UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

44th Annual

Medical Student Research Day

Hosted by
Office of Student Research, Dean's Office
Alpha Omega Alpha Honor Society

Monday, November 15, and
Tuesday, November 16, 2021
University of Maryland School of Medicine
Baltimore, MD 21201
Two-Day Virtual Event Through Zoom

Abstract Booklet

ABSTRACTS

See **MSRD 2021 Event Webpage** for more information about the event

Oral Presentation Abstracts

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

O.01

UNICOMPARTMENTAL KNEE ARTHROPLASTY PATIENTS HAD LOWER JOINT AWARENESS AND HIGHER FUNCTION AT 5 YEARS COMPARED TO TOTAL KNEE REPLACEMENTS. Zachary Brilliant*, Steven Haas, Thomas Sculco, Seth Jerabek, David Mayman, and Jason Blevins, Department of Orthopaedics, Hospital for Special Surgery, New York, NY.

Patients are being offered a total knee arthroplasty (TKA) or a unicompartmental knee arthroplasty (UKA) as surgical options for medial compartment osteoarthritis (OA). The purpose of this study is to evaluate postoperative outcomes at minimum 5 year follow up in patients following UKA compared to a matched cohort of TKA patients. We retrospectively identified 286 patients (300 surgeries) with primarily medial compartment OA on radiographs meeting criteria for a medial UKA who underwent a TKA (150) or medial UKA (150) between 2014 and 2015 at our institution. Patients were matched one-to-one based on age (± 5 years), exact sex, and BMI (± 3 kg/m2). Patients underwent unilateral TKA or UKA per their surgeon's standard surgical procedure. Forgotten Joint Score (FJS, range [1,100]), Knee Society Score (KSS, range [1,100]), Numerical Pain Rating Score (NPRS, range [0,10]), and patient satisfaction (range [0,40]) were assessed by serial questionnaires via phone. At a minimum 5 year follow up, 127 UKA patients and 118 TKA patients were available. Mean (± standard deviation) age was 69 ± 10 years and 71 ± 9 years in the UKA and TKA groups respectively (p=0.09). At five years postoperatively, patients who underwent UKA had significantly higher mean (± SD) FJS scores (86 ± 20 vs. 59 ± 34, p<0.001); higher KSS (88 ± 14 vs. 75 ± 21, p<0.001); lower NPRS scores (0.8 ± 1.5 vs. 1.9 ± 2.2, p<0.001); and higher satisfaction (37 ± 6 vs. 33 ± 10, p<0.001). Survivorship free from revision was 97% (95% CI=95-100%) and 98% (95% CI=96-100%) at 5 years for TKA and UKA, respectively (p=0.6). There were two both component revisions in the TKA group and no revisions in the UKA group. Patients with medial compartment OA who underwent UKA had significantly lower joint awareness and pain, as well as higher function and satisfaction compared to matched TKAs at minimum 5 year follow up. Excellent survivorship of 97% in the TKA group and 98% in the UKA group was demonstrated with no difference in revision rates between the two groups at 5 years. Unicompartmental knee arthroplasty should continue to be considered in patients with isolated medial compartment osteoarthritis.

This research was supported by Hospital For Special Surgery Medical Student Summer Research Fellowship.

O.02

CHARACTERIZATION OF PAIN IN PATIENTS WITH UNSTABLE PELVIC FRACTURES TREATED WITH POSTERIOR SCREW FIXATION. Darby Moore*, Vincent Allen*, Gerard Slobogean[1], Robert O'Toole[1], Nathan O'Hara[2], Danielle Sim[3], and Peter Campbell[3], [1]Division of Orthopaedic Trauma and [2]Division of Research Administration, Department of Orthopaedics, [3]University of Maryland School of Medicine, Baltimore, MD.

Unstable pelvic ring fractures are effectively treated with posterior fixation using sacroiliac (SI) and transiliac transacaral (TITS) screws. Although this treatment approach has been widely successful, some patients still experience chronic posterior pelvis pain and disability following the procedure. The objective of this study was to describe the distribution of patient-reported pelvis pain and function over a 24 month period post injury that required SI screw stabilization. We also sought to identify pre- and

perioperative factors associated with increased pain. This prospective case series was performed at a single academic trauma center. We enrolled 88 adult pelvic fracture patients treated with open or closed reduction and internal fixation using SI or TITS screws. The primary outcome was pain measured with the Brief Pain Inventory at 6-, 9-, 12-, 18-, and 24-months post-injury. The secondary outcome was pelvic function and was measured using the Majeed Pelvic Score. Sixty-nine patients (78.4%) reported mild to no pain at 6 months, while 12 (13.6%) patients had severe pain. Two years after injury, 71 patients (80.6%) exhibited mild to no pain. Half of the sample (n=44) had good to excellent pelvis function by 6 months post-injury, and 55 patients (62.5%) attained this level of function by 24 months. A history of chronic pain (mean difference, 1.26; 95% CI, 0.22 to 2.30; p=0.02 and socioeconomic deprivation (mean difference, 0.27; 95% CI: 0.11 to 0.43; p<0.01) were significantly associated with increased pain. This study suggests that the incidence of severe chronic postoperative pain and pelvic function deficits is uncommon following pelvic ring fractures requiring posterior screw fixation. The majority of patients with unstable pelvic ring fractures achieve minimal to no pelvis pain and good to excellent pelvic function six to 24 months after injury.

O.03

PATIENTS' UNDERSTANDING OF SLING NECESSITY IS PREDICTIVE OF SLING WEAR FOLLOWING SHOULDER SURGERY. Jacqueline Addona*, Tristan Weir[1], Ryan Curto[2], Michael Livesey[3], and Mohit Gilotra[4], [1]Department of Orthopaedics, University of Maryland, Baltimore, [3]Department of Orthopaedics, University of Maryland Medical Center, and [4]Department of Orthopaedics, [2]University of Maryland School of Medicine, Baltimore, MD.

Shoulder sling compliance was recently validated using temperature-sensing devices. This study sought to determine if patients' understanding for sling necessity was associated with accurately recorded sling wear following shoulder surgery using temperature-sensing devices. Secondary aims included determining whether home assistance or social deprivation were associated with sling compliance. A prospective cohort study was conducted to measure sling wear with temperature-sensing devices to provide a quantitative value of hours spent in the sling. To determine patients' understanding of sling necessity, the Patient Understanding Grading Scale (PUGS) was developed based on patients' response to the question, "Why did you have to wear a shoulder sling?" Patients with PUGS grade I had the least understanding of sling necessity, grade II had intermediate understanding, and grade III had the most understanding. Patients were asked if they had home assistance and social deprivation was measured with the Area Deprivation Index (ADI) based on area codes. A multivariable linear regression analysis for hours of sling wear controlled for PUGS grade, home assistance, age, sex, body mass index, ADI, and procedure. PUGS grade I patients wore their slings significantly less than PUGS II/III patients (P<0.05) and patients with home support wore their slings significantly more (P<0.05). After controlling for other variables, patients with greater understanding for sling necessity (PUGS grade II/III) had significantly greater sling wear (P<0.05), while male patients wore their slings significantly less (P<0.05). Home assistance and ADI were not significantly associated with sling wear in the multivariable regression analysis. This study demonstrates that patients with greater understanding for sling necessity have greater sling compliance, while male patients have lower sling compliance. Future studies should determine if patient education protocols influence sling compliance.

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.04

FACTORS AFFECTING DELTOID ELASTICITY MEASURED BY SHEAR WAVE ELASTOGRAPHY IN REVERSE SHOULDER ARTHROPLASTY PATIENTS. Ryan Curto*, Scott Koenig[1], Jacqueline Addona[2], Raziyeh Baghi[3], and Mohit Gilotra[1], [1]Department of Orthopaedics and [3]Department of Physical Therapy and Rehabilitation Science, [2]University of Maryland School of Medicine, Baltimore, MD.

Reverse total shoulder arthroplasty (RTSA) has been successful at improving function in patients with rotator cuff arthropathy or with glenohumeral arthritis with concomitant large rotator cuff tears, but achieving appropriate deltoid tension is difficult and likely affects outcomes and complications. Shear Wave Elastography (SWE) is a novel technique used as an objective and non-invasive method for measuring soft tissue tension. Factors which affect the deltoid tension in RSTA measured by SWE have yet to be examined. The specific aims of this study are to examine the relationship between implant characteristics, implant positioning, patient characteristics and deltoid elasticity measured by SWE. Eleven post-operative RSTA patients completed study protocols. SWE was used to measure post-operative elasticity of the anterior, middle, and posterior deltoid bellies at rest, in forward flexion (FF), abduction (ABD), and external rotation (ER). Patient demographics, implant characteristics, range of motion, deltoid length, deltoid thickness and ASES scores were also collected. Validated radiographic measurements were collected from post-operative x-rays. There was a positive correlation between Acromiohumeral interval (AHI) and elasticity of the mid. deltoid at 5 sec. of ABD (rho=0.67; p=0.03). There was also a positive correlation between Acromiohumeral Distance (AHD) and elasticity of ant. deltoid at 1 and 5 sec. of FF, the mid. deltoid at 5 sec. of FF, and the mid. deltoid at 1 and 5 sec. of ABD (rho=0.61, 0.72, 0.63, 0.82, 0.80; p=0.05, 0.02, 0.04, ≤0.01, 0.01). Shoulders without lateralization of the glenosphere exhibited a higher elasticity of the ant. deltoid at 5 sec. of FF and the mid. deltoid at 1 second of ABD than shoulders with 4mm of glenosphere laterization (117.00 vs. 40.40kPa, p=0.04; 103.10 vs. 53.30 kPa, p=0.02). In conclusion, RTSA implant characteristics, specifically glenosphere lateralization and superior-inferior placement of the implant construct, as measured by AHI and AHD, may contribute to deltoid elasticity. Further investigation is necessary to robustly determine the specific relationship between these factors and SWE deltoid elasticity.

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.05

PROMIS DEPRESSION AND ANXIETY PREDICT WORSE POSTOPERATIVE FUNCTION IN ORTHOPAEDIC HAND AND WRIST SURGERY PATIENTS. Luke Pitsenbarger*, Samir Kaveeshwar[1], Jason Lynch[1], Ngozi M. Akabudike[2], Raymond A. Pensy[3], and R. Frank Henn III[4], [2]Division of Hand Surgery, [3]Division of Trauma, and [4]Division of Sports Medicine, [1]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Orthopaedic practices continue to translate the use of patient-reported outcomes (PROs) from research to clinical settings. Previous studies indicate that depression and anxiety are prevalent perioperatively and are linked to greater impairment after surgery. Yet, the link between mental health and functional PROs is poorly understood in the context of hand and wrist surgery. We hypothesize that depression and anxiety symptoms will be prevalent preoperatively and will improve after hand and wrist surgery. Additionally, we hypothesize that worse PROMIS Depression and Anxiety scores will be associated with patient characteristics and worse two-year functional and satisfaction outcomes. This study included 232 hand and wrist surgery patients enrolled in a registry that broadly assesses patients undergoing orthopaedic surgery. We assessed patient outcomes up to two years after surgery with the National Institutes of Health Patient-Reported Outcomes Measurement Information System (PROMIS) computer adaptive testing. Analysis included bivariate testing for association and multivariable testing for predictive variables. Average two-year PROMIS Anxiety, Michigan Hand Questionnaire score (MHQ), and PROMIS PF improved significantly, but average two-year PROMIS

Depression did not. Worse two-year PROMIS Depression and Anxiety scores correlated with female sex, smoking, recreational drug use, history of depression or anxiety, and preop opioid use. Worse two-year PROMIS Depression was also associated with higher body mass index and preoperative expectations. Multivariate analysis demonstrated better PROMIS Depression and PROMIS Anxiety were both predicted by no history of depression or anxiety, no preoperative opioid use, and male sex. Worse two-year PROMIS Depression predicted less improvement in MHQ and worse two-year MHQ scores, while two-year PROMIS Anxiety predicted worse two-year PROMIS PF. This study demonstrates significant relationships between self-reported mental health and functional outcomes. Applied clinically, low PROMIS Depression and Anxiety scores may signal opportunity for intervention with the aim of improving functional outcomes.

This work was supported by a grant from The James Lawrence Kernan Hospital Endowment Fund, Incorporated and 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.06

UNDERSTANDING THE INSURANCE LANDSCAPE OF DUPUYTREN'S CONTRACTURE MANAGEMENT. Nicholas Hricz*, Michael Ha[1], Kevin Zhu[1], Ledibabari M. Ngaage[2], and Yvonne Rasko[1], [1]Division of Plastic Surgery, Department of Surgery, University of Maryland School of Medicine and [2]Division of Plastic & Reconstructive Surgery, Department of Surgery, Johns Hopkins Hospital, Baltimore, MD.

Dupuytren's contracture is a painful fibroproliferative disorder that results in contractions of most commonly the fourth and fifth digits of the hand. While there is no definitive cure, symptomatic relief can be achieved via open fasciotomy, percutaneous aponeurotomy, or the most frequent choice collagenase *clostridium histolyticum* injections (CCH). The insurance coverage of these options has not been discussed in the current literature. The authors evaluated American insurance coverage for the treatment of Dupuytren's and compared the coverage of open fasciotomy, percutaneous aponeurotomy, or CCH. A cross-sectional analysis of US insurance policies for coverage of Dupuytren's treatment was performed. Companies were selected based on those with the largest enrollment and their market share. Of the 100 companies examined, only 5% of companies had a policy that covered an open fasciotomy treatment, 6% had a policy that covered a percutaneous fasciotomy, whereas 37% had a policy for CCH. There were significantly more policies for CCH compared to open fasciotomy and percutaneous fasciotomy (CCH vs open fasciotomy: $p<0.001$; CCH vs percutaneous fasciotomy: $p<0.001$). The most common criterion for treatment options was the involvement of the MP joint or PIP (Open fasciotomy $n = 5$ (100%); percutaneous fasciotomy $n = 5$ (83.3%); CCH $n = 30$ (81.1%). There is noted coverage discrepancies between companies for the coverage of Dupuytren's management. This variability is lacking for surgical, minimally invasive, and injection options.

This research was supported by the Steuber Scholarship.

O.07

FUNCTIONAL VALIDATION OF *KPTN* - A NOVEL GENE IMPLICATED IN MACROCEPHALY, EPILEPSY, AND INTELLECTUAL DISABILITY. Rebecca Flessner*, Allan Barnes, Soad Elziny, Janice Babus, Philip Iffland II, and Peter Crino, Maryland Epilepsy Center, Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

Intractable epilepsy is a debilitating neurological condition affecting an estimated 23 million people worldwide. Several forms of intractable epilepsy have been linked to dysregulation of the mechanistic target of rapamycin (mTOR) pathway, a key regulator of cell proliferation, migration, and growth. Mutations in upstream regulators of mTOR result in hyperactive signaling, which leads to excessive cell growth and neuronal hyperexcitability. *KPTN*, encoding Kaptin, has recently been identified as part of a novel multi-protein complex (KICSTOR) that negatively regulates mTOR

activity during nutrient-depleted conditions. Interestingly, mutations in *KPTN* have been linked to macrocephaly, epilepsy, and intellectual disability. We hypothesize that loss of *Kptn* leads to enhanced mTOR signaling and altered neuronal morphology that can be rescued by treatment with mTOR inhibitors rapamycin and torin1. A *Kptn* knockout (KO) cell model was created using CRISPR/Cas9 reagents targeting *Kptn* in Neuro2a cells. Wild type (WT), scramble, and *Kptn* KO cells were treated with rapamycin, torin1, or vehicle (DMSO). Cells were analyzed for soma size, primary process outgrowth, and expression of phosphorylated ribosomal S6 protein (PS6), a marker of mTOR activation. Furthermore, brain sections from WT and *Kptn* KO mice were probed with primary antibodies targeting PS6, PCNA, NeuN, and GFAP to analyze mTOR activity, cell proliferation, neuronal and astrocytic density, and neuronal size. We observed enhanced PS6 and larger soma size in *Kptn* KO cells, which was rescued by treatment with rapamycin or torin1. Preliminary data also indicated a higher degree of primary process outgrowth in *Kptn* KO cells compared to WT and controls. *Kptn* KO mouse brains showed enlarged neurons and increased PS6 levels, but no difference in cell proliferation or numbers of neurons and astrocytes. These findings demonstrate that loss of *Kptn* leads to increased mTOR activity and altered cell morphology but has no effect on cell proliferation. These findings also suggest that mTOR inhibition may be a novel strategy to treat epilepsy associated KPTN variants.

This research was supported by the Leslie B. Barnett Memorial Student Fellowship from the University of Maryland Department of Neurology.

O.08

THE ROLE OF FUNCTIONAL NETWORK FORMATION IN A STIMULATION MODEL OF CORTICAL EPILEPSY. Ujwal Boddeti*, Muzna Bachani, Jemima Owotade, Mitchell Moyer, Riccardo Serra, and Alexander Ksendzovsky, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Despite surgical resection of a defined epileptogenic focus (EF), about 50% of patients go on to have refractory seizures1. Recently, focal epilepsy is being redefined as a network disorder1 and studies have demonstrated that resection of nodes outside the EF may contribute to better surgical outcomes1. Additionally, our group has shown higher interictal connectivity between nodes involved in seizure onset in a cohort of epilepsy patients, further suggesting the presence of an underlying distributed epileptogenic network in focal epilepsy. In order to explore epilepsy networks in vitro, we cultured primary mixed cultures of cortical neurons from P1 rat pups were cultured on 96-well multi-electrode array (MEA) plates with eight active electrodes per well for stimulation and recording. We developed an in vitro stimulation model of cortical epilepsy to study epilepsy network formation using a biphasic tetanic stimulation at 50 or 100 Hz, 500 μV, 250 μA applied for one hour daily for ten days. Our results show that after four days of daily in vitro stimulation demonstrated significant increases in neuronal baseline bursting, modeling kindled seizures. Tetanic stimulation with 50Hz had the highest elevation in neuronal busting. In order to compare distributed network connectivity, we calculated and ranked coherences (13-32Hz) across all electrode pairs (n=24) and identified the top 15% for comparison to control. The average coherence across the top connected pairs was significantly higher in stimulated wells compared to controls (0.27 vs. 0.17, p=0.0002). Furthermore, coherence across the highest-ranking electrode pair was strengthened with daily stimulation. This was not seen in control electrodes. Our data suggest that daily stimulation with 50Hz strengthens connectivity and increases overall neuronal bursting in vitro thereby potentially recapitulating in vivo seizure networks. Similar to human data, this in vitro model suggests an elevated interictal coherence among electrode pairs involved in seizure formation. Next, we aim to characterize the structural nature of this network quantifying axonal boutons and dendritic spines. Ultimately, our work aims to enable a better understanding of network formation in epilepsy that will inform future epilepsy surgery decision-making.

This research was supported in part by the American Academy of Neurology (AAN) Medical Student Research Scholarship, by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research, by the Department of Neurosurgery, University of Maryland School of Medicine, by the Neurosurgery Research and Education Foundation (NREF), and by the American Academy of Neurological Surgeons (AANS).

O.09

COMPARATIVE THERAPEUTIC EFFECTIVENESS OF ANTICOAGULATION AND CONSERVATIVE MANAGEMENT IN TRAUMATIC CEREBRAL VENOUS SINUS THROMBOSIS. Kevin Kim*, Aaron Wessell, Bizhan Aarabi, Timothy Chryssikos, and Gary Schwartzbauer, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Consensus is currently lacking on the optimal treatment for blunt traumatic cerebral venous sinus thrombosis (tCVST). Anticoagulation (AC) is used for treating spontaneous CVST (sCVST), but its role in tCVST remains unclear. To investigate the characteristics and outcomes of patients treated with anticoagulation compared with patients managed conservatively. We retrospectively reviewed patients who presented to a Level 1 Trauma Center with acute skull fracture following blunt head trauma who underwent dedicated venous imaging. There were 137/424 (32.3%) patients presenting with skull fractures with tCVST on venous imaging. Among them, 82 (60%) were treated with AC while 55 (40%) were managed conservatively. Analysis of baseline characteristics demonstrated no significant difference in age, sex, admission Glasgow Coma Scale (GCS), admission Injury Severity Score (ISS), rates of associated intracranial hemorrhage, or neurosurgical interventions. New or worsening intracranial hemorrhage was seen in 7 patients treated with AC. Patients on AC had significantly lower mortality than non-AC (1% vs. 15%; p=0.003). There was no difference in GCS or Glasgow Outcome Scale (GOS) at last clinical follow-up. On follow-up venous imaging, patients treated with AC were more likely to experience full thrombus recanalization than non-AC (54% vs. 32%; p=0.012), and subsequent multiple regression analysis revealed that treatment with AC was a significant predictor of full thrombus recanalization (odds ratio, 5.18; confidence interval [CI], 1.60-16.81; p=0.006). Treatment with anticoagulation for tCVST due to blunt head trauma may promote higher rates of complete thrombus recanalization when compared to conservative management.

O.10

GRADE 1 INTERNAL CAROTID ARTERY BLUNT CEREBROVASCULAR INJURY PERSISTENCE AND WORSENING RISKS STROKE WITH CURRENT MANAGEMENT: AN EAST MULTICENTER STUDY. Sarah Yang*, Margaret Lauerman, and Emily Esposito, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Screening and management protocols of grade 1 carotid blunt cerebrovascular injuries (BCVI) are poorly established and vary widely. Knowledge of stroke risk factors specific to individual grades could allow for tailored therapy recommendations based on injury characteristics. A post-hoc analysis of a 16 center, prospective, observational trial was undertaken of grade 1 internal carotid artery (ICA) BCVI. For patients enrolled in the study, information pertaining to medical management, endovascular intervention, and radiological imaging during the patient's stay at the hospital was collected. Repeat imaging was considered the second imaging occurrence. P-values were calculated using t-test, Mann-Whitney, Fisher Exact, or Chi-squared when appropriate.145 grade 1 carotid injuries were included (94.5% patients with no stroke and 5.5% patients with stroke). While the stroke rate for grade 1 ICA BCVI is low overall, injury persistence and worsening appear to heighten stroke risk, especially with progression to grade 2 ICA BCVI at second imaging. Patients with non-resolving lesions received a mix of antiplatelet and anticoagulant therapies over the hospital stay (p = 0.001). On the first imaging occurrence, percentage luminal stenosis (p=0.71) and presence of intraluminal

thrombus (p=0.16) were not significantly different between grade 1 ICA BCVI with and without stroke. However, upon subsequent imaging, an increased percentage of BCVI patients with stroke had luminal stenosis presence (p=0.05) and increased severity of grade injury (p<0.001). Furthermore, patients that had no resolution at second imaging were more likely to develop a stroke (p = 0.005). None of the patients that had resolution at second imaging developed a stroke. Subsequent follow-up radiographic imaging is critically important in evaluating an ongoing BCVI grade 1 carotid injury and risk for ischemic stroke. Dual antiplatelet therapy and stenting are potential options in high-risk subgroups given strokes despite medical therapy.

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.11

HYPOTHERMIA PLUS GLYBURIDE: A NOVEL SPINAL CORD INJURY THERAPY. Bradley Wilhelmy*, Nageen Sherani*, Vladimir Gerzanich, and J. Marc Simard, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Traumatic spinal cord injury (SCI) is defined by the primary insult and the ensuing secondary lesion expansion. Both glibenclamide and hypothermia have been shown to confer benefit in rat models of SCI. Glibenclamide prevents progressive hemorrhagic necrosis, the structural failure of capillary integrity surrounding the primary lesion, through potent inhibition of Sur1-Trpm4 ion channels. Additionally, systemic hypothermia induces neuroprotective benefits through a variety of mechanisms. The combination of glibenclamide and hypothermia has demonstrated synergy in animal models of cerebral ischemia but has not yet been tested in SCI. Here, we used a rat model of lower cervical hemicord contusion to compare the efficacy of these treatments individually and in combination compared to untreated controls. For clinical relevance, rats were treated at 4 hours after injury. Glibenclamide, dihydrocapsaicin (DHC)-induced hypothermia, and the combination of DHC-hypothermia plus glibenclamide all performed favorably compared to untreated controls. Modified Basso, Beattie, and Bresnahan (mBBB) scores, a measure of neurological function, were largely indistinguishable across the three active treatment groups at 6 weeks post-injury and were significantly different compared to untreated controls. Glibenclamide combined with hypothermia showed a faster rate of recovery than the other two single treatments. A similar pattern was seen with other assessments of motor function including beam balance, rotating rod, and grip strength. Notably, all treatments showed improved mortality rates compared to controls, and hypoglycemia was not observed in glibenclamide-treated groups. Histopathological analysis is currently underway to quantify tissue preservation. This work is supported by the Neurosurgery Research and Education Foundation (2021 Medical Student Summer Research Fellowship) and the University of Maryland School of Medicine Program for Research Initiated by Students and Mentors.

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.12

ASSOCIATION OF PROPHYLACTIC PLATELET TRANSFUSION AND SEVERE INTRAVENTRICULAR HEMORRHAGE IN VERY LOW BIRTH WEIGHT INFANTS. Katherine Raja*, Brenda Hussey-Gardner[1], Mathangi Gopalakrishnan[2], and Sripriya Sundararajan[1], [1]Division of Neonatology, Department of Pediatrics, University of Maryland School of Medicine and [2]Center for Translational Medicine, University of Maryland School of Pharmacy, Baltimore, MD.

Thrombocytopenia has the highest prevalence, up to 80%, in very low birth weight (VLBW, birthweight <1500g) preterm infants. VLBW infants with severe thrombocytopenia receive platelet transfusions to minimize the risk of intraventricular hemorrhage (IVH). NICU providers are faced with the difficult task of determining the threshold that triggers a platelet transfusion in VLBW infants.

Utilizing a lower platelet threshold (25,000/μL) is associated with lower rates of death and major bleeding compared to a higher threshold (50,000/μL). The objective of this study was to determine the threshold for platelet transfusion in VLBW infants and the association of prophylactic platelet transfusion and severe IVH (Grade III/IV). A retrospective chart review of 782 VLBW infants was performed at the University of Maryland Medical Center (UMMC) NICU between 2016 and 2020. Demographic information, platelet transfusion characteristics, and neonatal morbidities including IVH were collected. Of the 540 infants that met inclusion criteria, 105 (19.4%) received a platelet transfusion in their first week of life. NICU providers administered platelet transfusions at a median threshold of 59,000/μL (SD: 27,100/μL). In subjects that received platelet transfusion, median time to first IVH diagnosis was around 1 day. 121 (22.5%) infants developed IVH (all grades) within the first week of life, with 35 (6.5%) developed severe IVH. In multivariable logistic regression analysis of severe IVH status, platelet transfusion was a significant predictor of IVH ($p<0.05$) after adjusting for gestational age, birth weight, and gender. Platelet transfusion increased the odds of developing IVH (all grades) (OR: 4.4, 95% CI: 2.4-8.4) and severe IVH (OR: 50.9, 95% CI: 18.0-173.9) compared to VLBW infants that did not receive platelet transfusions. A great variation in platelet transfusion threshold in VLBW infants was noted compared to published guidelines. Implementation of more restrictive platelet transfusion practice at UMMC NICU could minimize platelet transfusion-related adverse outcomes such as severe IVH.

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.13

CANCER IN PATIENTS WITH AND WITHOUT HIV INFECTION IN THE NATIONAL CANCER REGISTRY OF RWANDA. Asha Kodan*, David Riedel[1], Mark Hagenimana[2], Nivya George[1], Uwikindi Francois[2], and Sabin Nsanzimana[2], [1]Department of Institue of Human Virology, University of Maryland School of Medicine, Baltimore, MD, USA and [2]Rwanda Biomedical Centre, Kigali, Rwanda.

Over the last two decades, antiretroviral therapy (ART) has been widely scaled up in Rwanda, resulting in substantially increased life expectancies among people living with HIV (PLWH). As the demographics of this population shifts, comorbidities like cancer will be expected to increase. There is little data about incidence and frequency of cancer among PLWH in Rwanda. The aim of this study was to compare the types of cancer diagnoses between PLWH and patients without HIV in Rwanda and to describe the changes in the number and types of cancer over time. Rwanda's National Cancer Registry recorded the primary site and morphological description for each cancer diagnosis from 2007 to 2018. Overall data are collected from a total of 23 hospitals/ clinics, vital statistics/ death registry, Laboratories, Hospices. The final cancer diagnosis was determined using the Surveillance, Epidemiology, and End Results (SEER) Site Recode ICD-O-3/WHO 2008 Definition database. Categorical variables were reported by group (HIV+ and HIV-) using number and percentages. There were 1,048 PLWH and 6,359 HIV negative individuals with cancer recorded in the Registry. The proportion of ADCs were significantly higher in the PLWH group compared to those without HIV ($p<0.001$). Within the PLWH group, there was a longitudinal increase in NADCs and a decrease in ADCs ($p<0.001$), whereas the proportion of ADCs and NADCs was stable for those without HIV. Among the ADCs in the PLWH group, there was a longitudinal decline in Kaposi sarcoma. The study demonstrates a decreased frequency of ADCs and an increased frequency of NADCs in the PLWH group. The frequency of ADCs and NADCs stayed relatively constant in the in HIV(-) group. These findings support a need for focusing screening efforts on NADCs, as they begin to play a larger role in the disease processes that affect the aging PLWH population.

This research was supported by the Infectious Diseases Society of America - Grants for Emerging Researchers/Clinicians Mentorship Program.

O.14

QUALITY OF LIFE ON PHASE I TRIALS (QOL-P1T): A RETROSPECTIVE CHART REVIEW. Mariela Trejo*, Andrea Cuviello, and Holly Spraker-Perlman, Division of Quality of Life and Palliative Care, Department of Oncology, St. Jude Children's Research Hospital, Memphis, TN.

Phase I clinical trials are imperative to the discovery and development of novel therapeutics aimed at advancing the goal of cure for all children with cancer. Enrollment on phase I trials is reserved for children with refractory disease who lack curative options. These studies are not designed or powered to measure drug (or combination) efficacy, and offer little potential for direct therapeutic benefit to participants. Children with poor prognoses are eligible for "concurrent care" while participating in phase 1 trials, which integrates pediatric palliative care (PPC) and/or hospice services alongside cancer directed therapy. However, patients on phase I trials may experience later integration of PPC services due to the hope generated by trial agents. The goal of this project is to describe the demographic, quality of life (QOL), and end of life (EOL) metrics for patients at St. Jude Children's Research Hospital (SJCRH) enrolled on phase I cancer trials to determine what PPC services were offered. Data were collected from the electronic medical record, and included patients aged birth to 25 years (at primary cancer diagnosis) who enrolled on at least one phase I cancer trial at SJCRH between 4/1/11 to 3/1/21. Variables were categorized into demographic, clinical, QOL, EOL, and socioeconomic metrics. Data were summarized by descriptive statistics, including counts, percentages, means, medians, and ranges. Of the N=418 patients, 77 patients remain alive (18.4%) after phase I enrollment. Despite being the target population for PPC consultation, 38.5% of the cohort were never cared for by the PPC team. For children who received PPC services, the average number of PPC encounters was 14.4 (range 0-139 visits). At the initial PPC encounter, 55% of participants cited "cure" as the goal of care during phase I trial participation. Children enrolled on phase I clinical trials for cancer therapy have poor chance of survival, yet most families are hoping for cure. The PPC team can help manage these patients, regardless of the stated goal, to optimize symptom management, care coordination, and decision making. Although the PPC team was involved with most pediatric phase I trial participants, it is imperative to understand which eligible patients were missed and why. Perhaps there is a time-based or service line trend that correlates with the cohort who were not referred to PPC. Clinically, our data supports the need for normalization of triggered consults for all pediatric cancer patients enrolled on phase I clinical trials.

This research was supported in part by the St. Jude Children's Research Hospital Pediatric Oncology Education (POE) Program.

O.15

TREAT NOW OR TREAT LATER: COMPARATIVE EFFECTIVENESS OF ADJUVANT THERAPY IN RESECTED STAGE IIIA MELANOMA. Emily Ma*, Yinin Hu, and Julia Terhune, Division of Surgical Oncology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Adjuvant therapy for most sentinel node-positive (stage IIIA) melanoma may have limited clinical benefit for older patients given competing risk of non-cancer death. The objective of this study is to model the clinical impact and cost of adjuvant therapy in stage IIIA melanoma across age groups. A Markov decision-analysis model simulated the survival of patients with resected stage IIIA melanoma treated with adjuvant therapy versus observation. In the adjuvant option, patients are modeled to receive adjuvant pembrolizumab (BRAF wild-type) or dabrafenib/trametinib (BRAF mutant). In the observation option, treatment is deferred until recurrence. Transition variables were derived from landmark randomized trials in adjuvant and salvage therapy. The model was analyzed for age groups spanning 40 to 89 years. The primary outcome was the number needed to treat (NNT) to prevent one melanoma-related death at 10 years. Cost per melanoma-related mortality avoided was estimated. Projections for NNT increased by age from 14.71 (age 40-44) to 142.86 (age 85-89) among BRAF wild-type patients, with patients in cohorts over the age of 75 having an NNT over 25. The cost per

mortality avoided ranged from $2.75 million (M) (age 40-44) to $27.57M (age 85-89). Corresponding values for BRAF mutant patients were: NNT 18.18 to 333.33, and cost per mortality avoided $2.75M to $54.70M. Universal adjuvant therapy for stage IIIA melanoma is costly and provides limited clinical benefit in patients with age >75 years.

O.16

EVALUATING ADJUVANT CHEMOTHERAPY IN ESOPHAGEAL AND GASTROESOPHAGEAL JUNCTION CANCER BASED ON PATHOLOGICAL RESPONSE TO NEOADJUVANT CHEMORADIOTHERAPY. Riyadh Ali*, Melanie Berger[1], Cristina Decesaris[1], Yixing Jiang[2], and Jason Molitoris[1], [1]Department of Radiation Oncology and [2]Division of Hematology and Oncology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Esophageal and gastroesophageal junction (E/GEJ) cancers are one of the deadliest cancers in the USA. The current standard of treatment is trimodality therapy (TMT) which consists of concurrent chemotherapy and radiation followed by surgery. Despite the widespread use of this technique, overall survival remains low at about 20%. Further investigation has been performed to improve overall survival. Adjuvant chemotherapy is not currently widely used, but has been shown to improve overall survival in patients with residual disease at the time of surgery. However, it is not currently known what other factors play a role in determining whether adjuvant chemotherapy will improve overall survival. Nodal clearance has been shown to be a prognostic factor of overall survival, with nodal clearance patients having a greater overall survival than nodal residual patients, regardless of the primary tumor clearance in the nodal residual patients. Therefore, degree of nodal clearance may also determine whether adjuvant chemotherapy will increase overall survival. We hypothesize that adjuvant chemotherapy increases the overall survival in the patients with residual nodal disease (regardless of primary tumor response). If proved correct, this would further select patients who could benefit from adjuvant chemotherapy and may limit utilization in patients who do not benefit. We have conducted a retrospective analysis of 256 E/GEJ patients who have undergone TMT at University of Maryland Medical Center (UMMC) from 1993-2020. Information extracted from the electronic medical records (EMR) provided by UMMC includes clinical staging, pathological staging, adjuvant chemotherapy received, and date of failure. We plan on analyzing these patients and comparing the overall survival and progression free survival between nodal clearance patient and nodal residual patients in order to determine whether residual nodal disease accurately predicts response to adjuvant chemotherapy.

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.17

ASSOCIATION OF ENTERAL FEEDING PATTERNS WITH INTESTINAL BARRIER FUNCTION IN PRETERM NEONATES. Lisa Roskes*, Bing Ma[1], Rose Viscardi[2], Alexandre Medina[3], and Sripriya Sundararajan[2], [1]Department of Microbiology and Immunology and [2]Division of Neonatology, [3]Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Necrotizing enterocolitis (NEC) is a devastating intestinal complication that affects premature infants. 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 maternal breast milk (MBM) offers protection against NEC by aiding the maturation of the intestinal barrier. While the protective effects of MBM vs. formula are well-documented, little is known about the modulating effect of donor breast milk (DBM) of enteral feeds on intestinal barrier function. We hypothesized that DBM is protective of intestinal barrier function in a similar manner to MBM. 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 240–326 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 (MBM, DBM, formula, or combinations of these), type and timing of fortification, growth parameters (weight, length and head circumference) and maternal delivery characteristics, including type of delivery and antibiotics exposure, were determined. 116 subjects have had measured IP thus far and 49 of them had high IP (La/Rh≥0.05). Subjects that received either MBM or DBM had significantly lower IP compared to infants that received formula. This was observed despite that face that formula-fed infants were larger and born at higher gestational ages, characteristics typically associated with lower 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.18

CLINICAL CHARACTERISTICS ASSOCIATED WITH DEVELOPMENT OF NODULAR REGENERATIVE HYPERPLASIA FOLLOWING LIVER TRANSPLANTATION.

Soumya Mishra*, Katherine Panagos[1], Ameer Halim[1], Ameer Abutaleb[2], Saad Malik[3], and Sasan Sakiani[2], [2]Division of Gastroenterology and Hepatology, [1]Department of Medicine and [3]Division of Transplantation, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Nodular regenerative hyperplasia (NRH) is associated with increased morbidity in liver transplant recipients. However, studies evaluating this disease have been few and small. Our study aim was to identify clinical and surgical factors associated with this disease process using the largest cohort of cases to our knowledge. We conducted a retrospective case-control study of patients receiving a liver transplant in our center from 2000-2019. Cases were defined as biopsy proven NRH following liver transplant (NRH+) and were matched 1:1 with controls that had no evidence of NRH on post-transplant biopsy (NRH-). 90 patients were included in the study including 45 NRH+ and 45 controls. Average age at time of transplant was similar between the groups (51 vs. 55, p=0.11). 59 (65%) patients were male and 31 (35%) were female (p=0.37). Most patients were either white (n=68, 75%) or black (n=14, 15%). Indications for transplant included cirrhosis due to hepatitis C (n=29, 32%), alcohol (n=22, 24%), and nonalcoholic steatohepatitis (n=12, 13%), as well as hepatocellular carcinoma (n=2, 2.2%), and cholangiocarcinoma (n=2, 2.2%). Both groups had similar rates of diabetes (p=0.63), hypertension (p=0.39), ascites (p=0.07), and variceal bleeding (p=0.38) prior to transplant. Pre-transplant, the NRH+ group had higher rates of atrial fibrillation (6 vs 0, p = 0.02) and varices (22 vs. 2, p<0.01) compared to controls. Post-transplant, NRH+ group had higher incidence of biliary anastomotic strictures (25 vs 3, p<0.01). Portal vein anastomosis type was not significantly different between the two groups (p=0.20). Immunosuppression regimens after transplant varied between groups, with significant differences in steroids (p<0.01), m-TOR inhibitors (p=0.05), and mycophenolate (p < 0.01). NRH- controls were more likely to be on steroids (69% vs 20%) and mycophenolate (93% vs 38%), while NRH+ patients were more likely to be on mTOR inhibitors (11% vs 0%). Rates of cardiac events defined as myocardial infarction, cardiac arrest, or pericarditis in the peri-transplant period or on post-transplant follow up visits were not significant between the two groups (p = 0.51). NRH development in liver transplant recipients is associated with higher rates of atrial fibrillation, pre-transplant varices, and post-transplant biliary anastomotic strictures. Further research is needed in understanding the role of immunosuppressive regimens as the data suggests that adding corticosteroids or mycophenolate may be associated with decreased incidence of NRH

following liver transplant, while the use of mTor inhibitors may be associated with increased incidence.

O.19

ESTABLISHING GENE TARGETS OF RFX1/3 AS TARGETS FOR SENSORINEURAL HEARING LOSS TREATMENT. Manaahil Rao*, Kathleen Gwilliam, and Ronna Hertzano, Department of Otorhinolaryngology - Head and Neck Surgery, University of Maryland School of Medicine, Baltimore, MD.

Sensorineural hearing loss (SNHL) is a permanent and devastating disability marked by the loss of hearing that affects hundreds of millions of people around the world. SNHL is often caused by the loss of non-regenerative hair cells within the cochlea of the inner ear. Therefore, it is essential to better understand the mechanistic pathways, including transcription factors, involved in hair cell development to develop therapeutics to regenerate hair cells and restore hearing. Recent research by the Hertzano laboratory has elucidated that the transcription factors RFX1 and RFX3 (RFX1/3) play a critical role in the development and maintenance of hair cells. Therefore, it is expected that the genes regulated by RFX1/3 are critical to the development of hair cells. An RNA-sequencing dataset from cochlear hair cells of postnatal day 7 (P7) *Rfx1/3* conditional knockout (cKO) mice, previously created by the Hertzano laboratory to identify RFX1/3 target genes, detected numerous downregulated genes in the *Rfx1/3* cKO mice compared to control littermates. We have used, Signal Amplification by Exchange Reaction (SABER), a novel, robust in-situ hybridization method, to validate some of these downregulated genes, specifically *1700001C02Rik* and *Tmprss3. 1700001C02Rik* and *Tmprss3* have similar expression patterns to *Rfx1/3*. Additionally, while *1700001C02Rik* is a novel gene with an unknown function in the ear, *Tmprss3* is a known deafness-causing gene. Using SABER, we have compared the expression of *1700001C02Rik* and *Tmprss3* between cochlear hair cells of *Rfx1/3* cKO mice (n=3) and control littermates (n=3). We hypothesize that the selected potential gene targets of RFX1/3 will have decreased expression in cochlear hair cells of *Rfx1/3* cKO mice compared to control littermates.

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.20

PROTEOMIC STUDY OF STROKE IN YOUNG ADULTS. William Zhu*, Huichun Xu[1], Brady Gaynor[2], Braxton Mitchell[2], and Steven Kittner[3], [1]Department of Medicine, [2]Department of Epidemiology and Public Health, and [3]Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

A prior systematic Mendelian randomization screen of 653 circulating proteins in a predominantly older ischemic stroke (IS) population identified a causal role for several established and novel biomarkers for IS and IS subtypes. We contrasted the magnitude of genetically determined levels of 6 of these biomarkers between early- and late-onset IS. We constructed genetic risk scores (GRS) for these 6 protein biomarkers from previously published GWAS analyses carried out in European populations. Using regression analysis, we evaluated associations of these GRS with IS and IS subtypes in 10,549 early onset (ages 18-59) and 9272 late onset (ages 60 and older) IS cases and associated controls. The Wald test was used to test for heterogeneity in the odds ratios between the two groups. Of the 6 biomarkers, only genetically determined protein levels of histo-blood group ABO system transferase were more strongly associated with early compared to late onset stroke ($p < 0.002$). Higher genetically determined levels of F11 and LPA and lower genetically determined levels of MMP12 were associated with both early and late onset IS with no evidence for differential effect sizes, while genetically determined levels of CD40 and SCARA5 showed no association with either early or late onset stroke. In subtype-specific analyses, increasing levels of genetically determined F11 were

correlated with increased risk of all strokes in both groups. Higher genetically determined LPA levels were associated with large artery atherosclerotic (LAA) strokes in both groups, while lower genetically determined MMP12 levels were associated with LAA strokes in both groups. Genetically determined histo-blood group ABO system transferase levels are more strongly associated with all strokes in early than in late onset stroke. Genetically determined blood protein levels of F11, LPA, and MMP12 were associated with both early and late onset stroke. Lack of association for CD40 and SCARA5 may be due to a smaller sample size than the initial discovery study.

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 by Dr. Steven Kittner of the Department of Neurology, UMSOM.

O.21

CCN2 KNOCKOUT DEMONSTRATES ENHANCED ACHILLES TENDON HEALING IN ADULT MICE. Danielle Sim*, Kathryn Grescovich[1], Jocelyn Wu[2], Natalie Leong[1], and Jie Jiang[1], [1]Department of Orthopaedics, [2]University of Maryland School of Medicine, Baltimore, MD.

Tendon injuries are common orthopaedic conditions, with an estimated economic cost of over $40 billion annually in the US. They significantly impact patients' quality of life and ability to meet their occupational, recreational, and health goals. There is a considerable need for better clinical options to augment both surgical and non-surgical tendon injuries. Thus, a mechanistically-based biologic treatment to promote tendon healing would be beneficial. CCN2, also known as Connective Tissue Growth Factor, is a member of the CCN family of matricellular proteins. It has important roles in many biological processes, but most importantly, it is known to be associated with virtually all fibrotic pathology, including tendon repair. However, much remains to be learned about the exact role of CCN2 during tendon repair. We hypothesized that knockout of CCN2 during tendon fibrous scar formation will result in less fibrous scar formation and improved tendon healing. Inducible conditional CCN2 knockout mice were generated by crossing CCN2 floxed mice with CAGACreERT2 mice (CCN2iKO). After complete deletion of CCN2 in adult mice with tamoxifen, the Achilles tendon was completely transected. Following euthanasia, the entire hindlimb was isolated, fixed, and sectioned. Hematoxylin and eosin staining and immunohistochemistry for αSma (myofibroblasts) were performed. After 28 days post-injury, dramatically improved Achilles tendon healing was observed in CCN2iKO mice as compared to wild type littermates. Additionally, a drastic reduction of alpha smooth muscle actin (αSma) positive myofibroblasts in CCN2iKO mice was observed as compared to WT littermates. These results suggest that myofibroblasts may be involved in promoting fibrous scar formation, and that CCN2 improves tendon healing in part through downregulating their activity. While the data shows that knocking out CCN2 can reduce fibrotic markers, the exact mechanism behind this finding remains unclear. Further study of fibrotic markers of interest as well as structural and mechanical analyses at multiple time points are needed to improve our limited understanding of the role of CCN2 in fibrous scar formation in tendon.

This work was supported in part by Career Development Award Number IK2 BX004879 from the United States (U.S.) Department of Veterans Affairs Biomedical Laboratory R&D (BLRD) Service, the Lisa Dean Moseley Foundation, and the Orthopaedic Research and Education Foundation.

O.22

THE ROLE OF PD-1/PD-L1 RECEPTOR-LIGAND IN THE MIGRATION OF CD8 T CELLS TO PROMOTE IMMUNE TOLERANCE. Emma Silverman*, Jonathan Bromberg, and Wenji Piao, Department of Microbiology and Immunology, University of Maryland School of Medicine, Baltimore, MD.

Over-reactive immune responses, as seen in transplant patients, can lead to devastating results. Post-transplantation, patients require pharmacologic immunosuppression to prevent alloimmunity driven organ rejection. The PD-1 receptor and its ligand though, have been understood to play a

critical role in inhibiting the immune response. Activation of this PD-1 receptor reduces both T cell response and B cell antibody production (7). Further, the PD-1/PD-L1 signaling has been implicated in tumor cells' ability to evade the immune system (5,6). This PD-1 pathway is also involved in the regulation of autoimmunity, including the function and development of T regulatory cells (Tregs) (13). This study aims to better understand the interaction of migrating cell PD-1 and endothelial PD-L1 involved in the transendothelial migration (TEM) of immune cells. Currently, Treg and T effector cells are under investigation concerning PD-1/PD-L1's role in their migration across lymphatics. Little is known though about the role of PD-1/PD-L1 signaling and CD8 T cell lymphatic endothelial cell migration. We found that PD-L1 on LEC plays a critical role in migration through the endothelium in a mouse model. Using both wildtype murine LECs and PD-L1 knockout murine LECs, we mimicked lymphatic TEM through a pre-validated method from this laboratory involving boyden chamber migration assays. By pretreating freshly isolated T cells with different monoclonal blocking antibodies, we hope to identify how PD-L1 signaling on LECs interacts specifically with CD8 T cells. A stronger grasp on PD-1/PD-L1 interactions within immune cell TEM would allow us to better manipulate the immune system to prevent immune-mediated demise in transplant rejection, but also in improving immunological protection in cancer.

This research was supported by the American Society of Transplant Surgeons Presidential Student Mentor Grant and by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.23

INVESTIGATING RECONSTITUTED B LYMPHOCYTES FOLLOWING IMMUNOSUPPRESSION IN A PIG-TO-BABOON CARDIAC XENOTRANSPLANTATION MODEL. Harsha Rao*, Avneesh Singh, Alena Hershfeld, John Treffalls, Corbin Goerlich, and Muhammad Mohiuddin, Division of Cardiac Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Heart transplantation is the optimal treatment for patients with end-stage heart failure following maximal medical therapy. At any given time, there are nearly 3,000-4,000 patients waiting for a heart transplant in the United States. Unfortunately, there is a shortage of donor hearts despite an increasing population of potential recipients. As a result, a growing number of patients have succumbed to their illness while waiting for an organ. Our group has proposed cardiac xenotransplantation from transgenic pig donors to bridge this gap and our study involves investigating xenograft function in baboon recipients. We have previously demonstrated long-term survival of cardiac xenografts from α1,3-galactosyltransferase gene-knockout pigs which also express human complement regulatory protein CD46 and human thrombomodulin (*GTKO.hCD46.hTBM*). Our immunosuppression regimen comprised of induction with anti-thymocyte globulin, αCD20, and αCD40 antibody, followed by maintenance with mycophenolate mofetil and an intensively dosed αCD40 antibody. We were the first to demonstrate that perioperative use of αCD20 antibody to deplete B lymphocytes and αCD40 antibody as a co-stimulatory blockade were crucial in overcoming antibody-mediated rejection of xenograft. B lymphocytes are reconstituted around two months following immunosuppression. Monitoring their levels over the course of transplant recovery would allow us to assess correlation between xenograft dysfunction and antibody-mediated rejection. In this study, we describe our experience with isolating B lymphocytes from peripheral blood mononuclear cells and quantifying corresponding IgM and IgG levels using enzyme-linked immune absorbent spot (ELISpot). Our data was remarkable for IgM response with no appreciable IgG response when peripheral blood from naïve baboon was tested. Investigating reconstituted B lymphocyte levels in our study recipients would help us gain further insight into donor heart immunogenicity, thereby extending rejection-free survival of the xenograft.

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.24

DIFFERENTIAL DENDRITIC CELL RECRUITMENT INDUCED BY THE GUT MICROBIOTA IN CARDIAC TRANSPLANTATION. Zachariah L. Lee*, Jegan Iyyathurai[1], Ram Lakhan[1], Samuel J. Gavzy[2], Vikas Saxena[1], and Jonathan S. Bromberg[3], [3]Division of Transplantation, [2]Department of Surgery, [1]University of Maryland School of Medicine, Baltimore, MD.

The gut microbiota species *Bifidobacterium pseudolongum* and *Desulfovibrio desulfuricans* are associated with murine cardiac allograft survival and rejection, respectively, yet the exact causal pathways involved remain uncharacterized. This study aimed to identify the effects of these constituents on innate immunity that subsequently influence allograft survival. C57BL/6 mice were treated with antibiotics followed by fecal microbiota transplant by oral gavage with *B. pseudolongum* or *D. desulfuricans*. Cardiac transplants were then performed on day 0, and RS504393, a selective CCR2 antagonist that inhibits macrophage migration, was administered for 7 days. Tacrolimus was also administered daily starting on day 0 until euthanasia and harvest of tissues on day 60. Changes in CD11c+ dendritic cell (DC) content in intestine, lymph nodes (LNs), and spleen were analyzed by immunohistochemistry and flow cytometry. The *Bifidobacterium* group had significantly more DC in the intestine compared to *Desulfovibrio* and control, while both *Bifidobacterium* and *Desulfovibrio* groups had increased DC in downstream mesenteric LNs. In systemic peripheral LNs, only the *Desulfovibrio* group showed decreased DC content compared to *Bifidobacterium* and control. Flow cytometry showed an increase in the tolerogenic CD11c+ CD11b+ DC subset in the spleen for the *Bifidobacterium* group. The results demonstrate how gut microbiota constituents differentially regulate DC migration to and retention in intestines as well as regional and systemic LNs. This subsequently can lead to downstream differences in immune cell recruitment in the lymphoid organs, ultimately affecting long-term allograft survival.

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 the Presidential Student Mentor Grant, American Society of Transplant Surgeons.

O.25

INFLAMMATORY CYTOKINES AND COGNITION FOLLOWING HIP FRACTURE. Claire Morton*, Ann Gruber-Baldini[1], Andrew Goldberg[2], Brock Beamer[2], and Larry Magder[1], [1]Department of Epidemiology and Public Health and [2]Division of Geriatrics, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Hip fracture among older adults poses a risk for loss of independence and results in significant health burden. Inflammatory levels after hip fracture is associated with increased disability and death (Cappola 2003). This study examines the relationship of three specific inflammatory markers, IL1-RA, IL6, and TNFalpha with cognition, as measured by MMS scores. We studied 339 individuals who had been enrolled in the Baltimore Hip Study (Orwig 2018). The Baltimore Hip Study cohorts are described in detail elsewhere. The 179 patients who had 3MS, IL1-Ra, IL6 and TNFalpha reported at both the initial and 2 month time points were included in these analyses (n=179). These patients had an average age of 81 for females and 80 for males, were 12% non-white among the females and 16% non-white among the males. Inflammatory marker distributions were log transformed to reduce skew. The majority of patients (~60%) had no change in their 3MS score 2 months after hip fracture. An additional 25% had an increase or decrease of 8 points, which is considered a clinically significant change (Andrew MK and Rockwood K 2008). Those who had an increase in IL6 had the greatest decline in average MMS. Patients with an increase in TNFalpha had the greatest decline in MMS. Most patients had a decline in IL1-RA in the two months following fracture, but those with the smallest reduction had the biggest decline in 3MS. These findings suggest a relationship between cognitive status and inflammatory state among patients following hip fracture. The groups of patients with either an increase, as is the case with TNFalpha or IL6, or smallest decrease, in the case of IL1-

RA, exhibit a greater worsening of their cognitive decline. In summary, this study suggests that among patients who suffer a hip fracture, those with the greatest degree of inflammation have the worst cognitive outcomes, but that for those patients not living at extremes inflammation does not seem to have a meaningful effect on cognition. Future goals include assessing more predictors of improvement or worsening in cognitive function and their interaction with inflammatory markers in the months following hip fracture.

O.26

THE RELATIONSHIP OF INFLAMMATION WITH ANTIBODIES TO GLIADIN (AGA IGG) IN PERSONS WITH SCHIZOPHRENIA. Emily Daniels*, William Eaton[1], Daniela Cihakova[2], Chen Mo[3], Monica Vladut Talor[2], and Deanna L. Kelly[4], [1]Department of Mental Health, Johns Hopkins University School of Bloomberg School of Public Health, [2]Department of Pathology, Johns Hopkins University School of Medicine, and [4]Department of Psychiatry, [3]University of Maryland School of Medicine, Baltimore, MD.

Recently it has been found that many people with schizophrenia have high levels of antibodies to gliadin (AGA IgG) (1), a protein found in barley, wheat, and rye. A gluten-free diet has shown to decrease negative symptoms among people with schizophrenia who have high AGA IgG (2). Other emerging data suggests that high AGA IgG may be associated with high levels of peripheral and central inflammation (3). Here we examine the relationship of inflammatory markers to AGA IgG levels in 417 people with schizophrenia. Participants with a DSM-5 diagnosis of schizophrenia or schizoaffective disorder had a serum sample to determine the levels of AGA IgG as well as a battery of inflammatory markers (GM-CSF, IFNγ, IL-17A, IL-1β, IL-6, and TNFα). AGA IgG was analyzed by using a semi quantitative ELISA assay from Inova Diagnostics (>20U = positive; <20U = negative). Cytokines were measured using EMD Millipore's MAP Human Cytokine Magnetic Bead panel (Luminex bead-based immunoassays) (Millipore, Billerica NY). The readout was completed using a Bioplex 200 platform (Biorad, Hercules CA) to determine the concentration of multiple target proteins in the specimens. The rate of AGA IgG positivity among the sample was 38.1%. Interestingly, in the group positive for AGA IgG antibodies (>20U), their values were moderately associated with all pro-inflammatory cytokines, including GM-CSF ($R=0.36$, $p<0.0001$), IFNγ ($R=0.28$, $p=0.00042$), IL-17A ($R=0.23$, $p=0.0032$), IL-1β ($R=0.33$, $p<0.0001$), IL-6 ($R=0.37$, $p<0.0001$), and TNFα ($R=0.2$, $p=0.013$). However, in the group found to be negative for AGA IgG (<20U), R values were all less than 0.20, suggesting little relationship of inflammation to these antibodies. These results replicate other emerging data and confirm our hypothesis that high AGA IgG seen in patients with schizophrenia are related to peripheral inflammation. This also demonstrates that the relationship between anti-gliadin antibodies and the immune response exists for those with positive anti-gliadin antibodies, further supporting the theory of a potential subgroup of schizophrenia patients whose symptomatology may be due to underlying inflammation related to AGA IgG.

This research was supported in part by the National Institute of Mental Health (NCT03183609, R01MH112617-01, PIs: DL Kelly and WW Eaton) and 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.27

LENS THICKNESS IN CONGENITAL AND CHILDHOOD CATARACTS: A CASE CONTROL STUDY. Sarah Byun*, Alexandra Dolgetta[1], Moran Levin[2], and Janet Alexander[2], [2]Division of Pediatrics, Department of Ophthalmology and Visual Sciences, [1]University of Maryland School of Medicine, Baltimore, MD.

Childhood cataract is defined as a lens opacity resulting in reduced visual acuity observed in the first few years of life. As the most common cause of preventable pediatric vision loss worldwide, early diagnosis is key to achieve good visual function. Literature suggests that congenital cataracts are

associated with altered lens structure, but no quantitative baseline has been established for the difference in lens structure in pediatric cataract versus control eyes. This study aims to determine agreement of lens measurement techniques, describe lens thickness among cataracts and controls, determine covariates associated with lens thickness and cataract, and evaluate the adjusted association between lens thickness and cataract. 63 subjects, 109 eyes (34 subjects, 53 eyes with cataracts and 40 subjects, 56 eyes as controls) were recruited prospectively at 0-5 years old and imaged using ultrasound biomicroscopy (UBM). Lens thickness was measured using ImageJ and ultrasound biomicroscopy software. Two observers measured lens thickness in two UBM images per eye. Inter-observer agreement was determined by calculating intraclass correlation (ICC) and assessing a Bland-Altman plot, both of which indicated excellent reliability between image measurement tools (ICC = 0.986) and between observers (ICC = 0.989). Our data suggest childhood cataract eyes have significantly thinner lenses than control eyes (p=0.0008). Stratifying for laterality and prematurity did not yield significant difference in lens thickness in cataract or control groups. Children 0-5 years old with cataracts were 2.9 times more likely to have a lens thickness less than 3.5mm, which increased to 6.6 times if under 7 months of age. Laterality of cataract did not affect odds of having a lens thickness less than 3.5mm. When controlling for age and compensating for correlation between eyes from the same patient, the odds of having cataract decreased by 2.66 for every 1mm increase in lens thickness. We anticipate the results of our study will expand our understanding of the role of lens thickness in childhood cataracts and its prognostic use as an objective measurement in pediatric patients.

This study was funded by: Proposed Research Initiated by Students and Mentors (PRISM) Program (University of Maryland School of Medicine, Office of Student Research), Knights Templar Eye Foundation Career Starter Grant, National Institutes of Health (NIH) UMB ICTR/Clinical Science and Translational Science KL2 Award KL2TR003099 and NIH/National Eye Institute (NEI) R43EY0300798.We acknowledge the support of the University of Maryland, Baltimore, Institute for Clinical & Translational Research (ICTR) and the National Center for Advancing Translational Sciences (NCATS) Clinical Translational Science Award (CTSA) grant number 1UL1TR003098.

O.28

IMPACT OF CHRONIC SYSTEMIC STEROIDS ON INTRAOCULAR PRESSURE AND GLAUCOMA IN IBD PATIENTS. Amrik Gill*, Uni Wong[1], Abigail Noyes[1], and Ramya Swamy[2], [1]Division of Gastroenterology and Hepatology, Department of Medicine and [2]Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Glaucoma is a chronic, progressive, irreversible cause of blindness and the only known modifiable risk factor is a reduction in intraocular pressure (IOP). Steroid-induced ocular hypertension was first characterized in 1950, and there has been a clear relationship identified between ophthalmic steroid medications and IOP elevation. Periocular, intravitreal, and topical ophthalmic steroid medications have been identified as causes of ocular hypertension (IOP elevation), and they increase a patient's risk for glaucoma. Currently, the link between systemic steroids and intraocular pressure has not been well studied. Our study aims to examine the relationship between systemic steroids and IOP as well as to help healthcare providers screen individuals who might be at a higher risk for this condition. We set out to assess this relationship with a cross-sectional observational study. Adult patients in the inflammatory bowel disease (IBD) clinic at UMMS who were on systemic steroids for management of their condition were consented and screened. IOP measurements and patient history were conducted for each patient that met the study criteria. If a patient had an IOP ≥21 they received a referral to the ophthalmology clinic for further glaucoma diagnostic testing. 46 patients were recruited for the study and were noted to be on systemic prednisone or budesonide. 14 of the 46 patients had an IOP elevation in one or both eyes and they were referred to the ophthalmology clinic for further evaluation and testing. Additional data including screening a large population of IBD patients on systemic steroids will help us determine the prevalence of steroid response in this population and identify the minimum dosage and treatment duration required for a significant change in IOP.

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.29

CHARACTERIZATION OF CATARACTS WITHIN TRISOMY 21 PATIENTS USING ULTRASOUND BIOMICROSCOPY. Dhruv M. Shah*, Zahur Fatima Sallman[1], Moran R. Levin[2], and Janet L. Alexander[2], [2]Division of Pediatric Ophthalmology and Strabismus, [1]Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

The incidence of Trisomy 21 (T21) has steadily increased over the last 30 years due to trends of advancing maternal age, improved disability services, and decreased abortion rates for T21 pregnancies. The most sight threatening comorbidity is early onset cataract, found in 15% of T21 patients. Few studies detail structural variations in the anterior segment of pediatric T21 patients with cataract. The quantitative features of associated subclinical anomalies of the anterior segment in T21 cataracts may inform our understanding of the pathogenesis of disease and may correlate with outcomes. Ultrasound Biomicroscopy (UBM) is a high-resolution imaging technique allowing noninvasive in-vivo imaging of these anterior segment structures. This prospective case-control study compares structural features in UBM images between pediatric T21 patients and age-matched controls. We examined 23 subjects (27 eyes) with 2:1 age matching for each eye with T21 (n=9) using generalized estimating equations to account for inclusion of more than one eye per subject. Iris and cornea parameters were compared using Students t-test. Preliminary data identified significantly lower iris thickness (0.53 vs. 0.68 mm, $p<0.05$) and lens thickness (3.14 vs. 3.63 mm, $p<0.05$) in T21 compared to control patients. Data shows no significant difference in angle opening distance (38.67 vs 39.80 degrees, $p=0.82$) between T21 and controls. In conclusion, some features of the anterior eye are altered in Trisomy 21 compared to age-matched controls. Future studies will evaluate vision and complication outcomes related to the structural variants observed in this study.

This study was funded by the Proposed Research Initiated by Students and Mentors (PRISM) Program, (University of Maryland, School of Medicine), the Knights Templar Eye Foundation Career Starter Grant, the National Institutes of Health (NIH) UMB ICTR/Clinical Science and Translational Science KL2 Award KL2TR003099 and NIH/National Eye Institute (NEI) R43EY0300798. We acknowledge the support of the University of Maryland, Baltimore, Institute for Clinical & Translational Research (ICTR) and the National Center for Advancing Translational Sciences (NCATS) Clinical Translational Science Award (CTSA) grant number 1UL1TR003098.

O.30

NON-CONTACT LASER SPECKLE CONTRAST IMAGING IN PREMATURE INFANTS WITH RETINOPATHY OF PREMATURITY. Tara Balasubramanian*, Alfred Vinnett[1], Noela Lu[2], Kristin Williams[3], Moran Levin[2], and Janet Alexander[4], [3]Department of Ophthalmology and Visual Sciences, University of Maryland, Baltimore and [4]Division of Pediatric Ophthalmology and Strabismus, [1]Department of Ophthalmology and Visual Sciences, [1]University of Maryland School of Medicine, Baltimore, MD.

Retinopathy of prematurity (ROP) is a condition of abnormal vascular development in the retina that affects premature infants. ROP can progress to retinal detachment and total blindness if left untreated. Early detection and intervention is critical to prevent infant blindness. The current standard ROP screening, direct examination by an ophthalmologist using binocular indirect ophthalmoscopy, is widely considered to induce physiologic stress in infants, and the assessment of the retinal examination is highly subjective. This study aims to develop a novel approach to ROP screening that reduces both stress and subjectivity, to address these major shortcomings in the current standard of care. The XyCAM Neo is a novel retinal imager that utilizes dual laser speckle contrast imaging and fundus photography to image the vasculature of the retina while capturing measurements of blood flow. This imager does not directly contact the eye during examination and requires neither a bright

light nor an eyelid speculum. Laser speckle outputs offer dynamic, quantitative data including local and global blood flow and vessel caliber. In this study, we obtained retinal images and flow data from 12 subjects age 4 - 12 weeks, with gestational ages between 22 and 32 weeks, and birthweight between 400 and 1500 grams. Our outcomes will include blood flow by vessel, blood vessel diameter, arterial vs venous mapping, and microvessel density. These outcomes will be summarized and compared between subjects less than 36 weeks and subjects greater than 36 weeks using paired t-tests. We hypothesize that objective measures of blood flow and mapping will differ between the younger and older group of premature infants. These findings will inform our understanding of dynamic quantitative features of ROP screening and may support future use of non-contact laser speckle imaging for ROP examination.

This study was funded by the Proposed Research Initiated by Students and Mentors (PRISM) Program, (University of Maryland, School of Medicine), the National Capital Consortium - Pediatric Device Initiative, the Little Giraffe Foundation, and the NIH/National Eye Institute (NEI) 2019 SBIR Award R43EY030798.

O.31

IMPAIRED REORGANIZATION OF CENTROSOME STRUCTURE UNDERLIES INFANTILE DILATED CARDIOMYOPATHY. Matthew Miyamoto*, Young Wook Chun, Daniel Fong, Charles Williams, and Charles Hong, Division of Cardiology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

During postnatal cardiomyocyte (CM) development, the centrosome undergoes a dramatic structural reorganization where its structural components, previously localized at the centrioles, become localized to the nuclear envelope. This developmental program, termed "centrosome reduction", has been associated with postnatal cell cycle exit but is otherwise relatively unstudied. Here, we describe an infant with infantile dilated cardiomyopathy (iDCM) whose impaired cardiac function, and disrupted sarcomere and mitochondria structures were modeled using induced pluripotent stem cells (iPSCs). The causal gene encodes the centrosomal protein rotatin (RTTN), representing the first time a centrosome defect has been found to cause nonsyndromic dilated cardiomyopathy (DCM) in humans. Genetic knockdowns in zebrafish and Drosophila confirm an evolutionarily conserved requirement of RTTN for cardiac structure and function. Mutant iPSC-derived cardiomyocytes (iDCM-CMs) exhibited impaired centrosome reduction, resulting in persistent localization of the pericentriolar material at the centriole and global microtubule network defects. We also identified a small molecule that restored centrosome reduction and significantly improved the structure and function of the iDCM-CMs. In summary, this study demonstrates a novel role of RTTN in centrosome reduction and CM maturation required for cardiac structure and function, and suggests a potential therapeutic strategy for iDCM.

This research was upported in part by an Alpha Omega Alpha Carolyn L. Kuckein Student Research Fellowship.

O.32

THE ASSOCIATION OF DIASTOLIC DYSFUNCTION AND POSTOPERATIVE MORBIDITY IN GERIATRIC PATIENTS WITH ORTHOPEDIC INJURIES. Ananya Sarkar*, Mira Ghneim[1], Ashley Menne[1], and Justin Richards[2], [1]Division of Surgical Critical Care, Department of Surgery and [2]Division of Trauma Anesthesiology, Department of Anesthesiology, University of Maryland School of Medicine, Baltimore, MD.

Musculoskeletal injuries are a concerning problem in older adults and surgical interventions present a burden for both the patient and the hospital. Previous research has indicated that cardiac comorbidities lead to worse outcomes and an important negative outcome is acute kidney injury (AKI) which increases the risk of multiple organ failure. While systolic function is a common measure of perioperative cardiac risk, diastolic dysfunction is being recognized as a significant marker of

postoperative morbidity and mortality. Current data on the association between diastolic dysfunction and AKI in older trauma patients is limited. One measure to categorize severe diastolic dysfunction is elevated left atrial pressure (LAP), defined on echocardiography with tissue doppler imaging as the lateral mitral annulus E' < 10 and E/E' > 10. The purpose of this project is to perform a retrospective cohort study to determine whether diastolic dysfunction will identify cardiac disease that is associated with postoperative complications in older adult trauma patients, defined as ≥65 years of age, with severe lower extremity injuries. Our specific goal is to evaluate the association of elevated LAP and AKI. We hypothesize that there is an association between diastolic dysfunction and AKI and is associated with worse postoperative outcomes. 479 patients with perioperative transthoracic echocardiography (TTE) with a severe lower extremity injury, defined as an Abbreviated Injury Scale score >3 admitted to the Shock Trauma Center were included. We used a logistical regression model to calculate odds ratios (OR) for the following variables that have demonstrated an association with AKI in previous studies in trauma patients: age (median 75 years), injury severity score (median 9), female gender (306/479, 63.9%), and admission systolic blood pressure (median 145 mmHg). AKI was determined by KDIGO criteria. Patients with elevated LAP were more than twice as likely to develop AKI than patients without elevate LAP (OR: 2.05 [95% CI: 1.27-3.31]. No other confounding variables were significantly associated with AKI. A sensitivity analysis of the 387 patients with normal EF (> 55%) was performed with an OR of 2.12 [95% CI: 1.21-3.71]. We conclude that an increased LAP is associated with a greater risk of developing AKI, even in patients with a normal ejection fraction.

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.33

THE IDEAL TRANSCUTANEOUS PACER PAD POSITION. Priya Patel*, Nick Brady[1], and Siamak Moayedi[2], [2]Division of Hyperbaric Medicine, Department of Emergency Medicine, [1]University of Maryland School of Medicine, Baltimore, MD.

Transcutaneous cardiac pacing is a lifesaving procedure for patients with certain types of unstable bradycardia. There are 2 main recommended pacer pad application sites: the anterior-posterior (AP) and the anterior-lateral (AL). To date, major resuscitation guidelines do not state which placement is preferred owing to lack of evidence. We aimed to assess the difference in the pacing threshold measured in mA between these 2 pacer pad positions. We conducted a prospective crossover trial in which participants functioned as their own controls to compare the pacing threshold of these 2 pacer pad positions. We enrolled patients who presented to the electrophysiology lab for elective cardioversion of stable atrial fibrillation or flutter. Once successful cardioversion to sinus rhythm was confirmed, the sedated participants were sequentially paced in both the AP and AL positions to determine the respective pacing threshold. The starting pacer pad position was alternated between each participant. The study procedure concluded after successful capture or inability to achieve capture by 140 mA (the pacer's maximum output) in both positions. Twenty-four patients were screened; 13 were enrolled in the study. Four participants were excluded from the analysis (3 were prevented from pacing in the second position at the anesthesiologist's discretion, and 1 did not capture in either position). The study population consisted of 6 men and 3 women with a mean age of 62 years (SD 12.2). The AP position was associated with a pacing threshold that was on average 28 mA lower than the AL position (P value = 0.003, 95% CI 12.2-43.4). The relative risk of capture for AP vs AL pacing was 1.30 (95% CI 0.83-2.03). Placing pacer pads in the AP position requires less energy and is 30% more likely to capture. Major resuscitation guidelines should favor the AP position for transcutaneous cardiac pacing.

This research was supported in Part by the Program for Research Initiated by Students and Mentors (PRISM) sponsored by the University of Maryland School of Medicine Office of Student Research, the Medical Student Grant sponsored by the Emergency Medicine Foundation and the

Society of Academic Emergency Medicine, and the University of Maryland Emergency Department.

O.34

CONTRAST-ENHANCED DUPLEX ULTRASOUND ASSESSMENT OF EXERCISE-INDUCED MICROVASCULAR PERFUSION DEFICITS IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE. Matthew Chrencik*, Steven J. Prior[1], Eric Christensen[1], Rishi Kundi[2], and Brajesh K. Lal[2], [1]Division of Gerontology and Geriatric Medicine, Department of Medicine and [2]Division of Vascular Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Clinical care and trials for peripheral artery disease (PAD) are limited by a lack of accurate and reliable quantification of perfusion deficits, which hinders objective quantification of improved blood flow after any type of treatment. Our goal was to develop a standardized protocol to assess exercise-induced changes in lower extremity muscle perfusion using contrast-enhanced duplex ultrasound (CE-DUS). CE-DUS was used before and immediately after a 10-minute standardized bout of treadmill walking to compare microvascular perfusion of the gastrocnemius muscle in 15 PAD patients and 13 normal controls. Perflutren lipid microspheres were infused, and acoustic intensity in the gastrocnemius muscle was quantified over time. The primary outcomes were microvascular blood volume (MBV) and microvascular flow velocity (MFV) at rest and changes in these variables during treadmill exercise. We also measured the Modified Physical Performance Test (MPPT) score to assess mobility function. Data are presented as means ± standard error of the mean and analyzed with repeated-measures analysis of variance and Spearman correlation. PAD patients and controls were well matched with respect to age and body mass index. At rest, neither MBV nor MFV ($P = .25$) was significantly different in PAD patients compared with normal controls. Conversely, walking elicited perfusion deficits in PAD patients that were quantifiable with CE-DUS. After exercise, MBV was ~40% lower in PAD patients compared with normal controls ($P = .04$). Additionally, MFV was ~60% higher in PAD patients compared with normal controls after exercise ($P = .01$). Neither MBV nor MFV correlated with ankle-brachial index; however, both basal and exercise MBV directly correlated with the MPPT score in PAD patients ($r = 0.56$-0.62; $P < .05$). We present a clinically implementable standardized CE-DUS protocol for exercise stress testing of the lower extremities that quantifies perfusion. Measurements are feasible in the clinical environment, are related to mobility function, and provide a potential method to assess therapeutic efficacy in PAD patients.

This research was supported by the State of Maryland Industrial Partnerships (MIPS) grant.

O.35

EXPLORING THE ROLE OF EPICARDIAL FAT IN ATHEROSCLEROTIC AND INFLAMMATORY STATES. Mark Sonbol*, Nahom Seyoum*, Ian Qian[1], and Jean Jeudy[2], [2]Department of Diagnostic Radiology and Nuclear Medicine, [1]University of Maryland School of Medicine, Baltimore, MD.

CT quantification of epicardial fat volume (EFV) may be an important biomarker that is more specific for atherosclerosis risk than HIV and HCV inflammatory states. Here we seek to measure EFV via CT in participants living with HIV, hepatitis C (HCV), or neither (n = 12 for each group; mean age 50 -57, men) and to compare with the total low attenuation volume (TLAV), a measure of low-density lipid plaque, in the LAD and RCA. Our findings showed that, average EFVs of the HIV group are 50 ± 20 cm3, of the HCV group are 80 ± 30 cm3, and of the healthy group are 80 ± 40 cm3. For EFV, the p-value between HIV and HCV groups is 0.030, HIV and healthy groups is 0.025, and HCV and healthy groups is 0.48. Average and TLAVs of the HIV group are 0.1 ± 0.1 cm3, of the HCV group are 0.2 ± 0.1 cm3, and of the healthy group are 0.16 ± 0.09 cm3. For TLAV, the p-value between HIV and HCV groups is 0.32, HIV and healthy groups is 0.22, and HCV and healthy groups is 0.98. Average coronary artery calcium (CAC) scores of the HIV group are 10 ± 10, of the HCV group are 100 ± 100, and of the healthy group are 100 ± 300. For CAC scores, the p-value between HIV and

HCV groups is 0.015, HIV and healthy groups is 0.14, and HCV and healthy groups is 0.97. In conclusion, the HIV group had the least EFV and TLAV when compared to the HCV and healthy groups. The difference in EFV and TLAV between the HIV and the healthy groups were statistically significant. The increased EFV in the healthy group is surprising and not consistent with existing literature. HIV and HCV infections can cause an inflammatory state, and EFV development can be a result of or contributor to inflammation. However, the association between increased EFV with increased TLAV and CAC is consistent with EFV being an indicator for coronary artery plaque development, which is consistent with previous studies. In this study, EFV is associated with TLAV and CAC more than other inflammatory, pathologic, and adipose characteristics of the heart and the body, suggesting that EFV characterization is more associated with coronary artery disease (CAD) progression than the inflammatory states of HIV or HCV.

O.36

ARE THE PHYSICOCHEMICAL METHOD AND SPECIFIC ELECTROLYTE ABNORMALITIES ASSOCIATED WITH MORTALITY AND MULTIPLE ORGAN FAILURE IN TRAUMA PATIENTS? Nelson Chen* and Justin Richards, Division of Trauma Anesthesiology, Department of Anesthesiology, University of Maryland School of Medicine, Baltimore, MD.

Acid-base disturbances are highly associated with mortality in trauma patients. Traditional methods of determining acid-base status, including anion gap and base deficit, are typically confounded by a variety of factors, making them suboptimal indicators. The physicochemical method is another method that can be used to determine acid-base disturbances and is based on the principles of electroneutrality and conservation of mass. The strong ion gap (SIG) is calculated from this method and has been associated with mortality in trauma patients. This study focuses on the association between SIG and multiple organ failure (MOF) and acute kidney injury (AKI). A retrospective cohort study was conducted in which relevant details including demographics, injury characteristics, and admission physiologic data were collected. Descriptive statistics were performed on the study population. Continuous data are reported as the mean and standard deviation (SD) and categorical data are presented as frequency, percent (n, %). The affective Strong Ion Difference (SID) was calculated as: $(Na^+ + K^+ + Ca^{2+} + Mg^{2+})$ and the effective SID was calculated as: $(2.46 \times 10^{-8} \times P_{CO2}/10^{-pH}) + ([\text{albumin}] \times (0.123 \times pH - 0.631) + ([PO_4] \times (0.309 \times pH - 0.469)$. The SIG = SIDa-SIDe. All laboratory values were obtained within 2-hours of admission and within 60-minutes of each other. Patients that died during hospitalization were recorded. Differences in the SIG among patients that survived compared to patients that lived were compared with the Student's t-test. Subgroup analysis of patients with a normal lactate (i.e. <2.6mmol/L) was also performed. $P<0.05$ was considered statistically significant. 448 patients were included, and the mean Injury Severity Score was 23.5 (SD: 14.5), indicating a severely injured population. 95 (21.2%) patients died. The mean SIG in patients that died was 14.9 (SD: 15.6) compared to 13.7 (SD: 5.5) in patients that lived ($p=0.23$). In patients with a normal lactate the SIG was significantly higher in patients that survived (17.3, SD: 4.1 vs 13.7, SD: 5.1; $p=0.04$). Ongoing data collection and analysis will look at the association between SIG and MOF as well as SIG and AKI.

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.37

OPTIMIZING SAFETY AND EFFICACY OF INTENSE PULSED LIGHT THERAPY IN SKIN OF COLOR. Elisabeth Fassas* and Gibran Shaikh, Department of Dermatology, University of Maryland School of Medicine, Baltimore, MD.

Intense pulsed light (IPL) has been demonstrated to be an effective modality for a wide array of medical and aesthetic indications. Nevertheless, most of the literature has focused on white skin despite an increase in demand for IPL procedures in patients with skin of color, who are more prone

to light- and laser-related side effects. We review here techniques and device parameters to maximize safety and efficacy in this population. We conclude by describing specific indications with unique treatment considerations in pigmented skin. Used correctly, IPL is a versatile, safe, and effective tool in most skin types.

O.38

PREOPERATIVE FACTORS ASSOCIATED WITH WORSE PROMIS PAIN INTERFERENCE TWO YEARS AFTER HAND SURGERY. Yanni Kevas*, Samir Kaveeshwar[1], Luke Pitsenbarger[1], Raymond Pensy[2], Christopher Langhammer[3], and Frank Henn III[4], [2]Division of Hand surgery, [3]Division of Orthopaedic surgery, and [4]Division of Sports medicine, [1]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

As the number of hand surgeries continue to increase nationwide, a better understanding of the factors that influence postoperative pain is crucial to optimizing treatment plans. The purpose of this study was to identify preoperative factors associated with worse postoperative PROMIS Pain Interference (PI) scores two years after hand surgery. We hypothesized that older age, more comorbidities, increased substance use and lower socioeconomic status would correlate with worse two-year PROMIS PI scores. This study was a retrospective review of prospectively acquired data on 253 patients. Surveys were administered within one week of surgery and two years postoperatively. Bivariate and multivariable analyses were conducted to identify significant predictors of worse two-year PROMIS PI scores and change in PROMIS PI scores. Older age, higher BMI, higher Charlson Comorbidity Index, lower preoperative expectations, more prior surgeries, unemployment, smoking, higher American Society of Anesthesiologists (ASA) score and multiple other socio-demographic factors were correlated with worse two-year PROMIS PI scores. Similar factors were also correlated with less improvement in two-year PROMIS PI scores ($P < 0.048$). Worse scores on all preoperative patient-reported outcome measures correlated with worse two-year PROMIS PI ($P < 0.007$). Multivariable analysis identified smoking history, less alcohol consumption, worse preoperative PROMIS Social Satisfaction and Numeric Pain Scale Whole Body scores, and higher ASA scores as independent predictors of worse two-year PROMIS PI. The same factors in addition to better baseline PROMIS PI were predictive of less improvement in two-year PROMIS PI. Factors associated with poor health, such as higher ASA scores and smoking history, and lower socioeconomic metrics were associated with worse two-year PROMIS PI. Similar factors were associated with less improvement in PROMIS PI. This information can be used by orthopaedic surgeons to manage expectations of postoperative pain levels and to improve pain management and recovery outcomes.

This study was funded by the James L. Kernan Endowment Fund.

O.39

PREOPERATIVE EXPECTATIONS ARE NOT INDEPENDENTLY ASSOCIATED WITH TWO-YEAR PATIENT REPORTED OUTCOMES FOLLOWING HAND SURGERY. Brandon Leon*, Samir Kaveeshwar[1], Yanni Kevas[1], Raymond Pensy[2], and Christopher Langhammer[3], Frank Henn III[4], [2]Division of Hand surgery, [3]Division of Orthopaedic surgery, and [4]Division of Sports medicine, [1]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Orthopaedic research has documented the relationship between better preoperative expectations and superior surgical outcomes. However, limited research in the field of hand surgery has failed to find this relationship. The purpose of this paper was to use validated instruments to identify if there is a relationship between expectations and patient-reported outcomes. We hypothesized that higher preoperative expectations would be predictive of superior two-year patient reported outcomes of hand surgery. 253 of 361 (70.1%) patients who underwent hand surgery and were enrolled in the institutional review-board approved Maryland Orthopaedic Registry (MOR) completed two-year follow-up. Musculoskeletal outcomes data evaluation and management system (MODEMS) was utilized to measure preoperative expectations, while multiple PRO measurements were administered

preoperatively and postoperatively. Bivariate tests were used to determine factors that were predictive of expectation scores, and to determine predictors of PRO scores two years postoperatively. Multivariable analysis of significant variables was then used to control for confounding variables and identify independent predictors of PRO scores two years postoperatively. Better preoperative expectations were associated with non-smokers and patients who quit smoking, patients with no worker's compensation, and patients with no legal claim ($p<0.05$). Worse preoperative expectations were associated with number of prior hand surgeries, number of prior orthopaedic surgeries, worse PROMIS Physical function, PROMIS Fatigue, and Numeric pain scale (NPS) whole body scores ($p<0.05$). Bivariate analysis indicated that preoperative expectations were predictive of better PROMIS physical function, PROMIS pain interference, PROMIS fatigue, PROMIS depression, NPS op site, NPS whole body, SSQ8, MODEMS, and MHQA ($p<0.05$). Multivariable analysis controlling for confounding variables revealed that preoperative expectations were not independent predictors of any two-year patient reported outcomes. Patients' preoperative expectations were associated with but not independently predictive of two-year patient reported outcomes.

O.40

DEFINING COMPLETELY BETTER STATUS THROUGH PATIENT-REPORTED OUTCOMES AFTER ROTATOR CUFF REPAIR. Seyedeh Zahra Mousavi* and Samir Kaveeshwar, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

With the shift towards using patient reported outcomes (PROs) to assess surgical results, the minimal clinically important difference (MCID), patient acceptable symptom state (PASS), and substantial clinical benefit (SCB) have gained traction for interpreting PROs. However, none assess the ultimate patient-focused goal of feeling "completely better" after arthroscopic rotator cuff repair (RCR). The purpose of this study was to introduce this novel indicator and establish predictive values of achieving "completely better" status with regards to preoperative, two-year, and change PRO scores. 88 eligible patients that underwent RCR between June 2015 through June 2019 were analyzed. Patients were asked to take Patient-Reported Outcomes Measurement Information System (PROMIS) Physical Function (PF) and Pain Interference (PI) as well as the Marx Activity Rating Scale (MARS) and American Shoulder and Elbow Surgery Shoulder (ASES) Score preoperatively and two years after their procedure. In addition, patients were asked at the two-year timepoint if they were "completely better". An anchor-based method was used to calculate threshold scores with 90% specificity. Thresholds for change and two-year PRO scores predictive of achieving "completely better" status were calculated using a Receiver-Operator Characteristic curve. 66 of the 88 study participants (75%) considered their condition "completely better" two years after arthroscopic rotator cuff repair. No statistically significant differences in baseline demographic and operative characteristics existed between the two groups. The two-year threshold values in predicting "completely better" status with 90% specificity were PROMIS PF $\geq$ 56.0, PROMIS PI $\leq$ 46.7, and ASES$\geq$ 85.0 with AUC values of 0.73, 0.80, and 0.93 respectively. Change threshold values with 90% specificity were PROMIS PF $\geq$ 19.3, PROMIS PI $\leq$ 17.7, and ASES $\geq$ 54.3 with AUC values of 0.62, 0.70, and 0.75 respectively. A majority of patients felt "completely better" after arthroscopic rotator cuff repair. There was not a significant difference in baseline characteristics between the "completely better" and "non-completely better" group, indicating that patients may be able to achieve "completely better" status regardless of their baseline function, health status, and sociodemographic characteristics. PRO values for two-year and change were the best predictors of "completely better" status, demonstrating their predictive power in assessing which patients feel "completely better" postoperatively. These results offer a reference for orthopaedic surgeons to contextualize postoperative PROs after RCR. "Completely better" status is a novel indicator that may be useful in clinical decision making by pushing the thresholds of PROs towards this ultimate clinical goal.

O.41

PATIENTS VALUE THEIR OWN PAIN OVER BRAKING SAFETY WHEN DECIDING WHEN TO RETURN TO DRIVING: A DISCRETE CHOICE EXPERIMENT ON LOWER EXTREMITY INJURIES. Nicholas Rolle*, Genaro DeLeon[1], Cynthia Shannon[2], Gerard Slobogean[2], Robert O'Toole[2], and Nathan O'Hara[2], [1]Division of Orthopaedic Trauma, Department of Orthopaedics, Indiana University School of Medicine, Indianapolis, IN, and [2]Division of Orthopaedic Trauma, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

A common concern for patients sustaining lower extremity orthopaedic injuries is timeline for return to driving. Surgeons currently lack guidelines to assist in this decision. We hypothesized that patients would have strong preferences for an early return to driving over various driving-associated risks. We enrolled adult, English-speaking patients with an operative lower extremity fracture from a Level I trauma center. Each participant completed a Discrete Choice Experiment (DCE) survey consisting of 12 hypothetical scenarios. We calculated patient preferences for time to return to driving (1-6 months) compared to the risk of hardware failure (1-12%), pain upon returning to driving (none-severe), and driving safety measured by braking distance (0-40 feet at 60 mph) using hierarchical Bayesian modeling. Patient preferences were calculated as the median utility (subjective value) with interquartile range (IQR). The relative importance of each attribute is reported on a scale of 0%-100%. The analysis included 96 patients (mean age, 41 years [SD: 15]; 56% male). Patients most valued a reduced pain level when resuming driving (62%), followed by the risk of hardware failure (17%), time to return to driving (13%), and braking safety (8%). Patients were indifferent to returning to driving at 1 month (median utility: 28, IQR -31 to 80) or 2 months (median utility: 59, IQR: 41 to 91) post-injury. Patients with lower extremity orthopaedic trauma demonstrated a willingness to forego earlier return to driving for a decrease in their pain level. Furthermore, patients are least concerned about their driving safety and place a greater value on their own pain level and chance of hardware failure over proper braking function. The findings of this study are the first to rigorously quantify patient preferences toward a return to driving in an area of ongoing clinical importance.

O.42

PREOPERATIVE FACTORS THAT IMPACT SURVEY COMPLETION 2 YEARS AFTER ORTHOPAEDIC HAND SURGERY. Matthew Moshyedi*, Brandon Leon[1], Samir Kaveeshwar[2], and Frank Henn III[2], [2]Department of Orthopaedics, [1]University of Maryland School of Medicine, Baltimore, MD.

The recent shift towards a value-based model of reimbursement has emphasized the importance of postoperative patient-reported outcomes (PROs), particularly their ability to capture valuable postoperative outcome information. PROs are often administered as postoperative surveys but, a major limitation of this methodology is survey nonresponse. Thus, it is important to identify factors related to low survey response rates so that orthopedic practices can target these populations. This study investigated preoperative factors associated with lower survey response rates two years after orthopedic hand surgery. 361 patients enrolled in an orthopedic registry were administered surveys at baseline and 253 completed the 2-year postoperative surveys. Questionnaires included demographics, six Patient-Reported Outcomes Information System (PROMIS) domains, Numeric Pain Scale (NPS), Brief Michigan Hand Questionnaire (BMHQ), Tegner Activity Scale (TAS), Marx Activity Rating Scale (MARS), and Musculoskeletal Outcomes Data Evaluation and Management System (MODEMS). Bivariate analyses were conducted to determine which factors were associated with survey nonresponse, and multivariable logistic regression analysis was run to determine which factors are independent predictors of survey nonresponse. Survey nonresponse was associated with younger age, less education, being unmarried, lower income, smoking, alcohol consumption, injury prior to surgery, worse PROMIS social satisfaction, worse PROMIS pain interference, worse PROMIS anxiety, worse NPS joint score, worse BMHQ score, and worse MODEMS treatment expectations ($p < 0.05$). Multivariable logistic regression analysis indicated that younger age, worse treatment

expectations, worse BMHQ score, and lack of alcohol consumption were independent predictors of survey nonresponse ($p < 0.05$). Orthopedic practices can use this information to target these populations before hand surgery in order to take measures to improve survey response rates. Higher survey response rates will allow practices to gather more accurate PROs data from their population to help improve the outcomes and quality of care for their future patients.

O.43

SURGICAL SITE INFECTIONS AMONG HYSTERECTOMIES: AN ASSESSMENT OF PERIOPERATIVE CEFAZOLIN AND METRONIDAZOLE VERSUS CEFAZOLIN ALONE. Jenna Kanner*, TJ Klein[1], and Gautam Rao[2], [1]Department of Obstetrics, Gynecology and Reproductive Sciences, University of Michigan School of Medicine, Ann Arbor, MI, and [2]Division of Gynecologic Oncology, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Surgical site infections (SSI) pose an increased risk of morbidity, mortality, and future hospitalizations for patients, and increased cost for both patients and the healthcare system. Hysterectomies are considered a clean-contaminated procedure, with exposure to the polymicrobial vaginal flora containing aerobic and anerobic organisms. Cefazolin is a generally accepted perioperative antibiotic to reduce the risk of post-hysterectomy infections such as incisional cellulitis, vaginal cuff cellulitis, and pelvic abscesses. SSI associated with hysterectomies often involve anaerobic organisms with varying resistance to cephalosporins and rare resistance to metronidazole. The purpose of this study was to investigate the risk or benefit in the addition of perioperative metronidazole to standard course perioperative cefazolin for prevention of post-operative SSI, as well as to assess any demographic or surgical factors that influence the risk of development of post-operative SSI. A retrospective cohort study was conducted at the University of Maryland Medical Center (UMMC). We identified all patients who underwent a hysterectomy from 2019 – 2021. Electronic medical records were reviewed for post-operative SSI, demographics, and surgical factors. Student's T-test and chi-squared test were used to compare continuous and categorical variables, respectively. A total of 373 patients met inclusion criteria, with 208 (55.76%) receiving only cefazolin perioperatively and 165 (44.24%) receiving both cefazolin and metronidazole perioperatively. The two groups were not significantly different regarding patient demographic or surgical factors. 14 (6.73%) patients in the cefazolin group experienced post-operative SSI as compared to 3 (1.82%) patients in the combined cefazolin/metronidazole group. The incidence of post-operative surgical site infection among patients undergoing hysterectomy was significantly reduced in patients who received cefazolin and metronidazole as compared to patients who cefazolin alone. ($p = 0.025$, OR: 0.26). No statistically significant differences in demographic and surgical factors was noted between the two groups (those with and without post-operative SSI). Our study provides additional evidence of the reduction in risk of postoperative SSI in patients undergoing hysterectomy with the addition of metronidazole to routine prophylactic antibiotic medication.

O.44

PAUSE FOR PUSHING: DOES IT CHANGE THE RATE OF POST-PARTUM HEMORRHAGE? Jennifer Strong* and Sarah Crimmins, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Postpartum hemorrhage (PPH) is a significant cause of maternal mortality in the United States. For vaginal deliveries, PPH is defined as blood loss of 500 cc or greater. Protocols have been created that provide guidelines for institutions for the best delivery practices to prevent PPH, including assessing patients for risk factors and preparing resources to aid in rapid intervention. The use of such protocols has been shown to improve patient outcomes. University of Maryland Medical Center (UMMC) has its own postpartum hemorrhaging protocol called Pause for Pushing (PFP) that was implemented in July of 2017. PUSH stands for patient, uterus, safeguards, and hematology. However,

the effectiveness of this tool has not yet been evaluated. The goal of this study is to assess the performance of the PFP tool for vaginal deliveries at UMMC. The aims of this study are to 1) determine if the PFP tool reduces the rate of PPH at the time of vaginal delivery, 2) determine if PFP influences post-delivery blood transfusion and changes in Hematocrit and 3) assess policy adherence to PFP at UMMC. A retrospective cohort study at UMMC was completed. Factors related to PPH as well as delivery information were collected via chart audit. Continuous variables were analyzed according to distribution using ANOVA. Categorical outcomes were analyzed by Chi-Square with $p< 0.05$ as demonstrating significance. A total of 974 were in the study population with 494 in the preintervention group and 480 in the postintervention group. PFP was completed in 30(6.1%) of the preintervention group and 248(51.7%) of the post intervention group. The rate of PPH did not differ between groups (54(7.8%) v 22(7.9%), p= 0.935). The mean estimated blood loss did not differ between individuals who PFP was completed or not (316 ml v 294 ml, p=0.217). Change in Hematocrit post-delivery did not differ between groups (2.916 v 2.580, p=0.181). Compliance differed significantly based on delivery provider with Certified Nurse Midwives using the protocol more than the OB and Family Medicine physicians. Compliance with PFP policy is low and thus no effect was seen on the rate of PPH at the time of vaginal delivery.

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.45

AN ANALYSIS OF PEYRONIE'S DISEASE INSURANCE COVERAGE. Nicholas Hricz*, Michael Ha[1], Joshua Yoon[2], Fan Liang[2], Arthur Nam[2], and Yvonne Rasko[2], [1]Division of Plastic Surgery and [2]Division of Trauma Plastic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Peyronie's disease is a fibroproliferative disorder that causes an abnormal curve of the penis resulting in pain, discomfort, and erectile dysfunction. Potential management options include correctional surgery, penile external/internal devices, extracorporeal shock wave therapy (ESWT), or collagenase *clostridium histolyticum* injections (CCH). The insurance coverage of these treatment options varies greatly and has yet to be discussed in the current literature. The authors performed a cross-sectional analysis of the top US insurance policies for coverage of Peyronie's disease. Companies were chosen based on their market share and enrollment. Their policies were identified through a Web-based search and telephone interviews, and their medical necessity criteria were extracted. Of the 100 companies examined, only 54% of companies had a policy that addressed the treatment coverage for Peyronie's disease. The most covered treatment was CCH injections with 37 companies providing unanimous coverage (n =37, 100%). Within this category, the most common requirement was a palpable plaque by 36 companies (n =36, 97.3%). Additionally, external/internal devices provide unanimous coverage within 18 companies (n =18, 100%). Surgical treatment was covered by 8 companies and 6 companies denied coverage (n =8 vs. n =6, 57.1% vs. 42.9%). The least covered treatment option was ESWT which was universally denied by 19 companies (n =19, 100%). CCH has the most representation in terms of coverage while also providing unanimous coverage whereas surgical coverage and ESWT have a lower representation of coverage. This variability may present a barrier for patients to receive adequate treatment for Peyronie's disease.

This research was supported by the Steuber Scholarship.

O.46

CUMULATIVE SUM IN SURGICAL TRAINING FOR STUDENTS AND RESIDENTS: A SYSTEMATIC REVIEW. Justin Kim*, Ace St John[1], Emilie Ludeman[2], and Yinin Hu[3], [1]Department of Surgery and [3]Division of General and Oncologic Surgery, Department of Surgery, University of Maryland School of Medicine and [2]University of Maryland Health Sciences and Human Services Library, Baltimore, MD.

Transitioning to a competency-based education model in surgical education continues to be a challenge. Traditionally, volume-based criteria have been implemented under the assumption that trainees will be proficient after completing a minimum number of cases. However, case volume requirements do not account for learning variability. Cumulative sum (CUSUM) is a sequential analysis technique that generates learning curves to monitor proficiency in real-time. This study aimed to evaluate how CUSUM has been implemented to characterize technical proficiency within the field of surgery. A systematic review was performed by searching three electronic databases (PubMed, Embase, and Google Scholar) in accordance with PRISMA guidelines. Full-text review was conducted independently by two reviewers under predetermined criteria. Quality assessment was appraised under the Medical Education Research Study Quality Instrument, which assesses domains items including study design, sampling, and instrument validity. Of 428 studies that were captured, 42 were included in the final analysis. We found that most studies were conducted in the US and UK (41% and 36%, respectively). Trainees consisted of medical students (28%), residents (25%), fellows (25%), or a mixed cohort. CUSUM analysis was predominantly applied retrospectively to general surgery (67%) procedures, within which endoscopy, fundamentals of laparoscopic surgery, and colectomy were the most frequently studied skills. Learning variability was detected in 85% of studies. CUSUM successfully identified trainees that never met proficiency in 43% of studies. There has been an enduring push towards a competency-based paradigm in surgical education. Our results indicate that CUSUM can capture learning variability and proficiency. Although CUSUM can be applied to various procedures at differing levels of training, its application to in vivo procedures has been underutilized.

O.47

EFFECT OF REMOTE MINDFULNESS-BASED ART WORKSHOPS (MBAW) ON STRESS, ANXIETY, AND DEPRESSION IN MEDICAL STUDENTS. Chaoyang Wang*, Isha Darbari*, Mazen Tolaymat[1], Sandra Quezada[1], John Allen[2], and Raymond Cross[1], [1]Division of Gastroenterology and Hepatology, Department of Medicine, [2]University of Maryland School of Medicine, Baltimore, MD.

Medical students report high levels of psychological distress compared to the general population. The authors sought to determine whether virtual, medical-student led mindfulness-based art workshops (MBAW) are effective in reducing measures of stress, anxiety, and depression in medical students. In 2020, 24 University of Maryland School of Medicine first- and second-year medical students were randomized to either the MBAW or no-intervention control group. Primary outcomes included a) short-term change in State Trait Anxiety Inventory (STAI) scores and b) difference between intervention and control group perceived stress scores immediately after, and 2, 4, and 6 weeks after a 6-session intervention. Throughout the study, participants completed questionnaires, which included STAI and NIH Toolbox Perceived Stress survey. Paired t-test, McNemar's test, and mixed-effects model for repeated measures analysis were used to test differences in questionnaire responses. Intervention group post-MBAW STAI scores decreased 16.2 ($P = 0.0001$), 5 ($P = 0.09$), 13.7 ($P=0.0002$), 13.6 ($P=0.0001$), 12.1 ($P=0.0006$), and 11.9 ($P=0.002$) points after sessions 1, 2, 3, 4, 5, and 6, respectively. Intervention group perceived stress scores decreased from baseline 5.9 ($P=0.07$) and 4.7 ($P=0.09$) points more than the control group immediately after, and 2 weeks after the 6-session intervention. Singular MBAW sessions are effective at reducing short-term anxiety and a 6-session MBAW workshop intervention shows trends towards decreasing levels of perceived stress lasting at least 2 weeks following the intervention. Future studies should evaluate a larger population to confirm the positive findings of this pilot study.

O.48

PERCEIVED RISKS AND ACCEPTABILITY OF PSILOCYBIN IN BLACK/AFRICAN-AMERICAN OUD PATIENTS. John Clifton*, Alan Davis[1], Annabelle Belcher[2], Christopher Welsh[2], and Aaron Greenblatt[2], [1]Ohio State University School of Social Work, Columbus, OH and [2]Division of Addiction Research and Treatment, Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD.

There is a lack of data on the beliefs and attitudes towards psychedelic substances and psychedelic-assisted psychotherapy among Black/African American individuals with opioid use disorder. The study characterized perceived risks of psilocybin mushrooms and acceptability of psilocybin-assisted therapy in 28 Black/African American individuals undergoing medication treatment for opioid use disorder in Baltimore City. Twenty-eight (mean age 53.8; 35.7% female) patients at the University of Maryland Opioid Treatment Program were paid five dollars to complete an anonymous phone based survey about their beliefs and attitudes towards psilocybin mushrooms and psilocybin therapy. Most participants (N=23; 82.1%) had "heard of" psychedelic substances before taking the survey, but few reported having used psychedelics (i.e., LSD (N=5; 17.9%), mushrooms (N=5; 17.9%) or MDMA (N=5; 17.9%)). Only one participant reported using any psychedelic substance in the past 30 days. Most participants (N=23; 82.1%) had never heard of psilocybin being used as an experimental medical treatment before taking the survey. Psilocybin mushrooms were perceived as having many health risks: more than 80% of participants perceived a risk or were unsure of the risk for sixteen of the seventeen items queried. A minority of participants perceived mushrooms as being less harmful than alcohol (N=6; 21.4%), tobacco (N=8; 28.6%), ecstasy (N=8; 28.6%), or heroin/other opioids (N=8; 28.6%). Approximately half of participants (N=15) endorsed willingness to try psilocybin treatment. When given the option to choose between treatment regimens, 64.3% of participants (N=18) said they would stay on methadone only, 32.1% chose a combination of both psilocybin and methadone (N=9), and only one participant chose psilocybin treatment alone. Many Black/African-American individuals undergoing medication treatment for opioid use disorder in Baltimore City perceive there to be many health risks associated with using psilocybin mushrooms and may be hesitant to try psilocybin therapy. Culturally sensitive treatment models, educational interventions and community outreach programs should be developed to increase racial/ethnic minority representation in psychedelic research and treatment.

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.

Poster Presentation Abstracts

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

P.02 See Poster

EVALUATING THE EFFICACY OF REMOTE VISUAL ACUITY TESTING IN THE PEDIATRIC POPULATION. Rachel Steger*, Elizabeth Fernandez-Paz*, Victoria Chen[1], Sue Junn[1], Noela Lu[1], Janet Alexander[2], and Moran R. Levin[2], [2]Division of Pediatric Ophthalmology and Strabismus, [1]Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Teleophthalmology was already a successful application of telemedicine even before the COVID-19 pandemic, especially in diseases such as retinopathy of prematurity and diabetic retinopathy. However, there are some essential parts of the ophthalmologic exam - such as measurements of visual acuity (VA) - that are difficult to do via telemedicine, especially without supervision by a trained professional. VA quantifies changes in central vision over time, alerting a provider to the presence or absence of visual pathway defects, making it an essential clinical metric. This prospective comparison study evaluates the accuracy of the smartphone application (EyeHandbook) and the paper chart (Safe Eyes America (SEA) paper Snellen Chart) used by parents at home against the validated VA measured by staff in the clinic. The average age of children enrolled in the study is 9±4 years old (mean±SD, n=22). The mean VA score with correction (glasses) over all three testing modalities is 0.17, and the mean VA score without correction over all three testing modalities is 0.29. The mean VA score over all participants as measured by the paper chart is 0.32, as measured by the EyeHandbook application is 0.17, and as measured in clinic is 0.22. The EyeHandbook application and the clinic VA measurements were not significantly different (p=0.068). When stratified by correction, the participants who were not wearing correction had significantly different VA scores as measured by both EyeHandbook (p= 0.03) and the SEA paper chart (p=0.04) versus the results measured in clinic. The participants who were wearing correction had comparable VA results from the EyeHandbook application, versus the VA as measured in clinic (p=0.98). The SEA paper chart VA results were also comparable to the VA results measured in clinic (p=0.07). For patients with glasses, both the application and the SEA paper chart are sufficiently accurate in detecting VA, as compared to the values measured in clinic. For patients without glasses, neither EyeHandbook nor the SEA paper chart is sufficiently accurate in detecting visual acuity. Further studies are needed to determine whether these findings are truly significant.

P.03 See Poster

MATERNAL MARIJUANA USE DURING PREGNANCY AND BREASTFEEDING: ASSESSING IN-HOSPITAL OUTCOMES OF EARLY PRETERM INFANTS. Sarah-Therese Curtis*, Megan Chang[1], and Natalie Davis[2], [1]Division of Neonatology, Department of Pediatrics, Keck School of Medicine of University of Southern California, Los Angeles, CA and [2]Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Legalization and decriminalization of marijuana has been associated with increased use in women of child-bearing age. Since Tetrahydrocannabinol (THC) has been shown to pass into breast milk, concern exists for the effects of prenatal exposure and post-natal exposure via mother's milk (MM). Our neonatal intensive care unit (NICU) allows provision of MM for early preterm infants regardless of THC status, though many will restrict MM use given concerns about effects on neonates. Our objective was to evaluate differences in outcomes between neonates who did vs. did not have exposure to THC via MM. We conducted a retrospective medical record review of <34 weeks gestational age neonates born 9/2014-12/2020 and admitted to our Level IV NICU. We compared maternal and neonatal characteristics in four cohorts: 1) THC positive moms providing MM, 2) THC positive moms providing no MM, 3) THC negative moms providing MM, 4) THC negative moms providing no MM.

We performed multivariable analyses to assess the effect of THC and MM status on significant outcomes. Of 763 early preterm neonates, seventeen percent of mothers tested positive for THC. THC positive mothers were more likely to be late to prenatal care (PNC) while those who did not provide MM were more likely to receive no PNC. There were no significant differences between the 4 cohorts in regards to growth restriction, oxygen requirement at 36 weeks, necrotizing enterocolitis, and ventilator requirement. We did find increased incidence of all grade intraventricular hemorrhage (IVH) in those infants who were THC exposed. We performed logistic regression for predictors of IVH and found that when controlling for variables such as birth weight, neither THC status nor MM status significantly predicted IVH in early preterms. In our study, we found no evidence that providing MM from THC positive mothers was detrimental to the health of this early premature population through hospital discharge. A better understanding of longer term perinatal outcomes associated with THC exposure postnatally via MM would inform appropriate interventions to improve clinical outcomes and safely encourage MM provision for early preterm infants.

P.04 **See Poster**

MATERNAL HISTORY OF ADVERSE CHILDHOOD EXPERIENCES (ACES) AND CANNABIS USE DURING PREGNANCY. Carson Klasner*, Jessica Brown*, Margaret Besse*, and Katrina Mark, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Adverse childhood experiences (ACEs) have been correlated with substance use in the nonpregnant population. However, the correlation between ACEs and continuation of drug use during pregnancy has not yet been studied. Additionally, many long-term health consequences have been correlated with both ACEs and cannabis use, but the two have not been studied together in pregnancy. The purpose of this study is to evaluate the correlation between ACEs scores and cannabis use during pregnancy with birth outcomes. Pregnant women were recruited in an outpatient setting at a single prenatal care site over a 6-month period. Each participant was given a 17-point ACEs questionnaire and consented for prospective data collection. Chart reviews were performed after delivery to collect data including birthweight and toxicology testing. Of 491 women approached, 248 enrolled. Out of these, 2 had incomplete ACEs data, 10 had incomplete drug screen data, so a total of 236 were analyzed. Of the 236 women enrolled in the study, 83 tested positive for cannabis at initiation of prenatal care and 32 remained positive at the time of delivery. The mean ACEs score for the entire cohort was 4.1, STD 3.3. Women who tested negative for cannabis at initiation of care had significantly lower mean ACEs scores than those who tested positive (3.75 v 4.7, $p = 0.03$). Although birthweights were similar between the cohorts of women who tested negative and positive at the time of initiation of care (3048gm v 2952gm, $p = 0.25$), women who continued to test positive at the time of delivery gave birth to infants with significantly lower birthweights than women who tested negative for cannabis (3048gm v 2683gm, $p = 0.0003$). There was not a significant difference found in the birthweights of infants born to mothers with high ACEs scores (≥ 5) versus low ACEs scores (3011gm v 3009gm, $p = 0.86$). Women who use cannabis during pregnancy report having experienced a greater number of adverse childhood events. ACEs scores were not found to be correlated with decreased birthweight, but continued cannabis use was correlated with decreased birthweight.

P.05 **See Poster**

DIAGNOSTIC VALUE OF MUSCLE BIOPSY IN CONJUNCTION WITH NERVE BIOPSY IN EVALUATION OF CLINICAL PRESENTATIONS OF PERIPHERAL NEUROPATHY. Sun Gyeong Choi* and Cheng-Ying Ho, Department of Pathology, University of Maryland School of Medicine, Baltimore, MD.

Muscle biopsy is occasionally performed in conjunction with nerve biopsy to evaluate patients with clinical presentations of peripheral neuropathy. Despite its frequent utilization, the diagnostic value of muscle biopsy in the setting of suspected peripheral neuropathy is unclear. The pathologic

findings from muscle biopsies may confirm or change the clinical diagnosis and help guide treatment. However, they are invasive procedures with associated risks and costs. In this study, we aim to determine the diagnostic value of muscle biopsy in conjunction with nerve biopsy in the setting of suspected peripheral neuropathy and identify cases that benefit most from a concurrent muscle biopsy. We performed a retrospective review of the clinical information, laboratory data, electrodiagnostic studies, and pathology report of 117 nerve biopsies with concurrent muscle biopsy cases from a single institution. Cases were divided into four categories based on findings of nerve and muscle biopsies. Among the 117 cases of nerve biopsies with a concurrent muscle biopsy, the pathologic findings were abnormal in 101 cases (86.3%). A specific diagnosis of neuropathy was confirmed in 96 cases (82.1%). New diagnostic information was provided by concurrent muscle biopsy in 33 cases (24.5%). A specific diagnosis of myopathy was made in 5 cases (4.3%) by muscle biopsy in the setting of normal nerve biopsy, e.g., inclusion-body myositis, neuromuscular sarcoidosis. Clinically inconclusive cases that benefited most from a concurrent muscle biopsy include vasculitis, TTR amyloidosis, mitochondrial myopathy, myositis, ALS, and neuromuscular sarcoidosis. In conclusion, a concurrent muscle biopsy significantly impacted clinical decision in 24.5% of the cases and thus its diagnostic utility should not be overlooked. Additionally, clinicians should consider concurrent muscle biopsy given that approximately 4% of cases may have unexpected myopathy.

This research was supported by grants from National Institute of Neurological Disorders and Stroke, Passano Foundation and National Institute of Diabetes and Digestive and Kidney Diseases.

P.06 **See Poster**

THE RATES OF ANXIETY AND DEPRESSION AND CORRELATION TO SYMPTOM SEVERITY AMONG PATIENTS WITH PULSATILE AND NON-PULSATILE TINNITUS.

Allison Williams*, Saikrishna Gourishetti[1], Marissa Flaherty[2], and David Eisenman[3], [2]Department of Psychiatry and [3]Division of Otology and Neurotology, [1]Department of Otorhinolaryngology - Head and Neck Surgery, University of Maryland School of Medicine, Baltimore, MD.

The objective of this study is to compare rates of anxiety and depression between patients with pulsatile (PT) and non-pulsatile tinnitus (NPT), and their correlation with tinnitus severity. All patients presenting either to the otolaryngology clinic or tinnitus habituation program (THP) with a chief complaint of tinnitus were administered tinnitus handicap inventory (THI), general anxiety disorder-7 (GAD-7), and patient health questionnaire-9 (PHQ-9). Kruskal-Wallis test compared survey scores, while Spearman correlation assessed correlation among survey measures. Complete data were collected on 81 patients, including 26 cases of PT and 55 cases of NPT. Among patients with NPT, 35 were first seen in the THP. All three groups had similar demographics though THP patients were older (median age 58 years vs. 42 years for PT, $p = 0.03$). Median THI scores were highest for THP patients (54), followed by PT (44) and NPT patients (20) ($p = <0.001$). Median GAD-7 scores were also higher in THP patients (8) compared to PT (2.5) and NPT patients (2) ($p = <0.001$). PHQ-9 scores showed no significant difference. A positive correlation was seen between survey measures, strongest for THP patients: THI and GAD-7 (0.79), THI and PHQ-9 (0.83), and GAD-7 and PHQ-9 (0.73). THP patients report more severe symptoms than other NPT patients and PT patients. Anxiety and depression rates are also higher in THP patients, but only GAD-7 scores were statistically significant. Tinnitus severity correlates more strongly with GAD-7 and PHQ-9 scores in THP patients compared to other patient groups.

P.07 **See Poster**

CAN A MEDICATION TRACKING SMARTPHONE APPLICATION IMPROVE MEDICATION ADHERENCE IN A PATIENT POPULATION AT HIGH RISK FOR 30-DAY HOSPITAL READMISSION?

Anna Apffel*, Daniel Gingold[1], and Andrea Levine[2], [1]Department of Emergency Medicine and [2]Division of Pulmonary and Critical Care, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Recent studies have estimated that, among adults with chronic illness, as many as 50% of medications are not being taken as prescribed. With the understanding that the reasons behind medication non-adherence are complex in nature, our study hopes to aid individuals in consistently taking their medications through a smartphone application "ICMed". This application is able to be customized with timed push notifications reminding the user to take their medication. This research is being conducted through the Mobile Integrated Health Community Paramedicine (MIH-CP) program. The Baltimore City MIH-CP program is a partnership between the University of Maryland Medical Center and the Baltimore City Fire Department, in which patients living in West Baltimore who are discharged from the hospital receive home visits from a community paramedic team for 30 days. The paramedics are supported by an interdisciplinary team including nurse practitioners, physicians, community health workers, and pharmacists. The goal of the program is to improve care quality and reduce unnecessary readmissions. One cause of these readmissions is medication non-adherence. Our project's primary goal is to assess if patients enrolled in the MIH-CP program that use a mobile app (ICMed) have higher adherence over 30 days compared to a control group. The secondary outcomes which we are interested in are: how the patient's medication management experience was, how often the patient used the educational material provided to them, and 90 day readmission rate. We plan to perform 1:1 prospective randomization of 30 adult patients who are enrolled in the MIH-CP program prescribed a cardiovascular medication to intervention and controls. This pilot study will primarily serve as a feasibility study that has the potential to be scaled up once proven effective in initial phases. If the use of ICMed application increases the patient's ability to consistently take medication through the ICMed application, expanded use of this technology could mitigate hospital readmissions, lessen individual and state level financial burden, prevent adverse outcomes, and improve the healthcare experience for individuals.

This research was supported by Health Services Cost Review Commission, Maryland Industrial Partnerships Grant Program.

P.08 **See Poster**

CORRELATION OF RACIAL FACTORS WITH PATTERNS OF CARE IN PATIENTS WITH GLIOMAS. Jessica Yau*, Mark Mishra[1], Bansi Savla[1], Suneet Waghmarae[2], Young Kwok[1], and William Regine[1], [1]Department of Radiation Oncology, [2]University of Maryland School of Medicine, Baltimore, MD.

Racial disparities may differentially affect outcomes in patients with gliomas. The prognostic role of racial factors in patients with gliomas is debated. We aim to evaluate how these demographic factors may impact treatments (e.g. volumetric modulated radiation therapy, proton beam therapy) rendered or outcomes for patients with treated with curable intent at a single institution. We hypothesize that racial factors may impact treatments rendered and cancer outcomes. This is an IRB approved single institution retrospective study of 363 patients with gliomas treated with curative intent at the University of Maryland Medical Center institution. Chi-square tests will be done to compare variables stratified by racial factors. Kaplan-Meier analysis and cox proportional hazard models will be used to analyze overall survival, freedom from recurrence, and freedom from radiation necrosis. Results/conclusions are pending.

This research was supported by the Keep Punching Foundation, American Society of Radiation Oncology (ASTRO) Comparative Effectiveness Grant.

P.09 **See Poster**

THE ROLE OF LEUKOTRIENE B4 ON NSAID INDUCED CORNEAL MELTS. Elif Kolanci* and Sarah Sunshine, Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Corneal melt is a devastating complication of corneal disease that results from immune mediated erosion of the cornea, ultimately leading to a robust inflammatory process. This degradation of the

cornea can cause complete corneal perforation, leading to severe vision loss. Despite the advances in corneal transplantation and rehabilitation, once the melting has begun it is challenging to reverse with few therapeutic options. There are multiple causes of corneal melt, however, one cause that is understudied is NSAID use. NSAIDs, such as ketorolac, are often prescribed to patients following ocular surgery to help with pain and inflammation, but some studies report a link to corneal melt. Through a series of biochemical reactions, NSAIDs lead to increased leukotriene B4, an inflammatory mediator that recruits neutrophils and promotes pro-inflammatory cytokines. Therefore, we hypothesize that therapeutics inhibiting the leukotriene B4 pathway will alleviate Ketorolac-induced corneal melt following epithelial debridement. To test this hypothesis, we began by replicating the NSAID-induced corneal melt in mice. A limbal-to-limbal epithelial debridement of the cornea is performed on both eyes of mice anesthetized with vaporized isoflurane. Immediately following debridement, corneas are incubated for 30 seconds with 1% Triton X-100 (positive control), DMEM (negative control), or 0.5% Ketorolac. The resulting wound was stained with fluorescein and imaged for 5 consecutive days. Method 2 compared the single exposure of 0.5% Ketorolac to repeat (4x) exposure over two hours. Additionally, Balanced Salt Solution was used as a negative control. At the end of day 5, all mice were sacrificed according to IACUC protocols. Cornea and conjunctiva samples were collected for RNA isolation and qPCR. We found that repeated (4x) Ketorolac exposure induces the most inflammation in the conjunctiva with increased TNF-a and IFNg expression compared to the single exposure model. Ketorolac 4x was also found to have a statistically significant impact on the clinically monitorable metrics of epithelial irregularities, haziness, and corneal revascularization as compared to the control group.

This research was supported by the Maryland Cigarette Restitution Fund Program.

P.10 **See Poster**

EVALUATING THE EFFICACY OF TARGETED WRITTEN PATIENT EDUCATION MATERIALS IN THE IMPROVEMENT OF UNDERSTANDING AND OUTPATIENT FOLLOW-UP COMPLIANCE FOR RETINOPATHY OF PREMATURITY.

Elizabeth Fernandez Paz*, Rachel Steger*, Rachel Steger[1], Courtney Pharr[1], Victoria Chen[2], Janet Alexander[3], and Moran Levin[3], [3]Division of Pediatrics, [2]Department of Ophthalmology and Visual Sciences, [1]University of Maryland School of Medicine, Baltimore, MD.

Retinopathy of prematurity (ROP) is a leading cause of preventable childhood blindness worldwide. Poor outpatient follow-up compliance in infants with ROP increases risk of vision loss. Educating parents about ROP has the potential to significantly improve follow-up compliance. However, information currently available about ROP is written at an 11th grade level, despite NIH and AMA recommendations that patient education materials (PEM) be written at a 3rd-7th grade level. Our study investigates the effects of implementing newly developed PEM adherent to reading level recommendations on improving parent understanding of ROP and follow-up compliance. We enrolled 240 parents of infants at risk for developing ROP in a pre-post-test study. Surveys assessing knowledge and perceived importance of ROP were distributed to parents before and after receiving either the newly developed PEM or currently available PEM. Follow-up appointment attendance data was also collected. Participants demonstrated a significant increase in knowledge of ROP after receiving either handout ($p<0.001$). Average scores on post-survey questions that assessed knowledge of ROP were higher for those who received the new PEM in comparison to current PEM (90.6% vs 83.1%, $p = 0.053$). There is a trend toward improved follow-up attendance for the new PEM (79.7% vs 75.9%, $p=0.289$). Our findings demonstrate that PEM that adhere to reading level guidelines significantly improve parent knowledge of ROP. Our results have the potential to change the standard for educating parents of infants with ROP and improve clinic follow-up rates following discharge.

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 **See Poster**

IDENTIFYING BARRIERS TO MOTHER'S MILK FEEDING IN EARLY PRETERM BLACK INFANTS IN AN URBAN NEONATAL INTENSIVE CARE UNIT. Sarah-Therese Curtis*, Megan Chang[1], and Natalie Davis[2], [1]Division of Neonatology, Department of Pediatrics, Keck School of Medicine of University of Southern California, Los Angeles, CA and [2]Division of Neonatology, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Greater use of mother's milk (MM) is associated with improved outcomes for preterm infants in neonatal intensive care units (NICUs). Healthcare disparities exist in provision of MM to preterm infants and further research is needed to identify modifiable barriers to providing MM.The objective of this study was to evaluate incidence and predictors of provision of MM to early preterm non-Hispanic Black infants. We performed a retrospective medical record review of non-Hispanic Black infants born <34 weeks gestational age (GA), between 9/2014 – 12/2020. We performed bivariate analyses comparing: 1) maternal and neonatal characteristics of infants who received MM during NICU admission vs. those who did not, and 2) neonatal outcomes based on exposure to any MM vs. none. We identified 422 non-Hispanic Black early preterm infants, of whom 332 received some MM during their NICU admission. Maternal factors associated with receiving no MM during admission included higher maternal gravidity, increased maternal parity of term deliveries ($p<.0001$) and mothers with increased number of living children. Maternal age and medical comorbidities such as pre-eclampsia, HELLP syndrome, chronic hypertension, and diabetes did not have a significant impact on MM provision. Infants of mothers with bipolar disorder were less likely to receive MM while those of mothers with anxiety were more likely to receive MM. There was no difference in provision of MM for those whose mothers had pre-existing depression or post-partum depression. The mothers of infants who did receive MM were significantly more likely to have had a lactation consultation during admission.Infants who received no MM had higher birth weights, were born less prematurely, and were more likely to have been on a ventilator during their admission. There was no difference in rates of intraventricular hemorrhages. Identifying significant barriers to MM provision for non-Hispanic Black infants will allow clinicians to focus supportive and educational interventions. Inpatient lactation consultation had one of the strongest associations, so enhancing access to lactation consultation may significantly increase MM provision.

P.12 **See Poster**

COMPARISON OF GROUP PRENATAL CARE VERSUS STANDARD INDIVIDUAL PRENATAL CARE FOR PATIENTS WITH DIABETES IN PREGNANCY. Hannah Palmer*, and Sarah Crimmins, Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Diabetes in pregnancy is a condition that, if left untreated or if not properly managed, can result in serious long-term sequelae for mother and baby. Women with diabetes in pregnancy may require care from a range of professionals, which can lead to a discontinuity in services and lack of coordination. These issues can be addressed with group prenatal care models which are designed to improve patient education and include opportunities for social support while maintaining the risk screening and physical assessment of individual prenatal care. The University of Maryland School of Medicine offers group prenatal care for individuals with diabetes. Multiple individuals with diabetes meet with a provider, social worker, and diabetes educator allowing for more time and attention to be spent on education compared to the traditional model of one provider per patient. Our primary outcome is patient compliance with blood sugar monitoring. In a retrospective chart review over 6 years (2014-2020), data was collected from patients who participated in standard prenatal care and group prenatal care. Information about glucose monitoring, delivery information, and postpartum visit information was collected. Primary outcome was measured by percentage of visits that an individual brought their blood sugar log. Data was analyzed with median and range for continuous variables (data was not normally distributed) and percentage with number for categorical variables.

P< 0.05 was considered significant. A total of 107 patients met inclusion criteria with 42 in group care and 65 in standard care. There was no difference in our primary outcome of compliance with producing blood sugar log to appointments (group: 61.9% (range=0-100%) vs. standard: 50.0% (range=0-100%); p=0.429). Individuals in group care were more likely to attend more prenatal visits from diabetes diagnosis to delivery (group: 7 visits (range 1-16) vs. standard: 5 visits (range 3-17); p=0.026). There were also no differences in delivery outcomes. Of note, individuals with group care were more likely to complete their 2-hour oral glucose tolerance test to test for Type 2 Diabetes Mellitus (T2DM) at their postpartum visit (group: 53.3% vs. standard: 20.5%; p=0.003). Group prenatal care for diabetes does not change compliance with blood sugar reporting but may increase attendance at prenatal appointments and enhance education to demonstrate the importance of postpartum screening.

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

P.14 **See Poster**

OUTCOMES AND PATIENT SATISFACTION OF DELAYED DISTAL BICEPS REPAIRS WITHOUT GRAFT AUGMENTATION: A SYSTEMATIC REVIEW. Serge Tzeuton*, William Johns[1], Surena Namdari[2], Michael Ciccotti[3], and Sommer Hammoud[3], [2]Division of Shoulder and Elbow Surgery and [3]Division of Sports Medicine, [1]Department of Orthopaedics, Rothman Institute at Sidney Kimmel Medical College, Philadelphia, PA.

Distal biceps tendon tears are responsible for 3%-10% of all biceps ruptures. Treated nonoperatively, these injuries result in poor endurance, loss of supination strength, and loss of flexion strength compared to those treated operatively with repair or reconstruction. Historically, operative management of chronic tendon tear has consisted of graft reconstruction in order to augment the contracted muscle, as delayed repair is theorized to pose greater technical demands and potentially higher complication rate due to required exposure. However, there are several published studies reporting promising outcomes pertaining to delayed primary repair of distal biceps ruptures. The purpose of this systematic review was to investigate the entirety of published literature regarding outcomes of direct surgical repair of chronic distal biceps tendon ruptures. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed to perform this systematic review in the literature, as well as for the presentation of results. A search of the literature was performed on the electronic database MEDLINE, Scopus, and the Cochrane Library. Included studies evaluated subjective and objective outcomes after delayed treatment for chronic distal biceps tendon ruptures, without use of graft augmentation, 3 weeks or more after the initial injury. Subjective and objective outcome metrics included: patient satisfaction with surgery, postoperative pain levels, Mayo Elbow Performance Scores (MEPS), and American Shoulder and Elbow Surgeons (ASES) scores. Eleven studies were reviewed, including four prospective studies and seven retrospective studies. Ten of the eleven studies assessed patients with full-thickness biceps tendon tears; one study assessed patients with partial-thickness tears. The studies included 122 patients with chronic distal biceps tendon tears, treated surgically after a mean delay to surgery of 132.8 days. Seven studies assessed patients with chronic tears and acute tears, whereas the other four studies assessed chronic tears only. Two studies excluded patients in whom direct repair could not be done—in one study, 27.1% of patients in their initial search were excluded due to graft augmentation, in the other study 20% were excluded due to tendon transfer. In a third and fourth study, 25% of the data and 5.2% of the data, respectively, was excluded from our calculations due to use of a graft. Four studies employed a 1-incision technique, four employed a 2-incision technique, and three studies employed both. 168/169 patients being assessed were able to return to their original job. Each study comparing acute vs. chronic distal biceps repairs reported no significant difference in range of motion and outcome scores between the two groups. Two studies showed differences in strength between delayed and acute biceps repairs—one study demonstrated decreased strength at 90-degree flexion in delayed repair approaching significance, with another demonstrating a loss of elbow flexion power and supination

strength in delayed repairs. The findings of four studies suggest that direct repair of chronic tears is correlated with a mildly higher rate of lateral antebrachial cutaneous nerve (LABCN) palsy (26/122 (21.3%) chronic, 16/110 (14.5%) acute) however, this complication was overwhelmingly transient. Repair of the distal biceps tear in most studies utilized ENDOBUTTON (Smith & Nephew; London, United Kingdom) fixation. Overall, patients who had undergone direct repair of chronic distal biceps tears had good patient satisfaction, outcomes, and range of motion. Direct repair of chronic distal biceps tendon tears without the use of graft reconstruction is associated with comparable results to that of early distal biceps repair, with acceptable patient satisfaction, range of motion, and functional outcome scores, although transient LABCN palsy rates may be slightly higher and some strength might be lost. Direct repair of chronic distal biceps ruptures could serve as a viable treatment option while alleviating the need for autograft or allograft utilization for reconstruction. Further prospective study directly comparing primary repair vs. reconstruction of chronic distal biceps ruptures is warranted.

P.15 **See Poster**

COVID-19 VACCINE HESITANCY IN EMERGENCY DEPARTMENT PATIENTS: AN ANALYSIS OF UNIVERSITY OF MARYLAND MEDICAL CENTER DATA FROM THE REVVED-UP STUD. Kurt Auville*, Benjamin Coleman*, Kyra Lasko, and Gentry Wilkerson, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

The COVID-19 pandemic has disproportionally affected vulnerable patient populations in the US, and Emergency Departments (ED) often serve as surrogates for primary care for these patients. We assessed COVID-19 vaccine hesitancy and willingness to receive vaccination in the ED among various patient populations. As part of a cross-sectional investigation that took place at 15 geographically diverse safety net hospitals from Dec 2020 to Mar 2021, the local study team conducted 150 surveys of ED patients regarding vaccine hesitancy. These surveys investigated COVID-19 vaccine hesitancy, willingness to get vaccinated in the ED, primary sources of medical care, and influenza vaccination in the past 5 years. Demographic information was collected, including age, sex, race, ethnicity, and housing status. Rates of vaccine hesitancy with 95% confidence intervals were compared across patient groups. Among the 150 UMMC patients surveyed, 49.3% were COVID-19 vaccine hesitant. Patients lacking a regular source of primary care (n = 26, 17.3%) had a vaccine hesitancy rate of 50%, which was not significantly different than that of those with primary care with a hesitancy rate of 49.3% (n=123, 82%). Patients who self-identified as Black (n=105,70%) were significantly more vaccine hesitant as compared to patients who identified as non-Black (57.1% [95% CI: 47.6-66.2%] vs 31.1% [95% CI: 19.5-45.7%], p = 0.006). Additionally, no influenza vaccine in the past 5 years was also associated with higher levels of vaccine hesitancy (72.5% [95% CI 57.1-83.9%] vs 42.1% [95% CI: 33.1-51.5%], p = 0.002). Vaccine hesitant subjects were significantly younger than those who were not (41.9 years [95% CI: 38.5-45.2 %] vs 54.2 years [95% CI: 50.6-57.7 %], p < 0.00001). Of the 76 non-hesitant subjects, all 76 indicated they would accept the vaccine as a part of their care in the ED. As a main site of care for vulnerable patients, the ED can educate patients about the COVID-19 vaccine and administer it to eligible patients in an effort to target underserved populations.

P.16 **See Poster**

ASSESSING APPROPRIATENESS OF RESPIRATORY CULTURES IN MULTIPLE ICU SETTINGS TO IDENTIFY OPPORTUNITIES FOR DIAGNOSTIC STEWARDSHIP. Meghana Patel*, Surbhi Leekha[1], Blaine Kenaa[2], Mary Maldarelli[3], and Kimberly Claeys[4], [1]Division of Infectious Disease, Department of Epidemiology and Public Health and [2]Division of Pulmonary Critical Care, [3]Department of Medicine, University of Maryland School of Medicine and [4]Department of Pharmacology, University of Maryland School of Pharmacy, Baltimore, MD.

Overdiagnosis of VAP is common and in part due to excessive respiratory culturing, and diagnosis of colonization as true infection. We sought to identify clinical attributes associated with unnecessary

respiratory tract culturing among ventilated patients in the ICU. We performed a cross-sectional study of patients admitted to 4 ICUs from January 2020-Sept 2020 and with at least one respiratory culture obtained after >=48 hours of mechanical ventilation. We defined necessity of culturing based on a combination of factors including increased oxygen requirement and at least one of fever, hypotension, leukocytosis, or X-ray abnormality. We conducted bivariate analyses between these following variables and whether culture was unnecessary. We evaluated 63 ICU patients with respiratory cultures. The mean age of patients was 59.2 (SD 13) years and 43 (68.3%) were male. Five (7.9%) had active COVID-19 at time of culturing. Nine (14.2%) were on immunosuppressive therapy. A total of 29 (46%) patients were from the medical ICU, followed by 17 (26%) from Neuro ICU, 9 (14%) from surgical ICU and 8 (12%) from cardiac surgery ICU. Few patients had a history of CHF (12, 19%), or COPD (8, 12.7%). Tracheostomy was in place in 19 (30%) patients, 15 (23%) had a diagnosis of ARDS during their hospitalization. Of 63 cultures, 40 (64%) were considered unnecessary. Compared to patients with appropriate cultures, those with inappropriate cultures were less likely to have decline in oxygenation (73.9% vs 7.5%, $P < 0.001$). There was no statistical difference in the frequency of new/worsening infiltrates on chest X-ray (60.9 vs 37.5%), fever (39.1% vs 45%), hypotension (47.8 vs 25%), or leukocytosis (60.9% vs 50%). In conclusion, a high proportion of respiratory cultures in ventilated ICU patients are unnecessary. Unnecessary cultures were less likely to meet criteria for respiratory tract specific symptoms. Incorporating respiratory tract specific attributes such as worsening oxygenation into clinical decision making rather than "pan-culturing" for sepsis can reduce unnecessary culturing in this setting.