance programs had lower scores for viewing the child care center webpage. There were no significant associations between parent engagement in CHAMP+ and changes in parent role modeling of healthy behaviors. Given our findings, stronger efforts should be directed towards effectively engaging parents from minority and low-income backgrounds in childhood obesity prevention interventions.

This research was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) to MMB.

P.25

THE BENEFITS OF EARLY ENROLLMENT IN HEALTHYSTEPS. Rebecca Weinstein*, Sarah Edwards, and Rebecca Vivrette, Division of Child and Adolescent Psychiatry, Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD.

HealthySteps was established in 1995 with the goal of uniting health care professionals, community members, and family members to help guide at risk mothers during the prenatal and postnatal periods from child's birth through age three. The program pairs mothers with a HealthySteps Counselor who serves as an integral member of her and her child's care team, providing resources ranging from assistance with adapting to motherhood to support during the visit with the primary care physician. Despite successful results with the HealthySteps Program, which serves over 30,000 children a year in 15 states, new mothers still face barriers. In this study, we analyzed patient records that were collected by family physicians at the University of Maryland Medical Center on mothers and their babies enrolled in HealthySteps from pregnancy through age three. Data was collected on 73 mothers, 71 whom were Black or African American, one who was Caucasian, and one who was American Indian or Alaskan Native. These women were enrolled in HealthySteps at trimesters one (N = 7), two (N = 31), and three (N = 20) as well as postnatally (N = 15). The objective of this study was to better understand how HealthySteps impacts postpartum depression (PPD) as measured by the Edinburgh Postnatal Depression Scale (EPDS), ER visits due to non-accidental trauma (NAT), and adherence to well-child (WC) appointments. Retrospective chart data was analyzed using SPSS. A listwise deletion was used to ensure that each analysis was based on cases with no missing data. Crosstabulations, Chi-square analysis, and ANOVA were used for significance testing. The study found that early enrollment in HealthySteps decreased EPDS scores with an associated p-value of .009. Time of enrollment, however, was not significantly associated with a decrease in ER visits due to NAT or adherence to WC appointments. It is evident from the literature that a mother's health and her child's health are closely intertwined, and postpartum depression plays an important role. HealthySteps successfully addresses and helps to decrease postpartum depression. Given the results from this study, it will be important to identify and enroll at risk women in HealthySteps early in pregnancy to optimize outcomes.

P.26

IMPACT OF PERCEIVED PATIENT-PROVIDER INFORMATION SHARING ON CONTRACEPTIVE USE AMONG BALTIMORE LATINAS. Gaia Cicerchia* and Diana Carvajal, Division of Director of Reproductive Health Education, Department of Family and Community Medicine, University of Maryland School of Medicine, Baltimore, MD.

Access to and counseling about contraception is not equitable in the United States. Latinas have lower rates of contraceptive use and report more negative counseling experiences compared with non-Latina White women. Patient-centered approaches to contraceptive counseling such as shared decision-making (SDM) have led to higher rates of counseling satisfaction and contraceptive use. Providers who engage in contraceptive counseling may not be communicating effectively to best support decision-making. To assess the relationship among how Latinas perceive communication with their providers (specifically perceptions of information-sharing about side effects), contraceptive use and use consistency. Self-identified Latinas ages 15-29 at two federally qualified health centers in Baltimore completed a content-validated cross-sectional survey measuring important factors associated with contraceptive decision-making and use. Associations were assessed using Chisquare (χ^2) or 2-sided Fisher's exact tests. Interaction between categorical variables was explored using Breslow-Day tests for homogeneity of odds ratios. 103 women participated; 65 were current contraceptive users. Current users who expected their providers to share all information about side effects were more likely to report that this knowledge is important for their use of contraception and vice versa. Expectations were also a mediator of the relationship between perceived importance of knowledge regarding side effects and consistency of use. Conclusions: Our study indicates that patient-provider communication, specifically regarding side effects, may be an integral component of patient autonomy in the contraceptive decision-making process of Latinas and that it can impact consistency of use. Providers engaging in contraceptive counseling with Latina patients should aim to use patient-centered approaches to reduce feelings of incompleteness or coercion and increase patient satisfaction.

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P.26A

NEUROACTIVE STEROIDS AND PERINATAL MOOD AND ANXIETY DISORDERS: ARE WOMEN WITH PCOS AT INCREASED RISK? Elizabeth Olson*, Courtney Erdly, Jennifer Payne, Lauren Osborne, and Lindsay Standeven, Division of Women's Mood Disorders Research Center, Department of Psychiatry, Johns Hopkins University School of Medicine, Baltimore, MD.

Polycystic ovary syndrome (PCOS) is a common fertility disorder affecting 15-20% of reproductive aged women, with an estimated annual national healthcare cost of $1.16 billion. Defined by a combination of signs and symptoms of androgen excess and ovarian dysfunction in the absence of other specific diagnoses, PCOS wields many names and multiple diagnostic classifications. Many complications experienced by women with PCOS are known risks factors for perinatal mood and anxiety disorders (PMADs), which are leading contributors to peripartum morbidity and mortality. Histories of depression, anxiety, infertility and miscarriage have all been independently associated with increased risk for PMADs. Here, we conducted a literature review to assess what is known about PCOS, PMADs, and neuroactive steroids. A search of two databases was executed (PubMed, PsycINFO). Search strategy included terms for PCOS, mood disorders, pregnancy and postpartum periods, and neuroactive steroids, and was limited by language of the study, journal of publication, human studies, and availability of full text. We did not limit by age of subjects or date of publication. Two coders independently extracted data from all studies using

consultation services from a university librarian. 392 titles were screened yielding 105 studies included in our qualitative synthesis. Additional papers were included for review on an ad hoc basis resulting in 20 additional papers. Findings from this review indicate that an underlying biological vulnerability for PMADs is likely present among women with PCOS, given the substantial overlap between neuroactive steroid profiles reported in women with PCOS and in women with elevated risk for PMADs. Despite the significant public health burden and serious consequences for this population, there has only been one study to date characterizing the perinatal psychiatric outcomes of women with a history of PCOS; thus, more studies are needed to advance our scientific understanding of PMAD risk in PCOS women. Results from a pilot analysis in a cohort of 8 PCOS women enrolled in the Johns Hopkins Women's Mood Disorders Prospective Study will be presented.

P.28

OVERDIAGNOSIS AND OVERTREATMENT OF URINARY TRACT INFECTION (UTI) IN NON-CATHETERIZED PATIENTS IN COMPARISON TO THOSE WITH AN INDWELLING CATHETER. Waqar Khan* and Surbhi Leekha, Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

Urinary tract infection (UTI) is the most frequent healthcare-associated infection in the United States[1]. Diagnosing UTIs is often difficult because they are largely done on a clinical basis. Challenges to diagnosis include non-specific symptoms, high incidence of asymptomatic bacteriuria (ASB), no definitive criteria for UTI diagnosis, high rates of contamination during urine collection and a lack of consensus of when to order urine cultures in asymptomatic individuals[2]. Over diagnosis and treatment of UTIs with antibiotics has significant consequences to patients including increases in drug-resistant bacteria, decreases in effectiveness of the antibiotic itself, longer durations of unnecessary antimicrobial therapy, and increased adverse drug events for patients[3]. A cross-sectional study was conducted on randomly selected hospitalized patients of all units in the University of Maryland Medical Center who were found to have a positive urine culture between 2016-2018. This study aims to evaluate the degree of overdiagnosis and over treatment of UTI in patients without an indwelling catheter when compared to patients with indwelling catheters. Criteria for diagnosis of UTI in patients without an indwelling catheter include at least one of the following symptoms: onset of fever, suspected sepsis with no other source, shaking chills, flank pain/tenderness, suprapubic pain or tenderness, dysuria, urinary frequency, urgency, new onset urinary incontinence with no known cause and/or new onset hematuria with no known cause. False positive UTI or overdiagnosis are defined as patients that had a positive urine culture but did not experience any of the previous symptoms mentioned. Tentative data collected this far has shown that of the 162 patients studied, 104 patients were catheterized while 58 were non-catheterized. Of these, 22.4% of non-catheter patients were over diagnosed and over treated for UTI while 27.9% of catheterized patients were over diagnosed and over treated for UTI.

P.29

TRISEGMENTAL TRIGEMINAL HERPES ZOSTER. Aloise Diedrich*, Hena Cheema[1], Briana Kyne[2], and Mona Toeque[3], [1]Department of Surgery, Hospital of the University of Pennsylvania, Philadelphia, PA, and [3]Division of Infectious Disease, Department of Medicine, [2]University of Maryland School of Medicine, Baltimore, MD.

Varicella zoster virus is the causative agent of chickenpox (varicella) and shingles (herpes zoster). Cases of disseminated disease have been widely reported in immunocompromised patients. The interesting case described here involves herpes zoster trisegmental involvement of trigeminal nerve (CN V) with a focus on the prominent clinical features and the importance of timely recognition,

diagnosis, and treatment. This patient presented six days prior hospitalization with a mild vesicular facial rash but was subsequently lost to follow up without filling a prescription for acyclovir, resulting in the patient returning to the hospital with severe facial involvement.

P.30

CHALLENGES IN IMPLEMENTING THE FIRST ANTIMICROBIAL RESISTANCE SURVEILLANCE PROGRAM IN DAR ES SALAAM, TANZANIA. Roger Lin*, Joan Rugemalila[1], Saniya Chaudhry[2], and Joy Musaerenge[2], Brenna Roth[3], [1]Division of Infectious Disease, Department of Medicine, Muhimbili National Hospital, Dar Es Salaam, Tanzania School of Medicine, Dar Es Salaam, Tanzania and [2]Department of Pharmacology, University of Maryland School of Pharmacy and [3]Division of Infectious Diseases, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

The World Health Organization recognizes antimicrobial resistance (AMR) is a serious threat to global public health and provides guidelines on how to mitigate the progression of this problem worldwide. We collected and analyzed microbiological data from Muhimbili National Hospital (MNH) microbiology lab to determine the bacterial causes of infections and degree of antimicrobial resistance of these bacteria with the intention to lay the foundation for future AMR surveillance. MNH is a 1500 bed national referral and university teaching hospital in Dar Es Salaam, Tanzania that sees tens of thousands of patients annually and is, thus, a critical location for starting an AMR surveillance program. AMR surveillance depends on the consistent and timely availability of high quality data for review and analysis. We describe here the challenges encountered and lessons learned in our data collection and analysis process that will be informative for future AMR surveillance efforts at MNH. We conducted a retrospective data collection of all blood, urine, sputum, and cerebrospinal fluid specimens sent to the MNH microbiology laboratory from July 2018 through June 2019. We accessed both electronic and paper records to collect AMR-specific data and patient demographics. During data collection, we identified the following challenges with data quality and access: 1) Lack of consistency between the three different data sources, one electronic and two paper-based, each one with variability in the information on each isolate, 2) Incomplete data, and 3) Non-standardized data entry. The obstacles we faced in data quality and access resulted in a limited amount of reliable data which would impede development of a reliable and regularly updated antibiogram at MNH. The need to cross-reference between different data sources presented a practical challenge for setting up an efficient system for regular and timely surveillance in the future. We believe that there is excellent potential at MNH for setting up an AMR surveillance program if systematic quality improvement of data quality and availability is implemented.

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PATIENT TO HEALTHCARE WORKER TRANSMISSION OF MRSA IN THE NON-INTENSIVE CARE UNIT SETTING. Karly Lebherz*, Anthony Harris, Gita Nadimpalli, Lyndsay O'Hara, Lisa Pineles, and J Kristie Johnson, Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

The National Healthcare Safety Network at the Centers for Disease Control and Prevention reports that methicillin-resistant Staphylococcus aureus (MRSA) contributes to 12% of healthcare-associated infections. Healthcare personnel (HCP) are vectors for the transmission of antimicrobial resistant pathogens, such as MRSA, from patient to patient. A large multicenter cohort study estimated that HCP gloves or gowns were contaminated with MRSA 16% of the time while caring

for patients in the Intensive Care Unit (ICU). While contact precautions (CP) continue to be a mainstay of infection prevention utilized by hospitals, controversy still exists regarding evidence-based justification for CP, especially in the non-ICU setting. The goal of this research is to better inform the use of CP in the non-ICU setting. We conducted a prospective cohort study to determine the rate of contamination of HCP gloves or gowns with MRSA, a surrogate for potential transmission to other patients in the non-ICU. Patients were randomly selected from a daily list of inpatients on CP per the University of Maryland Medical Center (UMMC) infection control policy. This list identifies patients as MRSA-positive by active surveillance cultures on admission, current clinical culture, or history of positive MRSA culture. We swabbed patients' anterior nares, perianal area, chest and arm to quantify MRSA burden. We observed the interactions of HCP donned in personal protective equipment (gloves and gowns) during contact with selected MRSA-colonized patients and/or their environment. Finally, we cultured HCP gloves and gowns for MRSA. We observed 517 HCP-patient interactions among 55 patients placed on CP for MRSA. 28 of the 517 (5.4%) interactions led to contamination of either HCP glove or gown. 16 of 517 (3.1%) led to contamination of HCP glove, 18 of 517 (3.5%) led to contamination of HCP gown. Transmission rate was highest among HCP who had direct patient contact, and patients with any detectable MRSA on their body transmitted MRSA at a higher rate. If these findings can be replicated, we may better understand factors that influence transmission in the non-ICU setting to inform when CP should be employed and when they may safely be forgone.

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INFLAMMATORY SIGNALS AND THEIR EFFECTS ON THE DEVELOPMENT OF DENDRITIC CELL SUBSETS. Huanwen Chen* and Chozha Rathinam, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Dendritic cells (DCs) are a rare population of heterogeneous immune cells that play critical roles in coordinating the innate and adaptive immune systems through antigen presentation and cytokine signaling. Many novel therapies targeting aggressive and difficult-to-treat human diseases have sought to take advantage of DC biology and function, however, these new technologies have not yet matured, and await further optimization. One obstacle of developing DC-based therapies is an incomplete understanding of how DC development and function are regulated, especially in pathological settings such as inflammation. In this study, we utilized transgenic mice models to investigate whether constitutive activation of canonical NF-kB signals impacts the development and function of DCs. Our findings showed that NF-kB activation at the hematopoietic stem cell stage, and not later stages of DC development, caused subset-specific and end-organ dependent disturbances in DC populations. Furthermore, our results suggest that Fms-like tyrosine kinase 3 (Flt3), a growth factor receptor indispensable for normal DC development, is transcriptionally downregulated in the presence of chronic inflammatory signals. Based on these findings, we hypothesize that constitutive NF-kB signals may impair DC development via suppression of Flt3. Our findings reveal a previously unknown role of chronic inflammatory signals in shaping the immune system, and also suggest a novel mechanism by which Flt3 can be modulated by the NF-kB signaling pathway.

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P.33

EFFECT OF SEVERE INSULIN RESISTANCE AND HYPERINSULINEMIA ON INFLAMMATION AND FIBRINOLYSIS. Nevin Varghese*, Marissa Lightbourne[1], and Rebecca Brown[2], [1]Division of Pediatric and Adult Endocrine, Department of Medicine, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, MD, and [2] Section on Translational Diabetes and Metabolic Syndromes, Diabetes, Endocrinology, and Obesity Branch, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD.

Insulin resistance is associated with cardiovascular disease via dyslipidemia, hypertension, abnormal coagulation, inflammation, and endothelial cell dysfunction. Increased plasminogen activator inhibitor 1 (PAI-1, a marker of impaired fibrinolysis) and increased plasma interleukin-6 (IL-6, a marker of inflammation) have been shown to be associated with insulin resistant states such as obesity, however this has not been thoroughly investigated in two severe insulin resistance states, lipodystrophy (LD) and insulin receptor mutations (INSR). LD, a selective loss of adipose tissue, has insulin resistance downstream of the insulin receptor resulting in severe, selective insulin resistance leading to hyperinsulinemia, hypertriglyceridemia, diabetes mellitus, and increased cardiovascular disease (CVD) risk. INSR defects are at the level of the insulin receptor, in which all downstream effects of insulin are lost, leading to extreme insulin resistance resulting in hyperinsulinemia and diabetes mellitus but no hypertriglyceridemia and an unknown CVD risk. Prior clamp studies and *in vitro* data suggest that IL-6 production is significantly increased during acute hyperinsulinemia, and that in the presence of selective insulin resistance, the Ras/MAPK pathway is upregulated, increasing PAI-1 expression. Preliminary data from a 3-hour hyperinsulinemic-euglycemic clamp comparing baseline to steady state plasma IL-6 and PAI-1 levels in LD, obese patients, and healthy controls showed no change in plasma IL-6 and a decrease in PAI-1 concentration. However, insulin resistance, as measured by glucose infusion rate (GIR), was associated with higher baseline PAI-1, and a larger decrease in PAI-1 during acute hyperinsulinemia. The limited data demonstrate that acute hyperinsulinemia does not affect acute inflammation (IL-6) and is negatively correlated with impaired fibrinolysis (PAI-1), albeit insulin resistance is associated with higher baseline level of impaired fibrinolysis. Future studies on LD and INSR patients will increase understanding of acute effects of insulin in insulin resistant states, which can be used as future therapeutic targets to treat insulin-mediated CVD.

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ANTERIOR SEGMENT STRUCTURAL CHANGES FOLLOWING PEDIATRIC CATARACT SURGERY. Libby Wei*, Sachin Kalarn[1], Camilo Martinez[2], Moran Roni Levin[1], Osamah Saeedi[1], and Janet Alexander[1], [1]Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD, and [2]Department of Ophthalmology and Visual Sciences, Children's National Hospital, Washington, DC.

Glaucoma following congenital cataract surgery (GFCCS) is a severe and recognized complication following pediatric cataract surgery (lensectomy), yet its etiology is not well-understood. Risk factors include early age at time of lensectomy; however, early surgical intervention is imperative to prevent irreversible amblyopia. This prospective, longitudinal cohort study aims to use ultrasound biomicroscopy (UBM), a high-frequency ultrasound technique, to analyze anterior segment differences between pre-and post-lensectomy eyes in children under 5 years of age. 23 eyes in 18 patients were enrolled in this study. UBM images were collected bilaterally in children before and after cataract surgery ages 5 weeks to 5 years old. 27 parameters involving the anterior chamber were measured using ImageJ between cataract (N=18) and post-lensectomy eyes, which included aphakic (N=10) and pseudophakic (N=10) eyes. Statistical analysis was conducted controlling for

age using the Mann-Whitney U test comparing cataract versus post-lensectomy groups. Analysis revealed significant corneal, iris, and angle differences with $p<0.05$. Compared to cataract eyes, post-lensectomy eyes demonstrated thicker central corneas and flatter and more posteriorly positioned irises, with an increased fraction of iris area below the mid-iris plane. Post-lensectomy eyes also had wider trabecular iris angles and narrowed ciliary body to sulcus angles compared to cataract eyes. Findings were consistent across all age groups and the statistical significance and magnitude of differences was greatest in the youngest age group. Structural differences occur in the anterior segment in children after cataract surgery and may relate to clinically significant outcomes such as refractive error or GFCCS. Further studies are needed to determine the clinical significance of the observed structural changes identified in this study.

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REPEATABILITY AND REPRODUCIBILITY OF MANUAL ANTERIOR SEGMENT-OPTICAL COHERENCE TOMOGRAPHY IMAGE GRADING IN KERATOCONUS. Anna Lin*, Isa Mohammed, Wuqaas Munir, Janet Alexander, and Saleha Munir, Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Keratoconus (KC) is a progressive, frequently asymmetric, bilateral eye disease that is characterized by corneal stromal ectasia resulting in a conical-shaped cornea. The corneal thinning in keratoconus is possibly associated with an increase in the anterior and posterior curvatures of the cornea, irregular astigmatism, myopia, and mild to severe visual impairment. While anterior segment optical coherence tomography (AS-OCT) is routinely used for detection of keratoconus, early signs of the disease may be missed in the absence of non-routine topographical measurements. The purpose of this study is to determine the repeatability of ImageJ software for measurements of anterior segment structures in healthy and keratoconus eyes. AS-OCT images of 25 eyes from 14 healthy patients and 25 eyes from 15 keratoconus patients, between the ages of 20 and 80, were attained. Two trained observers used ImageJ to measure the central corneal cross-sectional area and anterior and posterior corneal arc lengths of the eyes. MedCalc statistical software was used to analyze intraclass correlation coefficient (ICC) followed by assessment of Bland-Altman plots (BAP) for each observer. Measurements of central corneal cross-sectional area and anterior and posterior corneal arc lengths had an ICC > 0.7. The ICC comparing the control group measurements of the three parameters ranged between 0.75 – 0.84. The ICC comparing the keratoconus group measurements of the three parameters ranged between 0.96 – 0.98. No systematic proportional bias was detected by the BAPs. This study suggests that ImageJ is a precise tool in analysis of AS-OCT corneal images among patients with keratoconus. These findings are applicable to AS-OCT corneal imaging protocol development, an area of active keratoconus research.

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EVALUATING THE EFFICACY OF TARGETED PATIENT EDUCATION MATERIALS IN THE UNDERSTANDING AND PERCEIVED IMPORTANCE OF RETINOPATHY OF PREMATURITY. Haleigh Bass*, Latasha Easter[1], Jordan Tutnauer[1], Janet Alexander[2], Alfred Vinnett[2], and Moran Levin[2], [2]Department of Ophthalmology and Visual Sciences, [1]University of Maryland School of Medicine, Baltimore, MD.

Retinopathy of prematurity (ROP) is a potentially blinding disease that occurs due to abnormal retinal vessel development in premature infants. Timely eye screenings and rigorous follow-up by an ophthalmologist are critical to reducing the risk of partial or total permanent vision loss. Unfortunately, compliance with follow-up appointments after the infant leaves the NICU continues to be an issue in the United States and around the world. Previous studies have shown that educating parents and caregivers on the importance of ROP follow-up care has led to improved compliance. Fifty percent of the general population cannot read above an 8th grade level. While it is therefore recommended that patient education materials be written at or below a 7th grade reading level, currently available ROP educational information online and in-print is written at an 11th grade reading level, too advanced for caregivers with limited health literacy. The objective of this work is to create effective new patient educational materials designed using validated readability standards to be appropriate for the general population. This study investigates the efficacy of our new patient educational materials in comparison to currently available materials in improving parent understanding and perceived importance of ROP. Surveys are used to assess parent understanding and perceived importance before and after receiving the educational handouts. Preliminary analysis shows that the 71 parents who completed the baseline survey assessing understanding of ROP scored an average of 56.1% correct. The 44 parents that completed the follow-up survey after receiving the currently available educational materials demonstrated a 22.6% average improvement in understanding. Our findings from this study add to the literature that improved education leads to better understanding of the disease. We hypothesize that our new patient educational materials will further improve understanding of ROP as well as the importance of timely follow-up. We anticipate that these new materials will increase patient compliance and ultimately help reduce the incidence of infant blindness due to ROP.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

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PERCEIVED BARRIERS TO DIETARY INTAKE OF MARYLAND ELEMENTARY MIDDLE SCHOOL TEACHERS AND ASSOCIATIONS WITH DIETARY QUALITY. Yixuan Wang*, Amy Zemanick[1], Rachel Deitch[1], Erin Hager[1], and Elizabeth Parker[2], [1]Division of Growth and Nutrition, Department of Pediatrics and [2]Department of Family and Community Medicine, University of Maryland School of Medicine, Baltimore, MD.

Given that children spend a large percentage of the day at school, schools are often targeted to implement policies aimed at promoting healthy habits as a strategy to combat the childhood obesity epidemic. While there are many studies on student health and risk of childhood obesity, there are limited studies focused on factors that can impact the health of teachers. Therefore, this research project surveys teachers employed in schools participating in Wellness Champions for Change (WCC), a randomized controlled trial that seeks to improve the school wellness environment by training teachers in select elementary and middle schools across Maryland to implement their local wellness policies (LWPs). Outcomes will assess teachers' perceptions of barriers to healthy dietary intake and determine how such barriers are associated with their dietary quality using a Likert-style survey and ASA-24 system 24-hour dietary recall. Our hypothesis is that lack knowledge of consuming a healthy diet, lack of access, social support, and negative perceptions of healthy foods, and time constraints are associated with a lower dietary quality. Linear regressions (SPSS v. 26) will be used to analyze the associations between outcomes. Eighty-three teachers completed one dietary recall and survey (included in analysis 88% female; 55% Black; 79.5% overweight/obese; BMI = 30.9 $\pm$ 6.7; aged 39.8 $\pm$ 10.8 yrs). Preliminary data suggests that the mean number of perceived barriers teachers faced was 3.2 $\pm$ 2.7. The most common barrier reported was lack of time to

prepare or eat healthy foods because of the job. The mean HEI score was 53.4 ± 13.6 and the mean total daily intake of fruits and vegetable servings was 2.9 ± 1.8. There was no significant association between perceived barriers and dietary quality in teachers. However, a negative Pearson correlation of -0.017 (p value = 0.339) suggests a possible inverse relationship. The next step would be to increase sample size and conduct multi-level regression with potential co-variates.

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PROMIS FOR CHARACTERIZING HEALTH-RELATED QUALITY OF LIFE IN ADULTS WITH AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE. Boyan Xia* and Stephen Seliger, Division of Nephrology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Autosomal dominant polycystic kidney disease (ADPKD) is the most common inherited cause of kidney failure characterized by the growth development of renal cysts and enlargement of the kidneys. Over 60% of patients with ADPKD have pain from kidney cysts, which may be acute or chronic, advanced kidney disease of any etiology may experience symptoms related to retention of uremic solutes. Therefore, for both disease-specific and non-specific processes, patients with ADPKD are expected to suffer from reduced health-related quality of life (HRQoL), which may represent a clinically relevant outcome for treatments modifying ADPKD progression. Our study utilized a set of patient-reported outcomes (PRO) developed as part of the NIH-sponsored PROMIS program intended to measure HRQoL for patients affected by a wide variety of chronic illnesses. We quantified domain-specific HRQoL with the NIH PROMIS instruments among N=161 adults with ADPKD and compared differences with normative/expected values, and between subgroups of patients with ADPKD. We noted small but nominally statistically significant differences between PKD patients and unaffected population in fatigue, pain, physical function, and depression with PKD patients exhibiting overall lower levels of pain and depression along with higher levels of physical function compared to the general population ($p<0.001$). Increasing disease severity as demonstrated by decrease in total kidney volume and eGFR were not reflected by corresponding decline in measured HRQoL parameters. At the same time, PKD patients who reported experiencing pain (flank, back, abdominal) were shown to have modestly higher anxiety and depression, more fatigue, pain and sleep disturbance with lowered overall physical function compared to those who reported no pain. These preliminary results demonstrate that the NIH-sponsored PROMIS instrument did not meaningfully distinguish HRQoL among PKD patients compared to the general population nor did the PROMIS response robustly distinguish those with more severe polycystic kidney disease. These results suggest that new, disease-specific instruments are needed in PKD to better quantify impairments in HRQoL.

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SONIC HEDGEHOG PATHWAY INHIBITION FOR THE TREATMENT OF AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE. Mark Wieland*, Patricia Outeda Garcia, and Terry Watnick, Division of Nephrology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Autosomal Dominant Polycystic Kidney Disease (ADPKD) is a hereditary disease caused by mutations in PKD1 and PKD2 genes. Polycystin 1 and Polycystin 2 proteins (codified by PKD1 and PKD2 respectively) co-localize together in the primary cilia of renal epithelia cells to promote and regulate the normal development of the renal tubules. The canonical Sonic Hedgehog (Shh) signaling pathway relies on the cilia to regulate biological processes such as cell proliferation, differentiation and cell fate. Previous studies have shown increased Shh signaling in ADPKD (demonstrated by an increase in GLI family proteins, downstream targets of the Shh pathway) and that inhibition of the Shh signaling pathway reduces in vitro cyst growth and proliferation of ADPKD patient derived cells. These studies suggest that the Shh signaling pathway could be a potential therapeutic target to treat PKD. In this study we evaluated 1) activation of the Shh pathway in a new Pkd1 conditional mouse model and 2) the effect of inhibiting the Shh pathway in vivo (in mice) using the Shh inhibitor Vismodegib. For the first aim, we hypothesized to see an elevated expression of GLI family proteins in cystic animals compared to non-cystic animals, but instead saw higher GLI1 expression in non-cystic animals. For the second aim, treatment with Vismodegib in cystic animals has shown improved outcomes (demonstrated by reduced kidney/body weight ratio indicating cystic reduction) compared to controls.

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VOLUMETRIC ANALYSIS OF CONTRAST EXTRAVASATION AND PARENCHYMAL DISRUPTION IN BLUNT HEPATIC TRAUMA TRIAGE TO ANGIOEMBOLIZATION. Tina Chen*, Jonathon Morrison[1], Ashley McLenithan[2], and David Dreizin[3], [1]Division of Trauma surgery, [2]Department of Surgery and [3]Division of Trauma and emergency radiology, Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine, Baltimore, MD.

Liver injury is the second most common solid organ injury in blunt trauma. Of hemodynamically stable patients, multidetector computed tomography (CT) is the imaging modality of choice. Conventional multidetector CT liver injury grading is based on the American Association for the Surgery of Trauma (AAST) framework, which combines hepatic injury depth (diameter), number of segments involved, and several additional subjective features into a single categorical variable. Based on AAST grade, presence of contrast extravasation (CE) and clinical variables, physicians may decide to treat these patients with angioembolization, laparotomy or conservative management. However, binary and categorical imaging variables do not capture the same level of granular information as volumetric techniques, and there is considerable underutilization of available information from the CT. We hypothesize that volumetric measurements of liver parenchyma disruption (LPD) and CE will be of greater predictive value and improved accuracy compared to AAST grade and contrast extravasation in predicting need for angioembolization. We examine the hypothesis through a retrospective study including adult patients with blunt hepatic injury (BHI) between 1/1/2018-5/1/2017 and CT prior to angiography (n=74). Voxelwise volumetric labeling of CE and %LPD of total liver volume was then performed. %LPD and CE volume were combined using forward logistic regression and compared to AAST grade and binary CE assessment with angioembolization as the binary dependent variable. The AUC of CE vol and %LPD combined was higher than either AAST grade (0.85 vs 0.72, p= 0.033) or CE (binary) (0.71, p= 0.004). Using

thresholds optimized for ≥ 95% specificity there were 5 fewer false negative and 5 fewer false positive CT examinations than for binary CE assessment. Therefore, we conclude CT volumetric analysis of blunt hepatic injury has the potential to improve upon the current assessments for need of angioembolization. With the advent of advanced deep learning-based computer vision algorithms, automated, rapid, and objective hepatic laceration may be achievable and is an area of further study by our group.

This research was supported by RSNA R&E Foundation Medical Student Grant.

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POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS): LACK OF DIAGNOSTIC CONSISTENCY AND PREDICTIVE VALUE. Michael Gould* and Geoffrey Rosenthal, Division of Pediatric Cardiology, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Postural Orthostatic Tachycardia Syndrome (POTS) is a commonly assigned diagnosis in the pediatric population that is used to describe numerous symptom constellations. Current diagnostic criteria often do not distinguish POTS from orthostatic intolerance due to external causes such as medication side effects or underlying medical conditions. The most common diagnostic criteria are: an orthostatic increase in heart rate without a decrease in blood pressure or a positive tilt table test. However, these criteria are not used consistently. The purpose of this study was to describe the diagnostic consistency and predictive value of the diagnosis of POTS. To that end, we reviewed the record of 178 "POTS" patients to determine if a potential external cause of their reported symptoms was present in current medications or past medical history. We recorded each patient's demographics, presenting symptoms, diagnostic criteria, medication list, and concurrent medical conditions at the time of their diagnosis. Patients with an identifiable external cause of their specific presenting symptoms were classified as "Secondary," and those without were classified as "Primary." We defined "external cause" as conditions and medications that have been shown to cause a patient's specific presenting symptoms. Of the 178 subjects identified, 116 (64%) had no identified diagnostic testing to support their diagnosis. Fifty three patients (30%) had measurements of orthostatic changes, and 8 of those 53 had measurements that did not meet the diagnostic criteria for POTS. Twelve subjects (7%) had a tilt table test, 2 of which had negative results. Among those who had no identifiable testing, 76% had an external cause. Similarly, 78% of those who were tested had an external cause. Eleven of the 12 (92%) patients who had a tilt table test had identifiable external causes of their symptoms. This study challenges the utility of the diagnosis of POTS.

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THE EFFECTS OF UNIVERSITY OF MARYLAND BALTIMORE: HEALTH ALLIANCE (UMBHA) PARTICIPATION ON INTERPROFESSIONAL EDUCATION. Patricia Tyson*, Claire Morton*, Lori Edwards[1], Vishnu Rao[2], and Daniel Mansour[3], [1]Department of Family and Community Health, University of Maryland School of Nursing, [2]Department of Physiology, University of Maryland School of Medicine, and University of Maryland School of Pharmacy, Baltimore, MD.

The education of future health professionals has long been siloed, isolating students from the individual programs such as dentistry, law, nursing, medicine, pharmacy, public health, physical therapy and social work. With an individual patient with needs across disciplines, this framework of separate education sets the stage for unifactoral analysis of patient problems. Additionally, the 2018 Community Needs Assessments, reiterated the continued discrepancies in health, health literacy, and access to healthcare services that the West Baltimore community experiences1. To address both the limited interprofessional education (IPE) in healthcare and these discrepancies, University of

Maryland, Baltimore (UMB) students have established a free student-run health education resource with the West Baltimore community. The UMB: Health Alliance (UMBHA) provides preventative health services and community resource information while fostering a sustainable relationship between all eight schools on the UMB campus and the broader West Baltimore community. In this poster, we introduce the Interprofessional model created to achieve these goals, analyze the preliminary process evaluation data and provide a metric to measure the impact UMBHA has had on the IPE of student volunteers across disciplines. The Assessment of Interprofessional Teams Collaboration Scale (AITCS) was selected to assess collaboration across interprofessional teams volunteers in accordance with the 4 core competencies Partnership, Shared Decision Making, Cooperation and Coordination. This along with the Student Perceptions Survey (SPS) of the West Baltimore Community were provided to volunteers both prior to and following UMBHA training and service. We also analyzed the quantity of IPE the students perceive receiving. We compare these metrics across pre and posttests in order to assess the role serving on interdisciplinary teams within West Baltimore has on student IPE. UMBHA provides a novel model to engage with West Baltimore, improve interprofessional education and student perceptions of West Baltimore.

This research was supported by the Office of President Perman.

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CONTEMPORARY USE OF ANTICHOLINERGIC MEDICATIONS FOR NEUROGENIC BLADDER. Aidan Kennedy*, Alana Christie[1], Rena D Malik[2], and Phillipe Zimmern[1], [1]University of Texas Southwestern, Dallas, TX, and [2]Division of Urology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

First line treatment for patients with neurogenic detrusor overactivity (NDO) is anticholinergic or beta-3 agonist medications. The addition of a secondary medication in patients with NDO may avoid progression to third and fourth line therapies. We aim to identify patterns of anticholinergic and dual therapy prescriptions for patients with neurogenic bladder using a national database. The National Ambulatory Medical Care Survey (NAMCS) database was queried for a sample of ambulatory patient visits from 2003-2015. Visits were included for all patients aged 18 years or older diagnosed with neurogenic bladder (NGB). Dual therapy was defined as the prescription of two anticholinergics or 1 anticholinergic + beta-3 agonist on the same visit. Visits in which anticholinergic medications were prescribed were analyzed with descriptive statistics. Sampling weights were adjusted for nonresponses to yield an unbiased national estimate of ambulatory care visits. Out of a weighted sample of 5,391,680 patient visits with a primary diagnosis of neurogenic bladder, 1,602,705 (30%) were prescribed anticholinergic medication. Of included patients, the majority were white, (80%) located in the Northeast, (71%) and were referred to their doctor (42%) (Table 1) with a mean age of 51± 3. Of patients taking anticholinergic medications, only 14% were prescribed dual therapy. Myrbetriq, a beta-3 agonist used to treat NGB, was only used in 29% of patients with NGB in 2014 and 3% of NGB patients in 2015. Despite current clinical recommendations, 70% of patients with NGB are not receiving anticholinergic medication and the use of dual therapy is limited. Further prospective evaluation of patient satisfaction and efficacy of both single anticholinergic medication and dual therapy is needed.

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ORBITAL AND EYE INJURIES FROM SELF-INFLICTED GUNSHOTS: PATTERNS AND MANAGEMENT. Carolyn Drogt*, Adekunle Elegbede, and Michael Grant, Division of Plastic and Reconstructive Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Self-inflicted facial gunshots (SIGSWs) typically result in a spectrum of severe injuries to facial structures including the orbit and globe. Roughly three-quarters of those who arrive to the hospital alive will survive their injuries, and recidivism is typically low. Therefore, effective management is paramount to preserve vision and long-term quality of life. The objective of this study is to characterize the common injuries to the orbit, globe, and periocular structures following SIGSWs, their management, and the eventual visual and reconstructive outcomes. This study is a retrospective review of trauma registry records at the R Adams Cowley Shock Trauma Center for patients who presented alive following SIGSWs involving the globe and/or orbit from 2007- 2016. 69 patients presented alive with SIGSWs to the face. 47 of the 69 patients (68 %) sustained injuries to the orbit. Three patterns of orbital injury emerged: i) open globe (47%) ii) orbital fractures with globe and optic nerve intact (34%), and iii) optic nerve injury with intact globe (19%). Overall mortality was 30% among patients that sustained injuries to the orbit. Open globe injury was associated with increased odds of death (odds ratio= 5.8; p= 0.04) and increased number of surgeries. Open globe injury was also associated with worse initial and final visual acuity, with the majority (75%) having No Light Perception (NLP) on initial exam, and no visual recovery during the follow up period (median follow-up= 25 months). Patients required multiple surgeries, some of which were not indicated until years after the initial injury. Injuries to the eye and orbit are common among survivors of SIGSWs. Management involves multiple surgeries across several specialties, and outcomes are strongly influenced by initial visual acuity, and the presence of open globe injury, which is associated with higher mortality and significant permanent vision loss.

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ANALYSIS OF MUSCLE ARCHITECTURE AND FATTY INFILTRATION AFTER TENDON TEAR. Amil Sahai*, Mohit Gilotra[1], Nicolas Gonzalez[1], Derek Jones[2], [1]Department of Orthopaedics, [2]University of Maryland School of Medicine, Baltimore, MD.

Rotator cuff tear is one of the most common orthopaedic injuries, with the prevalence of tear increasing dramatically with age. In fact, it has been estimated that approximately 20% of the population is affected with some degree of rotator cuff tear. Because the presentation of rotator cuff tear is clinically insidious, late-stage surgical intervention often results in failure rates as high as 50%. Rotator cuff tears have been studied intensely from a biomechanical perspective, but the microscopic biological composition of muscles and tendons after tendon tear are a topic of ongoing research. Fatty infiltration, which is the term used to describe the phenomenon of excess adipocytic deposition within injured musculature, has been shown to occur due to chronic muscle unloading or nerve denervation after rotator cuff tendon tear. Previous studies have correlated the presence of fibro/adipogenic progenitor (FAP) cells with increased muscle fibrosis and fatty infiltration in mouse models. Recently, it has also been shown that tear in the tendons of rotator cuff musculature within a clinically relevant rabbit model are correlated to an increased amount of fatty infiltration. However, the relationship between the presence of FAP cells and the accumulation of fatty infiltration and changes in muscle architecture have not been studied in a rabbit model. In our study, we plan to compare the changes in muscle architecture and adipocytic content to the presence of FAP cells after complete tendon transection (tenotomy) of the supraspinatus and infraspinatus muscles in a rabbit model. We hypothesize that as time elapses, the increasing presence of fatty infiltration within muscle samples will correlate to an increase in the number of FAP cells present within the tissue. In this study, 6 rabbits who underwent complete supraspinatus and infraspinatus tendon tenotomy were analyzed at 4 different timepoints (n=24) for FAP cell content, adipocyte content, muscle twitch strength, Goutalier score, and overall muscle architecture. In this ongoing study, we plan to use T-test and linear regression to complete a multivariate statistical analysis between these parameters.

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PREDICTORS OF POSTOPERATIVE PAIN TWO YEARS FOLLOWING ORTHOPAEDIC KNEE SURGERY. Moli Karsalia*, Tina Zhang[1], Ali Aneizi[1], Michael Foster[1], Alexander Wahl[2], and R. Frank Henn III[3], [3]Division of Sports Medicine, [1]Department of Orthopaedics, [2]University of Maryland School of Medicine, Baltimore, MD.

Due to the growing opioid epidemic, accurate assessments of pain after orthopaedic surgery have become increasingly important. To better predict and manage postoperative pain, it is important to understand any potential factors associated with pain interference (PI) in 2-year follow-up of patients. The purpose of this study was to identify factors associated with greater pain interference two years following orthopaedic elective knee surgery. All patients undergoing elective outpatient orthopaedic knee surgery at a single urban academic institution were evaluated preoperatively from August 2015 to March 2017. Inclusion criteria were as follows: (1) patient undergoing knee surgery, (2) age 17 years and older, and (3) English-speaking. Patients completed a baseline assessment consisting of demographic information, PROMIS CAT, legacy PRO measures, and knee-specific activity measures. Two years following surgery, patients completed the same questionnaires. Bivariate and multivariate regression analyses were performed. Wilcoxon signed-rank test and/or Kruskal-Wallis was used for analysis of continuous variables and chi-squared analysis for categorical variables. Spearman rank correlation coefficient was used to determine the correlation between PROMIS PI and the other continuous variables. Statistical significance was set at $p < 0.05$. 359 patients undergoing orthopaedic knee surgery at a single urban academic hospital were included in the study. There was a moderate positive correlation between preoperative PROMIS PI ($rs = .4013$, $p < .0001$) and two-year PROMIS PI and a weak negative correlation between preoperative PROMIS Physical Function ($rs = -.2958$, $p < .0001$) and two-year PROMIS PI. PROMIS PI at two years also had a moderate positive correlation with anxiety ($rs = .3161$, $p < .0001$) and a weak positive correlation with depression ($rs = .2200$, $p < .0001$). Findings conclude that chronic postoperative PI may be predicted by the following preoperative factors: pain, physical function, psychosocial factors, patient-reported outcomes (PROs), and patient demographics.

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PREDICTORS OF TWO-YEAR PATIENT SATISFACTION FOLLOWING ORTHOPAEDIC KNEE SURGERY. Justin Kung*, Tina Zhang[1], Ali Aneizi[1], Scott Koenig[2], Patrick Sajak[1], and R. Frank Henn III[1], [1]Division of Sports Medicine, [2]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

With the increasing use of patient satisfaction metrics as evaluation tools of the quality of healthcare, pinpointing the major drivers of patient satisfaction will help providers such as orthopaedic surgeons better understand how to make impactful improvements. The objectives of this study were to (1) identify factors associated with two-year patient satisfaction after knee surgery, (2) determine if two-year patient satisfaction can be anticipated based on preoperative variables, and (3) compare two different measures of patient satisfaction. A sample of 366 patients undergoing elective knee surgery at an urban academic center was administered questionnaires to assess demographics, medical history, and various patient-reported outcomes preoperatively and two-years postoperatively. Bivariate and multivariate statistical analyses were performed to identify significant associations and independent predictors. Worse Surgical Satisfaction Questionnaire (SSQ-8) scores were associated with Black race, unemployment, government insurance, income less than $70k,

smoking, preoperative opioid use, diabetes, ASA score, and depression or anxiety ($p < 0.05$). However, when satisfaction was assessed as a single number on a scale of 0-100, there were not as many or as strong associations when compared to SSQ-8. Multiple regression models for two-year SSQ-8 score and Numeric Satisfaction Score separately identified two-year Improvement Survey score, two-year MODEMS relief, and smoker status as independent predictors of patient satisfaction. When only preoperative variables were considered, the multiple regression model accounted for less than 7% of the variance in either of the patient satisfaction metrics, thus indicating that preoperative characteristics alone are not likely to be useful in predicting patient satisfaction. Specific preoperative and two-year variables were significantly associated with two-year patient satisfaction. Clinicians should focus on patient improvement and relief from symptoms while counseling patients regarding smoking habits. Physicians can use the findings of this study to better understand patient satisfaction and tailor their perioperative care.

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DOES THE USE OF A PARENT'S CELL PHONE REDUCE ANXIETY DURING CAST REMOVAL? Serge Tzeuton*, Danielle Hogarth[1], Nathan O'Hara[2], and Joshua Abzug[1], [1]Division of Pediatrics, [2]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Orthopaedic fractures are quite common amongst the pediatric population and application of a cast is frequently included in the treatment plan, therefore making cast removal inevitable. The vision and sound of the cast saw can be quite jarring for pediatric patients, making the cast removal process evoke fear and anxiety. Previous studies have evaluated the use of music as coping mechanisms to reduce the stress and anxiety experienced during the cast removal process. The purpose of this study is to prospectively determine the effectiveness of visual stimulation in reducing anxiety in children during cast removal. All patients aged between 12 months and 17 years of age presented in the clinic for cast removal were eligible for participation. Blood pressure and heart rate were recorded using an automated sphygmomanometer, and their faces score will be assessed by the researcher utilizing the faces pain scale to subjectively assess patient's facial expressions. Their respective anxiety levels were recorded throughout the cast removal process. Fifty patients were randomly assigned to either the experimental group (n=21) or the control group (n=29) via REDCap survey. Heart rate in the experimental group was found to be less than the control group, however, this difference was not statistically significant ($p=0.82$). Repeated measures mixed effect models were used to determine effect of mobile device to reduce that patient's heart rate and blood pressure during the cast removal compared to a control group. A student t-test was used to determine the effect of the intervention on anxiety. Using mobile devices as distractors would benefit in reducing anxiety during cast removal for the pediatric population. Mobile cell phones and personal electronic devices can be utilized as a low-cost distractor for the pediatric population during the cast removal process to mitigate anxiety levels and promote a less uncomfortable cast removal experience.

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PROMIS PHYSICAL FUNCTION TWO YEARS FOLLOWING ELECTIVE KNEE SURGERY. Darius Hunt*, Tina Zhang[1], Ali Aneizi[1], Scott Koenig[1], Gregory Perraut[1], and Frank Henn[2], [2]Division of Sports Medicine, [1]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

The dramatic rise in orthopaedic surgery in the 21st century has increased the importance of patient-reported outcomes in evaluating postoperative success. This study attempted to evaluate and

characterize patient-reported physical function (PF) two years following elective knee surgery as well as to identify preoperative factors that may affect it. It was hypothesized that physical function would be significantly improved compared to baseline at two years postoperatively. Additionally, it was further hypothesized that certain preoperative factors—particularly age, smoking status, previous opioid/drug use, injury prior to surgery, and mental health—would also be associated with improvement in physical function. Patients of age 17 years and older undergoing elective knee surgery were enrolled prospectively and completed various questionnaires prior to surgery and again two years postoperatively. Responses were analyzed using Spearman correlation coefficients, Kruskal-Wallis, and multivariate linear stepwise regression modeling with PROMIS PF as the dependent variable. A total of 365 patients were included in this study's analysis, consisting of 203 males and 162 females. Mean PF scores, on average, were 2.4 points higher for patients undergoing knee arthroscopy compared to those who did not, and 3.8 points lower for patients undergoing knee arthroplasty compared to those who did not. Patient sex, ethnicity, employment status, income, insurance, smoking history, medical comorbidities, and baseline all yielded significant differences in two-year PF scores. Several baseline demographics and two-year measurements also showed significant correlations with two-year PROMIS PF—including age, BMI, number of prior surgeries and/or comorbidities, as well as two-year PPOMIS Pain Interference (PI), Fatigue, and Anxiety. Baseline demographics as well as other two-year measurements were found to be all related to significant differences in physical function following elective knee surgery. Physicians can ultimately use this information to educate their patients prior to surgery to establish more realistic expectations and thus, achieve better patient satisfaction.

This work was by the James Lawrence Kernan Hospital Endowment Fund, Inc.

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FACTORS ASSOCIATED WITH TWO-YEAR POSTOPERATIVE SURVEY COMPLETION IN ORTHOPAEDIC KNEE SURGERY PATIENTS. Jagannath Kadiyala*, Tina Zhang, Ali Aneizi, and R. Frank Henn, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Patient-Reported Outcomes (PROs) have become increasingly valued by physicians as measures of clinical and surgical success. The limitations associated with PROs are important to identify, as these metrics are determinants of Medicare reimbursement. Patient-Reported Outcome Measures (PROMs) are surveys that track PROs, and the main limitation associated with this modality is the survey response rate. Through the Maryland Orthopedic Registry (MOR), this study aims to determine the PROs associated with survey compliance. 500 patients age 17-years and older participating in the MOR from August 2015 and March 2017 were administered a baseline questionnaire preoperatively and emailed a follow-up questionnaire two-years postoperatively. Demographics were self-reported and medical records reviewed for relevant medical history. 365 patients (73.0%) completed both the baseline and the two-year surveys. A decreased likelihood of survey completion was seen in patients who identified as black, smokers, patients who had a lower income, or covered by government-sponsored insurance ($p<0.05$). Other preoperative variables significantly associated with decreased likelihood of completion included preoperative opioid use, lower preoperative expectations, and patients with worse pain, social satisfaction, and activity scores ($p<0.05$). Numerous demographic and preoperative factors are associated with survey completion two-years after elective orthopedic knee surgery. The results provide insight into patient populations that may be targeted in order to assure higher survey compliance and improve analysis of patient-reported outcomes.

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IS MRI BEING OVER-UTILIZED FOR THE EVALUATION OF KNEE PAIN?: A LOOK AT A SINGLE VETERAN'S ADMINISTRATION FACILITY. George Morcos*, Scott Koenig, Frank Henn, and Natalie Leong, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

We suspect that MRI is an over-utilized diagnostic tool in middle aged patients with knee pain, particularly at our local VA hospital. Oftentimes, pathology explaining knee pain is well defined on XR, especially in the case of knee osteoarthritis. Although MRI can provide more information in certain cases, it is often not relevant in case of osteoarthritis at the cost of increased expenditure and time to acquisition. The primary purposes of this chart and imaging review is to ascertain the number of unnecessary MRIs ordered in Veterans, and to find out the delay in care incurred by MRI at VA hospitals. Chart review including imaging review was performed on all knee MRIs ordered over a 6-month period. Patient demographic information, completion of XR prior to MRI, number of days to MRI order completion, specialty of ordering provider, diagnosis, and timing of any surgical procedures following MRI were reviewed. Data from a total of 304 cases was reviewed: 17.4% (n=304) of patients underwent knee MRIs without preceding plain radiographs; 56.6% (n=53) of those were ordered by PCPs. On average, obtaining an MRI delayed care by ~29.2 days. Furthermore, 29.4% (n=112), 35.5% (n=137), 55.8% (n=55) of MRI's ordered by orthopedic surgeons, PCPs, and other healthcare providers respectively were deemed unnecessary. Of the 252 cases that obtained XR, none obtained all four preferred views, while four had weightbearing images. There is still a notable number of knee MRIs ordered, in situations where they may not have been clinically necessary. This study shows that the MRI delays patient care by approximately one month and can unnecessarily increase the cost of delivering orthopaedic care. There may be a need to educate ordering providers on appropriate clinical indications for obtaining knee MRIs, particularly in the middle aged to elderly population.

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PERIOPERATIVE OPIOID USE IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION PATIENTS. Leah Henry*, Gregory Perraut*, Ali Aneizi[1], Elizabeth Friedmann[1], Jack Song[1], Jonathan Packer[2], and R. Frank Henn[2], [2]Division of Sports Medicine, [1]Department of Orthopaedics, Unversity of Maryland School of Medicine, Baltimore, MD.

Anterior cruciate ligament reconstruction (ACLR) is one of the most commonly performed outpatient orthopaedic procedures, yet there is little data about perioperative opioid prescribing practices. We hypothesized that patients receiving greater quantities of opioids postoperatively are less likely to require subsequent opioid prescriptions. Additionally, we hypothesized that younger age, female gender, smoking, and preoperative opioid use are associated with refilling opioid prescriptions. Patients who underwent ACLR at a single institution between 6/2015-5/2017 were retrospectively identified. A regional prescription monitoring database was used to identify preoperative and postoperative outpatient opioid prescriptions up to 2 years postoperatively. The number of Morphine Milligram Equivalents of each opioid was calculated to determine Preoperative Total Morphine Milligram Equivalents (Preop TMEs), Discharge TMEs, and Refill TMEs. Of 269 patients, 99 (36.8%) refilled an opioid prescription postoperatively. 12.3% of patients who received discharge opioids required a refill after 2 weeks postoperatively, and 0% received refills at 2 years postoperatively. Increased age, higher BMI, government insurance, current/prior tobacco use, preoperative opioid use, and greater number of medical comorbidities were significantly associated with refilling a prescription opioid ($p<0.05$). In logistic regression, only BMI ($p=0.001$) was a significant independent predictor of refill status. Patients with ASA score of 2 had higher Preop TMEs ($p=0.021$) and Refill TMEs ($p=0.020$) than patients with ASA score of 1. Preoperative opioid

users had significantly higher Refill TMEs than opioid-naïve patients (p=0.005). In multivariable regression, having ≥1 comorbidities (p=0.030) and shorter time to first refill (p=0.015) were significant independent predictors of Refill TMEs. In conclusion, patients receiving greater quantities of opioid medication at discharge are not less likely to fill subsequent postoperative opioid prescriptions. Higher BMI, increased medical comorbidity, and shorter time to refilling are significant independent predictors of increased postoperative opioid use.

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