Medical Student Research Symposium

Presenter Index

October 31, 2016
The Richard M. Ross Heart Hospital
Aradhna Agarwal
Poster # 1
Research Mentor: Cynthia Sieck, PhD
Project Title: “OSUMychart Use and Demographics”
Project Abstract: Background: As more patients are using patient portals to access their medical records and communicate with their physicians, there is a greater need to understand who is using patient portals and how they are using them. Methods: We retrospectively analyzed log file data of over 30,000 patients who had used Mychart, a patient portal, at a large Midwestern academic center. Data consisted of all patients in the Department of Family medicine from 2014-2015. Usage data was defined by variables of frequency and comprehensiveness. Information regarding demographics (age, race, gender) and number of problem list conditions were isolated from the patient’s medical record and connected to their usage data. Results: A total of 35,608 patients had created an OSUMyChart account. The sample was 62.2% female, 19.7% non-white, and had a mean age of 47 ± 15 years. Of the initial sample, 32,325 patients had created an account and logged onto the system at least once. The three most frequently used features in descending order were messaging (40.6%), lab results (26.4%), and appointment management (14.3%). Females, blacks, and those with multiple comorbidities were more likely to be high frequency and high comprehensive users. Multivariate regression analysis controlling for comorbidities found that race was no longer statistically associated with frequency of use; however, the relationship between black patients and comprehensiveness persisted. Conclusions: This study found that, there are significant differences in usage across demographics. By understanding how patients are using patient portals, we will better be able to maximize effective patient usage.

Avni Amratia
Poster # 79
Research Mentor: Meng Welliver, MD, PhD
Project Title: “Risk Factors Contributing to Pulmonary and Cardiac Radiation Toxicity Profiles in Lung Cancer and Lymphoma Patients”
Project Abstract: The purpose of this project is to determine the risk factors contributing to pulmonary and cardiac toxicity among lung cancer and lymphoma patients receiving thoracic radiotherapy at The James Cancer Hospital. Baseline health profiles, such as co-morbidities, are different between patients; therefore, we hypothesize that damage from radiotherapy should produce different pulmonary and cardiac toxicity profiles among these diseases. All selected patients received thoracic radiotherapy. Lung cancer patients were selected as Stage III or IV and either as non-small cell carcinoma or small cell carcinoma. Electronic medical records via ARIA and IHIS where utilized to collect treatment factors (radiotherapy dose, fraction number, etc.) and patient specific risk factors (COPD, CAD, diabetes, etc.), respectively. The data was organized in a binary format (0 = no presence, 1 = presence) for risk factors and absolute values for treatment factors. Association analysis of the data was performed using Fisher's exact test and Wilcoxon sign test via departmental statistician (p < 0.05). Our preliminary results indicate limited associations for toxicities and risk factors between lung cancer and lymphoma patients.
Lindsay Boles
Poster # 41
Research Mentor: Geoffrey Heyer, MD
Project Title: “Electrogastrography during tilt-induced syncope in youth (a pilot project for the ENCHANT Study)”
Project Abstract: Orthostatic intolerance (OI) refers to the development of symptoms such as lightheadedness with standing and relief of symptoms with recumbency. Nausea is a common OI symptom; however, the physiologic basis of orthostatic nausea is unknown. Electrogastrography (EGG) provides a non-invasive method of monitoring gastric electrical rhythm in real-time. EGG rhythms can change with nausea onset. The overall objective of the ENCHANT study was to characterize the EGG and hormonal changes related to orthostatic nausea among patients with tilt-induced syncope. The aim of this pilot project was to explore how the EGG rhythm changes during tilt-induced syncope and during tilt-table testing when syncope does not occur. Patients that had syncope during tilt-table testing (n=9) had significant changes in power in the bradygastria frequency during the pre-syncope period (p=.02) and during syncope (p< .001), relative to the pre-testing baseline. Patients who did not have syncope during tilt-table testing (n=4) did not complain of nausea and did not have changes in power in the bradygastria frequency during testing (p=.72). The results of this project suggest that slowing of gastric myoelectrical activity may play a role in the orthostatic nausea that patients experience on the tilt table prior to loss of consciousness.

Arthur Broadstock
Poster # 80
Research Mentor: Aaron Moberly, MD
Project Title: “Verbal Learning and Memory Abilities in Adults with Cochlear Implants”
Project Abstract: Purpose: Currently, a large degree of unexplained variability exists in speech recognition outcomes in postlingually deaf adult cochlear implant (CI) users. To recognize degraded speech, such as through a CI, the listener must use language knowledge and cognitive abilities, including verbal learning and memory, to make sense of the incoming signal. This study sought to examine the effects of hearing loss and aging on verbal learning and memory in this adult CI population, and to assess the relationship between these cognitive skills and speech recognition abilities. Method: Eighteen adults with CIs and 14 age-matched controls with normal hearing (NH) underwent testing of verbal learning and memory using the California Verbal Learning Test-II (CVLT). Speech recognition abilities were measured using auditory presentations of Harvard Sentences, Harvard Anomalous Sentences, PRESTO Sentences and CID W-22 word lists. Results: Primary CVLT outcomes did not differ between CI and NH adults, though List B recall neared statistical significance between the two groups. Duration of deafness in CI users was negatively correlated with process measures of learning (Total Learning Slope), and positively correlated with proactive interference within the CVLT. Delayed recognition of visually presented words (Yes/No Recognition) was positively correlated with all four speech recognition measures in CI users, but this relationship was absent in the NH sample. Conclusions: Duration of deafness negatively impacted verbal learning and memory abilities in CI users, independent of age-related cognitive decline. Components of the CVLT, namely Yes/No Recall, may possess utility as a prognostic indicator of speech recognition abilities and could function as a potential pre-operative screening tool for CI outcomes.
Daniel Brook  
**Poster # 6**  
**Research Mentor:** Laura Thompson, MD  
**Project Title:** “Opioid Prescribing Habit Changes Following Opioids and Other Controlled Substances Prescribing Guidelines Introduction in the Emergency Department”  
**Project Abstract:** Opioid agonists are a group of natural and synthetic substances that can have analgesic effects without producing a loss of consciousness and carry risks of abuse and fatal overdose. The opioid overdoses associated with the current opioid epidemic in the United States can be correlated with opioid prescribing habits. Policy changes regarding the opioid epidemic have led to the introduction of a Prescription Drug Monitoring Program (PDMP) in Ohio, the Ohio Automated Rx Reporting System (OARRS), which tracks the dispensing and personal furnishing of controlled prescription drugs to patients. PDMPs have been shown to decrease the overall morphine milligram equivalent (MME) dose of opioid prescriptions. Despite the advent of OARRS, the opioid epidemic continues to show a rise in unintentional opioid overdose deaths in Ohio. The Ohio Governor's Cabinet Opioid Action Team has developed the Opiate and Other Controlled Substances (OOCS) prescribing guidelines to provide a general approach to controlled substance prescriptions. The effectiveness of the OOCS guidelines in Emergency Departments (ED) has yet to be studied. By utilizing a retrospective observational study, we aim to identify the opioid prescribing habit changes after OOCS guidelines introduction in the ED. We hypothesize that the overall morphine-equivalent dose of opioid prescriptions has decreased in the ED as a result of the OOCS prescribing guidelines introduction. If shown to be effective in reducing MME dosage in the ED, the OOCS prescribing guidelines could be expanded as a model for other governmental entities and regulating bodies.

Scott Canepa  
**Poster # 58**  
**Research Mentor:** Daniel Cohen, MD  
**Project Title:** “Geographic and socio-economic variations in children requiring cardio-pulmonary resuscitation in one county”  
**Project Abstract:** Background: Pediatric out-of-hospital cardiac arrests (OHCA) represent a rare and tragic event, with variation of incidence across age, race, and arrest etiology. In adults, geographic variation of OHCA exists at the neighborhood level, with clusters of high incidence observed in multiple regions with shared characteristics.  
**Hypothesis:** Clustering of OHCA by geographic and socioeconomic factors occurs within the pediatric population, providing opportunities for targeted intervention.  
**Methods:** Single-center, retrospective study from 10/2006-6/2016 at a large, urban children's hospital, serving over 86,000 ED patients per year. Inclusion criteria: patients experienced an OHCA; CPR performed in ED or by EMS; age < 18. Exclusion criteria: patient was seen at an outside hospital; private transport. Data abstracted included: (1) patient level— age, race, location of arrest, location type, arrest etiology; (2) CPR— witness/unwitnessed arrest, bystander/EMS/ED CPR, and survival to discharge.  
**Results:** 135 patients were included in the study. 37.8% were white, 48% < 1 year of age, and 87.4% of arrests occurred at home. CPR was initiated by bystanders 50.8% of the time and 37.8% of arrests were witnessed. Primary cause of arrest was determined to be traumatic instead of medical in 34.8% of cases. Etiology was determined to be Trauma 31.9%, SIDS 15.6%; Respiratory 13.3%; and Submersion 10.4%. Survival to discharge was 25.9%. Non-white versus white children experienced a higher incidence of arrest, lower rates of bystander CPR, and were less likely to survive to discharge. Arrest locations were analyzed to show incidence rate of the eligible study population, grouped by zip code.  
**Conclusions:** Geographic analysis failed to identify regions of significantly greater incidence rates for further study and intervention. Continued efforts should be placed in densely populated and racially overrepresented areas, with respect to OHCA, to improve bystander CPR and safe sleeping practices.
Arren Carter
Poster # 2
Research Mentor: Meng Welliver, MD PhD
Project Title: “Correlation of Imaging Intra-Tumoral Heterogeneity and Patient Outcomes in Soft Tissue Sarcomas in a Neoadjuvant Setting”
Project Abstract: Radiotherapy is an important treatment modality for soft tissue sarcomas. In radiotherapy, homogeneous doses are given to the tumor mass, but increasing evidence has demonstrated that there is substantial intra-tumoral heterogeneity. Intra-tumoral heterogeneity could represent subsets of tumor cells that are more aggressive, more resistant to therapy, or more prone to metastases. In this project, we hypothesized that intra-tumoral heterogeneity plays a role in ultimate patient treatment outcomes. We aimed to use digital technology to analyze pre-treatment and post-treatment imaging (including MRI and PET/CT) to determine the degree of intra-tumoral heterogeneity and to explore the correlations between this heterogeneity, along with other features such as changes in SUV values after chemo and changes in MRI size after radiation therapy, with histological response (percent necrosis) and disease free survival of the patient.
A retrospective set of sixteen patients were collected that received neoadjuvant chemo and radiation therapy followed by surgery. These patients had PET/CTs collected before and after chemotherapy and MRI's collected before and after radiation therapy. Features of the PET/CTs examined include: initial SUV, final SUV, and percent change in SUV (after chemo). Features of MRI examined include: pre-radiation therapy size of tumor, post-radiation therapy size of tumor, and percent change in size. The imaging heterogeneity analysis has been delayed and cannot be reported on currently. The percent of tumor necrosis was determined by a pathologist after surgical excision of the tumor. Finally, failure of treatment was determined by recurrence of the cancer either locally or distally.
While the set of patients examined is small, there appears to be little to no correlation between the examined imaging features and either histological necrosis or ultimate failure of treatment.

Aaron Chafitz
Poster # 23
Research Mentor: David Flanigan, MD
Project Title: “Preoperative pain perceptions are predictive of physical therapy performance, healthcare resource utilization, and postoperative symptoms after anterior cruciate ligament reconstruction: a minimum 1 year follow-up study”
Project Abstract: ACL reconstruction requires extensive post-op rehabilitation with high reported rates of persistent symptoms. There is new evidence that psychological traits like anxiety or fear of pain, coping skills, and severe subjective pain prior to surgery can adversely affect outcomes after orthopedic surgery. The goal of this study is to examine the predictive effect of preop pain perceptions, physical therapy performance, healthcare resource utilization, and persistent symptoms after ACL reconstruction. 72 ACL patients completed a series of preop self-administered surveys related to subjective pain (McGill pain questionnaire), subjective knee symptoms (IKDC subjective score), anxiety related to pain (pain catastrophizing scale), fear of reinjury (Tampa scale for kinesiophobia), pain from movement (Fear Avoidance Beliefs Questionnaire), pain coping methods (brief COPE, Pain Coping Methods). The association between preop scores and post-op pain scripts, office visits, phone encounters, re-injury and return to sport within 12 months as well as physical therapist documented poor perceived effort were analyzed. Increased preop McGill scores were predictive of a higher number of post-operative pain scripts, pain-related phone encounters in the first month and decreased return to sport. High pain catastrophizing and kinesiophobia scores were associated with poor perceived effort in rehab, decreased rates of return to sport, and increased re-injury rates. Low pre-op IKDC scores were predictive of a higher number of post-op pain scripts, and number of phone encounters in the first year. Lower pain coping scores on the PCM emotional coping subscale were predictive of more pain scripts and phone encounters in the first year. Preop pain perceptions are associated with effort in PT and functional outcomes such as return to sport. Additionally, maladaptive pain perceptions appear to be predictive of higher post-op healthcare resource utilization as well as higher re-injury rates.
Radhika Chalasani
Poster # 47
Research Mentor: David Flanigan, MD
Project Title: “Evaluation of Treatment Outcomes of Multi-ligament Knee Injuries”
Project Abstract: Introduction: Multiligament knee injury represents a spectrum of complex knee injuries; functional outcomes can range from mild impairment to severe disability. There is substantial literature on outcomes after treatment of a multi-ligament knee injury. The objective of this study is to identify factors influencing the time to return to sport or return to work after a multiligament knee injury to help providers more effectively counsel patients early in the treatment process.

Methods: A systematic review of the literature was performed on the PubMed database available until January 2016 using keywords “knee dislocation” or “multiple ligament-injured knee” or “multiligament knee reconstruction”, resulting in 1586 hits. Prospective and retrospective patient outcome studies reported in English were included. We investigated the effect of age, surgical timing, injury mechanism, treatment strategy, ligaments involved, BMI, vascular involvement and nerve injury on functional outcomes including return to sport or return to work. After thorough review of abstracts and full text of the search results 118 articles are identified for data analysis. Some of the articles provided detailed case outcomes while the others summarized their key findings. A summary and detailed data base was developed to capture information from the key articles. Data analysis is conducted to arrive at predictable outcomes based on comorbidities, complications and treatment methods.

Results: Preliminary analysis suggest surgical treatment to be superior to non-operative treatment of knees with clinical instability. Non-operatively treated patients had abysmally low rate of return to sport. Earlier surgical treatment (within 3 weeks) in patients without vascular injury was associated with improved outcomes. A higher grade injury as defined by the KD classification is associated with worse outcomes. Morbidly obese patients often had poor outcomes even with low energy injury mechanism or low KD injury grade. Both vascular and neurologic injury were associated with low rate of return to work or sport as well as chronic pain medicine requirement. Injuries that occurred in polytrauma patients often required longer rehabilitation and carried a significant financial burden. Conclusion: Injury severity, patient demographics and presence of associated injuries influence outcomes following multiligament knee injury and should be considered when counselling patients on reasonable expectations for return to sport or return to work. Further analysis of literature will help quantify the outcomes for athletes of their outcomes subsequent to multi-ligament injury and treatment.

Marcus Cluse
Poster # 42
Research Mentor: Gurneet Sandhu, MD
Project Title: “Hemodynamic Changes in Patients Undergoing Neurosurgical Procedures under General Anesthesia with Sevoflurane or Desflurane”
Project Abstract: The aim of this paper was to identify and analyze the hemodynamic changes in patients undergoing neurosurgical procedures under general anesthesia with either desflurane or sevoflurane. We retrospectively analyzed patients with supra- and infra-tentorial tumors who underwent craniotomies between September 2015 and April 2016. We collected information including demographics, the dose of phenylephrine received, the dose of ondansetron received, mean arterial pressure and heart rate. Our results showed that patients receiving sevoflurane had significantly higher mean arterial pressures than those receiving desflurane. There was no significant difference in heart rate between the two groups. Patients receiving sevoflurane also received significantly lower doses of phenylephrine and ondansetron compared to those receiving desflurane. While the results of this study are limited due to the small sample size, they indicate that sevoflurane may be more effective at maintaining a patient's blood pressure and vital organ perfusion. Additionally, the higher dose of ondansetron given to patients receiving desflurane may indicate that patients are more likely to suffer post-operative nausea and vomiting when receiving desflurane rather than sevoflurane.
Ross Comisford  
Poster # 52  
Research Mentor: Jeffrey Granger, MD  
Project Title: “Retrospective review of explant and spacers (static and mobile) for the infected total hip”  
Project Abstract: Periprosthetic joint infection (PJI) is a leading cause of failure of total hip arthroplasty (THA) and hemiarthroplasty (HA) that results in a substantial cost to the healthcare system and increased patient morbidity and mortality. A standard treatment protocol for established infections is a two-stage exchange with removal of the infected prosthesis and insertion of an antibiotic cement spacer until the infection is eradicated and a revision THA is possible. There are a wide variety of spacer techniques that can be employed including both static and articulating constructs but there is controversy regarding the indications for and the advantages and disadvantages of various spacer techniques. In this study we report outcomes of 56 patients treated for PJI of THA and HA using four distinct antibiotic cement spacer techniques at the Ohio State University Medical Center.

Nicole Davidson  
Poster # 48  
Research Mentor: Stacy Ardoin, MD  
Project Title: “Assessment of a Cognitive Impairment Measure in SLE”  
Project Abstract: Objective: Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease which can impact the central nervous system in multiple ways, including cognitive dysfunction. Cognitive dysfunction is commonly reported and difficult to detect. Currently used diagnostic methods are time consuming, costly and challenging to implement in clinic. This study used the Self-Administered Gerocognitive Exam (SAGE) screening test to assess cognitive impairment in SLE.  
Methods: Study included 118 SLE patients. Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) and Systemic Lupus International Collaborative Clinics Damage Index (SLICC DI) were completed for all patients. SAGE scores were grouped into two categories: normal (> 16) and abnormal (≤ 16). Univariate and multivariate analyses were performed.  
Results: Of the 118 subjects in this study, 97 scored normal on SAGE and 21 scored abnormal. Race, ethnicity, education level and household income were significantly associated with SAGE score at the p<0.15 level. Abnormal SAGE scores were associated with higher overall SLICC DI scores but not neuropsychiatric-specific SLICC DI score. In multivariable analysis there was an independent association between abnormal SAGE score and higher SLICC DI score (odds ratio (OR) = 1.44, 95% CI 1.01-1.11, p-value=0.03), Hispanic ethnicity (OR=43.4, 95%CI 3.1-601, p-value=0.005) and lower household income (OR=11.9 for ≤$15,000 vs >$50,000, 95%CI 2.45-57.8, p-value=0.002).  
Conclusions: Study results show a significant independent relationship between neurocognitive impairment as measured by SAGE and higher lupus related damage as measured by SLICC DI. Abnormal SAGE scores were associated with lower household income and Hispanic ethnicity, which may suggest language barriers. The SAGE was feasible to measure in the clinic setting.
Jennifer DeSalvo  
**Poster # 35**  
**Research Mentor:** Electra Paskett, PhD  
**Project Title:** “Characterizing Time to Diagnostic Resolution After an Abnormal Cancer Screening Exam in Elderly Patients in the Ohio Patient Navigation Research Program”  
**Project Abstract:** Cancer is a leading cause of death among elderly persons, yet current patient navigation (PN) models do not specifically address cancer health disparities and barriers to prompt and quality standard cancer care for elderly persons. The goal of this study was to assess the effect of patient navigation (PN) on time to diagnostic resolution among elderly persons age 65 and older with abnormal breast, cervical or colorectal cancer screening exams from Ohio Patient Navigation Research Program (OPNRP) clinics and to identify differences in barriers to prompt diagnostic resolution among elderly and younger participants who received PN. The OPNRP utilized a nested cohort group-randomized trial design to randomize 862 patients from 18 OPNRP clinics to PN or usual care conditions. The primary analysis utilized a shared frailty model to test for the effect of PN on time to diagnostic resolution among elderly participants with abnormal cancer screening exams. Barriers were analyzed by calculating the sum and frequency of barriers encountered in the patient navigation arm by age group (≥65 versus < 65 years old). Conditional on the random clinic effect, hazard ratios became significant at six months in the PN arm for elderly participants and demonstrated a resolution rate at six months that was 88% higher than participants in the usual care arm (p=0.009). Among participants reporting barriers to care in the elderly and younger PN groups, almost half reported two or more intrapersonal or systemic barriers that frequently required more than 2 encounters consisting of referrals and support from the patient navigator. Therefore, PN significantly improved time to diagnostic resolution and addressed intrapersonal and systemic barriers to care among elderly participants over time. Future research should implement and evaluate strategies tailored to address intrapersonal and systemic barriers encountered in this population to reduce the burden of cancer incidence and mortality.

Zachary Diltz  
**Poster # 63**  
**Research Mentor:** Rajan Thakkar, MD  
**Project Title:** “Persistent Lymphopenia is Associated with an Increased Infection Rate in Pediatric Burn Patients”  
**Project Abstract:** We determined the predictive value of restoration of the immune response, as measured by the white blood cell, neutrophil, and/or lymphocyte counts at 72hrs in relation to adverse outcomes in severe pediatric thermal injury. We used our institution's trauma registry to identify patients aged 0-18 years old with burns of at least 10% total body surface area. Demographic data, mechanism of injury, and clinical outcomes were extracted from the medical record. Complete blood count with differential was acquired for the first week of hospital stay. Patients were classified as abnormal or return to normal based on response of each complete blood count component on or after 72hrs post injury which was then compared to clinical outcomes. There were 140 burn patients admitted over the 10 years included in the study. Of these, 47 had white blood cell data from day 3-7 post-admission required for the study, 25 for neutrophils, and 58 for lymphocytes. A much higher percentage of patients remained abnormal for lymphocytes (67.2%) than white blood cells (10.6%) or neutrophils (32.0%). There were no significant differences in age or burn TBSA between the abnormal and normal lymphocyte groups. Also, the group of patients with an abnormal lymphocyte response had a significantly higher (p = 0.0287) infection rate (71.8%) than the lymphocyte group that returned to normal (42.1%). Regression analyses performed on the lymphocyte patients revealed that a return to normal in lymphocyte percentage was associated with a decreased odds of developing an infectious complication (OR = 0.18; 95% CI = 0.04-0.81). Age and mechanism were not significantly associated with infectious outcomes. Persistent lymphopenia at 72 hours following severe pediatric thermal injury is associated with the development of infectious complications. Also a return to normal lymphocyte count at 72 hours post injury was protective against acquiring an infection regardless of age and burn size.
Garrett Diltz  
**Poster # 29**  
**Research Mentor:** Alejandro Diez, MD  
**Project Title:** “A Retrospective Analysis of Living Donor Kidney Function and Relationship to Patient Outcomes”  
**Project Abstract:** The overall outcomes of living kidney donors in regards to rates of end-stage renal disease have been well described, however there are limited data examining the outcomes of donors as a function of the size and function of the remaining kidney. It is unclear if the rates of hypertrophy, proteinuria, and hypertension as clinical outcomes in donors will vary according to the predonation renal function and remaining renal mass. Under IRB approval we designed a single center retrospective study of all consecutive living kidney donors who donated between January 1, 2008 and December 31, 2013; abstracting demographic and clinical data including pre-and post donation renal function, proteinuria, blood pressure measurements along with pre-donation renal volumes as determined by 3D reconstructions of CT angiograms (CT-V). Post donation outcomes were determined at 1 year post donation. 247 cases met the inclusion criteria. We found that the average rate of hypertrophy of the remaining kidney was 1.37, regardless of the pre-donation renal function. Likewise, there were no changes in mean blood pressures before and after transplantation. We did find however, that there was a statistical significant difference higher rate of post donation proteinuria in cohorts with lower predonation renal function. (p=0.04956, N=23; p< 0.001, N=73). As a secondary outcome, we determined that random "spot" urine protein-creatinine measurements were shown to correlate highly with measured urine proteins from timed 24 hour urine collections (Pearson coefficient=0.87, p< 0.001, N=408). The results of this project suggests that in living kidney donors post donation renal function may be reliably estimated based on pre-donation creatinine measurements. Furthermore, this data suggests that donors with lower renal function may have a higher incidence of proteinuria in the future. Future work will examine whether eGFR has an effect on outcomes in recipients of kidney donation.

Au Duong  
**Poster # 81**  
**Research Mentor:** Kun Huang, PhD  
**Project Title:** “Integrative Genomic Approach for Cancer Biomarker Discovery”  
**Project Abstract:** The development of complex diseases such as cancers involves intricate interactions between genotypes and phenotypes as well as different types of cells. In integrative genomic studies, data obtained at different levels such as genetic mutations, gene and protein expression profiles, and clinical phenotypes are integrated with the purported goals of developing new insights on the biology and discovering new integrated biomarkers for diseases. The database used in this project is The Cancer Genome Atlas, specifically a subset of their breast cancer patients. Using Matlab and other statistical tools, clusters of genes that show similar expression, so called 'co-expression gene networks,' were created. Different somatic mutations were correlated to changes in gene cluster expression, with statistically significant differences noted for multiple clusters depending on the mutation used to stratify the population. One very influential gene mutation was TP53. In order to explore the extent of TP53's effect when other mutations were also present, a subpopulation of TP53 mutation free (including silent mutations) patients was analyzed, again correlating somatic mutations to changes in gene expression. Overall our results identified many genes previously shown to play a role in breast cancer, as well as a few less well studied genes. We found that the removal of TP53 mutation carriers did significantly change the genetic expression profile for multiple clusters. Our method is supported by the finding of genes well established to be related to cancer. More research is needed to further elucidate the relationship of the less well studied genes to breast cancer, as well as the potential interplay between TP53 and other gene mutations on genetic expression. Other potential areas of research are the application of this gene expression analysis pipeline to other cancer and the correlation of these genetic results to clinical outcomes.
Ryan Eaton  
Poster # 82  
Research Mentor: Flavia Pichiorri, PhD  
Project Title: “Therapeutic implications of Exportin-1 inhibitor in enhancing Reovirus infection of myeloma cells through Drosha regulation”  
Project Abstract: Oncolytic virotherapy (OV) in Multiple Myeloma (MM) patients using Reolysin (RV), infusible form of human reovirus, in phase I trial was limited due to antiviral immune response. Hence, it is important to identify drugs that would suppress innate antiviral immune responses of MM cells and aid RV replication. Recently, RNaseIII nuclease Drosha was shown to cleave viral RNA and inhibit viral replication depending on its exportin 1 (XPO1/CRM1)-driven translocation from nucleus into the cytoplasm in virus infected cells. Thus, inhibition of XPO-1 may reduce Drosha-mediated viral RNA processing, limiting its antiviral activity. Our laboratory demonstrated that XPO-1 inhibitor treatment can induce apoptosis in MM cell lines and leads to primary miRNA accumulation indicating impaired small RNA processing by Drosha. Therefore, in this project, we have investigated the possibility of using XPO-1 inhibitor as companion drug to inhibit antiviral immune response and enhance MM tumor sensitivity to RV in OV therapy.

Andrew Eiterman  
Poster # 3  
Research Mentor: Barbara Rogers, MD  
Project Title: “Perioperative Blood Glucose Control: A Prospective Analysis of Demographic Factors and HbA1c Levels”  
Project Abstract: Perioperative blood glucose control is an essential component of care in the diabetic surgical patient. Evidence abounds for the negative impact of hyperglycemia on surgical complications and outcomes. It is critical to understand the relationship between HbA1c and perioperative glucose control and this study will enable us to gauge how well blood glucose levels (BGLs) are managed based on patient HbA1c. Diabetic surgical patients at the Ohio State University Wexner Medical Center were enrolled in this study and took variable doses of basal insulin the night before surgery. We hypothesize that in outpatients undergoing general anesthesia for non-cardiac next-day surgery, a 25% reduction in basal dose insulin the night before will result in better perioperative blood glucose control compared with our institutional 50% decrease. We believe that this conservative increase will not result in an unacceptable increase in hypoglycemia. This project is currently ongoing so secondary end points were analyzed. Data from 36 diabetic patients undergoing surgery at the Ohio State Wexner Medical Center were analyzed using statistical regression models. The results indicate that worse glycemic control, indicated by higher HbA1c, is associated with higher preoperative BGL but is not correlated with intraoperative or postoperative BGLs. However, after adjustment for insulin dose, there was no longer any significant association between preoperative BGL and HbA1c. No other demographic factors were associated with increased HbA1c level. These results indicate that preoperative, intraoperative, and postoperative insulin successfully control for variations in HbA1c blood glucose but improvements in preoperative basal insulin dosing could better regulate perioperative blood glucose levels.
Brady Evans  
**Poster # 36**  
**Research Mentor:** Dan Jones, MD, PhD  
**Project Title:** “Identifying Genetic Heterogeneity in TNBC”  
**Project Abstract:** Triple-negative breast cancer (TNBC) represents a tumor subclass that shows particularly aggressive clinical behavior. We have observed a particular pattern of genetic heterogeneity in TNBC whereby mutations that arise in the primary tumor can show regression in metastatic lesions. These mutational changes were observed not only in the master cell cycle/checkpoint regulator TP53 but also in growth regulatory genes such as BRAF. This particular pattern of mutational instability is important clinically as it affects potential therapeutic targets. Current identification methods for this TNBC subtype involve time- and cost-intensive next-generation sequencing (NGS). We hypothesized that these mutational patterns would be more feasibly recognized by identifying functional correlates of G1-S phase dysfunction as a surrogate marker for mutational instability. Primary breast cancer and metastatic lymph node tissue samples were stained using the Fanconi Anemia triple-stain immunofluorescence method (FATSI). Cells with dysfunctional DNA repair pathways / mutational instability stained negative for FANCD2 repair foci. These cells were counted in each sample by multiple researchers. The cell counts were analyzed and adjustments were made in the FATSI protocol to account for the genetic heterogeneity of TNBC. Post-adjustment counts were concordant with the mutational load of each tissue sample. Given that the FATSI method requires a fraction of the time and cost necessary for NGS, our findings support a possible future role for FATSI staining in the identification of genetically heterogeneous TNBC subtypes.

Miles Fisher  
**Poster # 43**  
**Research Mentor:** Laura Schmitt, PT, MPT, PhD  
**Project Title:** “Quadriceps Strength and Knee Biomechanics during Stair Descent in Individuals with Patellofemoral and Tibiofemoral Articular Cartilage Defects”  
**Project Abstract:** Individuals with knee articular cartilage defects (ACDs) have progressive loss of knee function and may be at risk for early onset knee osteoarthritis. Limited information exists regarding how muscle function and biomechanics during stair descent differ based on knee ACD location. The purpose of this study was to compare quadriceps femoris (QF) strength and lower extremity biomechanics during a stair descent task among individuals with tibiofemoral (TF) ACDs, patellofemoral (PF) ACDs, and healthy individuals. Forty individuals with full thickness knee ACDs and 19 uninjured individuals participated. Individuals were grouped by ACD location: PF (n=20) and TF (n=14). QF strength was quantified as peak knee extension torque. Participants completed trials of stair descent on an instrumented staircase. 3-D motional analysis was conducted by tracking retroreflective markers. Variables of interest included peak knee flexion angle (PKFA) and peak internal knee extension moment (PIKEM). The TF and PF groups had significantly lower involved limb PIKEM and involved limb QF strength compared to the control group. There were no differences between the PF and TF groups in involved PIKEM or QF strength. Also, there were no group differences identified in involved or uninvolved PKFA. In the PF group, the involved limb had significantly lower PKFA, PIKEM, and QF strength compared to the uninvolved limb. In the TF group, the involved limb had significant lower PIKEM and QF strength compared to the uninvolved limb. Individuals with PF and TF ACDs demonstrated notably lower involved limb QF strength and PIKEM during descent compared to healthy subjects. Also, individuals with PF and TF defects demonstrated limb asymmetry in PIKEM and QF strength, but only individuals with PF ACDs demonstrated asymmetry in PKFA during descent. These alterations in strength and movement patterns suggest potential targets for rehabilitation, but further study is warranted to determine the consequences.
Hannah Florian  
**Poster # 30**  
**Research Mentor:** Ann McAlarney, ScD, MS  
**Project Title:** “Provider Perspectives on engaging with patients through a tethered patient portal: "I don't like being any patient's email buddy"”  
**Project Abstract:** Objectives: Providers hold the key to increasing low patient portal enrollment rates. Literature shows that provider support is the most effective way to increase patient portal use. However, providers are hesitant to adopt portals due to concerns. The aim of our study conduct a mixed methods study of provider use of a tethered patient portal to determine use patterns and elucidate provider concerns.  
**Methods:** The study population was ambulatory health care providers within a large Midwestern academic medical center (AMC) that uses EPIC MyChart as its tethered patient portal. A semi-structured interview guide was used to conduct phone and in-person interviews with 13 primary care providers within the Department of Family Medicine to gather provider perspectives on engaging with MyChart. For all ambulatory physicians at the AMC 1-month of log file data in 2015 was extracted from the electronic health record and descriptive statistics were used to examine provider use patterns.  
**Results:** Provider interviews identified recurrent themes associated with MyChart use. The major concerns were time, patient misuse, workload, reimbursement and liability. While the benefits were direct communication, convenience, and ease of use for patients. The log file showed that surgery, IM, OB/GYN and family medicine have approximately half their patients actively using MyChart. While patients are engaged in MyChart, there is a low physician utilization rate of the MyChart messaging feature.  
**Conclusions:** There is a discrepancy between specialties’ utilization of MyChart and patient enrollment rates. 28% of specialists’ total communication is through MyChart messaging in contrast to primary care at 56%. Providers raised concerns that had not previously been discussed in literature, particularly patient misuse of the portal and the need for formal training. These results highlight the need to make office workflow changes to relieve provider burden and institute patient portal training.

Hannah Fox  
**Poster # 37**  
**Research Mentor:** Michelle Isley, MD, MPH  
**Project Title:** “LARC Use and Knowledge in Medical Students”  
**Project Abstract:** Long acting reversible contraceptives (LARC), such as intrauterine devices (IUD) and implants, are a highly effective and safe form of contraception, yet LARC use in the United States remains low compared to other less effective methods. Studies have demonstrated significant misinformation surrounding LARCs, in medical textbooks as well as among practicing physicians. A survey was distributed to medical students to assess LARC use and knowledge. It was hypothesized that medical students would have increased use of LARC methods compared to the general population, and that medical student knowledge of LARCs would increase as they moved from pre-clinical to clinical years. Results demonstrate that medical students use LARC methods significantly more than the general population (30.09% versus 11.6%, respectively), and clinical medical students have higher LARC use than pre-clinical students (34.59% versus 24.27%, respectively). Medical students in their clinical years also have higher LARC knowledge than pre-clinical students. When examining knowledge stratified by gender, female medical students have higher knowledge than male students. This was consistent between pre-clinical and clinical students. Though both genders demonstrate increased knowledge from pre-clinical to clinical years, female LARC knowledge remained higher than male knowledge. Our results suggest that medical school curricula impart accurate knowledge of LARCs, translating into increased knowledge and use. However, the gender discrepancy suggests that curricula need to be improved to ensure that both genders take away similar knowledge, so that accurate information will be provided to patients, no matter the gender of their doctor.
Thomas France  
**Poster # 24**  
**Research Mentor:** Pawan Kumar, MS, PhD  
**Project Title:** “Role of IL-6 in Head and Neck Squamous Cell Carcinoma (HNSCC) Metastasis to Lung”  
**Project Abstract:** Tumor metastasis is one of the major causes of treatment failure and mortality in cancer patients. Although our understanding of the molecular and biological events that contribute to tumor progression has increased considerably over the last few decades, we still know very little about the biological processes that contribute to cancer metastasis. Head and neck cancer is no exception. Recent studies have shown that elevated IL-6 levels are an independent predictor of tumor metastasis in a number of malignancies including head and neck squamous cell carcinoma (HNSCC) [1]. This study was designed to better understand the mechanisms by which IL-6 promotes head and neck squamous cell carcinoma metastasis to distal sites. Our results show that IL-6 promoted tumor cell homing to lungs by regulating sialyl Lewis x-E-selectin adhesive interactions and the SDF-1-CXCR4 chemotactic axis. A better understanding of molecular mechanisms that contribute to cancer metastasis will help in the development of novel and effective therapeutic strategies to treat patients with metastatic disease.

David Gage  
**Poster # 17**  
**Research Mentor:** Lara McKenzie, PhD, MA  
**Project Title:** “Automatic and manual garage door-related injuries treated in U.S. emergency departments from 1990-2015”  
**Project Abstract:** Injuries associated with garage doors can affect individuals of all ages. Our objective was to describe, on a national level, the epidemiology of automatic and manual garage door-related injuries treated in US emergency departments (ED). We conducted a retrospective analysis using data from the National Electronic Injury Surveillance System (NEISS), a probability sample of hospital-based EDs, and examined cases from 1990 through 2015 where patients sustained an injury associated with a garage door and were treated in EDs. A total of 10,981 cases were reviewed and 1,433 cases were excluded because their injuries were not directly related to interaction with a garage door. A total of 9,548 cases were included in the analysis. An estimated 436,737 (95% CI=352,461-521,013) patients (age range 1 month to 100 years) were treated in U.S. EDs for garage door-related injuries from 1990 through 2015. The rate of garage-door related injuries significantly decreased over the 26-year study period (p < 0.001). Males were most frequently injured (63.5%). Patients were often injured while they were closing (33.2%), opening (23.5%), or repairing (21.5%) the garage door. Children aged ≤ 9 were most frequently injured due to horseplay (67.4%) with the garage door. The most common type of injury was lacerations (38.5%) and the majority of injuries occurred to fingers (45.6%). Nearly 3% of patients were hospitalized. These findings demonstrate that garage door-related injuries, specifically those resulting from routine use or repair, are an important source of injury. Although the rate of garage door-related injuries decreased over the study period, injuries persist suggesting the need for future research to examine possible ways to reduce the potential for injuries associated with these products.
Manisha Gamage  
**Poster # 44**  
**Research Mentor:** Gloria Fleming, MD  
**Project Title:** “Corneal biomechanical properties between eyes with asymmetric glaucoma”  
**Project Abstract:** Purpose: To study differences in corneal biomechanical properties between fellow eyes in patients with asymmetric primary open angle glaucoma (POAG).  
Methods: 18 eyes of 9 asymmetric POAG subjects underwent measurement of intraocular pressure (IOP) using Goldmann applanation tonometry (GAT) and dynamic contour tonometry (DCT), corneal compensated IOP (IOPcc) and corneal hysteresis (CH) using the Reichert ocular response analyzer (ORA), central corneal thickness (CCT) using optical coherence tomography, anterior chamber volume using Pentacam, and several corneal biomechanical parameters (deformation amplitude, applanation lengths, times of both applanation events and greatest deformation, radius of curvature of greatest deformation, and the velocities of the corneal deforming and recovering) using the CorVis ST. Asymmetric glaucoma was defined as vertical cup-to-disk ratio (VCDR) difference of ≥0.2 between both eyes. Results from fellow eyes were then compared using paired t tests.  
Results: Overall, the average ganglion cell complex (GCC) in the worse eyes was on average 11.3 less than in the better eyes (P = 0.0011). The visual field mean deviation (VFMD) in the worse eyes was on average 5.2 greater than in the better eyes (P = 0.0103). There was no significant difference in IOP between worst/best eyes measured by either the GAT, ORA, or the DCT. There were no significant differences found biomechanical properties measured by the CorVis ST.  
Conclusions: These findings suggest that average GCC could be an effective parameter to detect early glaucoma in clinical practice, and may even provide more accurate detection than visual field mean deviation. Studies with a larger sample are needed to corroborate our results.

Sarah Gartner  
**Poster # 68**  
**Research Mentor:** Gail Besner, MD  
**Project Title:** “Utilizing the Benefits of Biofilms: Prevention of Necrotizing Enterocolitis Using a Novel Probiotic Delivery System”  
**Project Abstract:** Background: Necrotizing Enterocolitis (NEC) is a devastating gastrointestinal disease affecting premature babies. The clinical use of probiotics, including Lactobacillus reuteri (Lr), has been shown to decrease the incidence of clinical and experimental NEC. However, studies have been successful only with repeated administration of probiotics and cases of bacteremia have been reported. Hypothesis: To improve the efficacy of probiotic administration, the use of a novel microsphere delivery system that promotes biofilm formation will enhance intestinal mucosal barrier function in rat pups subjected to experimental NEC.  
Methods: Pre-term rat pups were delivered by C-section and randomized to receive: (1) sterile water (vehicle control, n=20); (2) free-living Lr alone (n=20); (3) Lr grown on sucrose-loaded microspheres (n=18); (4) Lr grown on maltose-loaded microspheres (n=15); or (5) breast fed uninjured control pups (n=10). Experimental pups were exposed to NEC (repeated episodes of hypoxia and hypothermia, with administration of hypercaloric feeds). Pups received fluorescein isothiocyanate (FITC) labeled-Dextran (FD70) via gastric gavage 48h after C-section. They were sacrificed 4h later and serum levels of FD70 were quantified as a measure of gut barrier function, where decreased serum FITC-Dextran levels indicate improved gut barrier function. Results: There was statistically significant decreases in serum FITC-Dextran levels for a single dose of Lr grown on either sucrose- or maltose- loaded microspheres when compared to sterile water (p=0.0044 and p=0.0071, respectively). A single dose of free-living Lr did not offer any improvement compared to sterile water (p=0.083). Conclusion: Lr administered as a biofilm preserves gut barrier function in experimental NEC.
**Preeta Gupta**  
**Poster # 49**  
**Research Mentor:** Benjamin Kaffenberger, MD  
**Project Title:** “A retrospective analysis of acne treatment progression based on generic minocycline dosed twice daily vs extended release minocycline dosed once daily”  
**Project Abstract:** Minocycline is widely used as a second line treatment for acne vulgaris. It is available in an extended release, once daily branded formulation and a twice daily generic formulation. Extended release formulations may allow for improved patient adherence and improved outcomes although no head-to-head trials have been conducted to date. Our study objective was to conduct a retrospective comparative analysis among the extended release and generic minocycline formulations to determine any trends in efficacy or administrative burden. The Ohio State Medical Center information warehouse was queried for eligible patients, and they were evaluated for baseline characteristics, concomitant medications, treatment escalation to isotretinoin, which is defined as real world treatment failure, and subsequent direct and administrative encounters. 216 patients were retrieved and the patients were generally demographically well matched between the minocycline groups, with the exception of insurance types. The primary outcome endpoint was treatment progression to isotretinoin. The secondary outcome measure was administrative encounters after prescription start date. 172 patients were prescribed generic and 44 patients prescribed extended release minocycline. 29.6% of patients prescribed extended release minocycline were escalated to isotretinoin treatment compared to 9.3% of patients prescribed generic (p< 0.05). Patients prescribed extended release minocycline had higher administrative encounters at 3 months, 6 months, and 12 months after prescription start date (p< 0.05 at each time point). Our data did not support less frequent treatment escalation to isotretinoin. It also demonstrated additional administrative burden for patients prescribed extended release minocycline. Prospective studies should be conducted to confirm if patient convenience, adherence, and most importantly acne outcomes are truly improved using extended release vs. generic minocycline.

**Caitlin Handy**  
**Poster # 7**  
**Research Mentor:** Andrea Bonny, MD  
**Project Title:** “Contraceptive Use, Counseling, and Uptake Among Adolescents with Opioid Use Disorder”  
**Project Abstract:** OBJECTIVE: To describe contraceptive use, counseling, and uptake among female adolescents seeking outpatient treatment for opioid use disorder. METHODS: Retrospective chart review of female patients presenting for treatment of opioid use disorder 1/1/2013-1/31/2016 (N=118). The study was deemed exempt by the Institutional Review Board. Contraceptive method at intake and 90 days were extracted from the electronic medical record. Logistic regression explored associations between new hormonal contraceptive (HC) uptake at 90 days (among those using no method at intake) and potential predictors. RESULTS: Subjects were 94.1% white/non-Hispanic with a mean age of 19.3 (±1.7) years. Most were publicly insured (64.4%), resided in Franklin County, OH (53.4%), and had less than a high school diploma or GED (58.5%). Opioid use patterns varied; 70.3% reported combined prescription opioid/heroin, 17.8% prescription opioid only, and 10.2% heroin only. At intake, 63.6% were on no HC, 39.8% had a prior pregnancy, 19.5% had a positive STI screen, and 28.8% were hepatitis C antibody positive. Contraceptive counseling was not documented for 64.4% of patients; 22.9% received non-efficacy based counseling, 12.7% efficacy-based. At 90 days, 24 (20.3%) were on no HC and use of all HC increased: LARC (11.0% to 15.3%), DMPA (12.7% to 41.5%), combined HC (11.0% to 21.2%). Prior pregnancy was the only significant predictor of new HC uptake: OR 5.0 [1.26—19.42 95% CI]. Although not statistically significant (p = 0.1), a higher percentage of those who received non-efficacy based counseling initiated a new HC (83% non-efficacy, 50% efficacy, and 64% counseling not documented). CONCLUSIONS: Prior pregnancy and STIs were common among adolescent females presenting for opioid use disorder treatment; the majority was on no HC and had no contraceptive counseling documented, underscoring the need for future intervention. Further study should establish effective contraceptive counseling strategies for adolescents with opioid use disorder.
Walter Hardesty
Poster # 25
Research Mentor: Ginger Yang, PhD, MPH
Project Title: “The Impact of State Concussion Laws on the Characteristics of Pediatric Concussion-Related Emergency Department Visits Between 2006-2014”
Project Abstract: With the enactment of state concussion laws in the US between 2009 and 2014, healthcare utilization for sports-related concussions has increased significantly, adding a significant burden to the healthcare system. The aim of this study was to examine the impact of state concussion laws on Emergency Department (ED) utilization and associated healthcare costs for sports-related concussions among children ages 0-18 from 2006 to 2015. We retrospectively analyzed data from the Pediatric Health Information System (PHIS), an administrative database containing patient and clinical data from more than 45 tertiary care children's hospitals across the US. A total of 123,220 ED visits in PHIS were included for analysis. Multinomial logistic regression models were used to determine the differences in patient and visit characteristics across periods from pre-law, to immediate post-law (one year after law enactment) and post-law periods. Of the 123,220 ED visits due to sport-related concussions identified, the majority were males (n=83,208; 67.6%), children ages 10 to 14 years (n=49,863; 40.9%), and children who were privately insured at the time of the ED visit (n=62,376; 50.6%). Females, older age, and patients with Medicaid/Medicare each had significantly increased odds of ED visits in both the immediate post-law and post-law periods as compared to their counterparts. A significantly decreased proportion of imaging use was also observed post-law compared to pre-law (AOR: 0.49, 95% CI: 0.47, 0.50, P< 0.0001). Finally, decreased adjusted costs per ED visit for sports-related concussions were observed from pre-law to post-law (P< 0.0001), despite increased total adjusted costs in the post-law period. Our results offer empirical data on the impact of state concussion laws on ED utilization for pediatric sports-related concussions. These results have important implications for policy interventions and their effects on healthcare systems.

Clifton Hartwell
Poster # 8
Research Mentor: Gurneet Sandhu, MD
Project Title: “The Effects of Sitting Position on Tumor Resection Extent, Diuresis, and Blood Loss During Surgery on Posterior Cranial Fossa and Pineal Region”
Project Abstract: Background: Patient positioning during neurosurgery on the posterior cranial fossa (PCF) and pineal region (PR) can have a significant impact on surgical outcome. Two positions are generally used: sitting and horizontal (including variations of horizontal). Current evidence supports horizontal positioning of the patient, which has a significantly lower associated risk of intraoperative air embolism (VAE). However, there is literature evidence indicating that there is no significant difference in the rate of clinically important, major VAE between the two groups. My goal was to identify other potential differences between the two groups, including blood loss, diuresis, fluid infusion, or total tumor resection. Methods: Patient information is being collected from two institutions: OSU Wexner Medical Center (US) and the NN Burdenko Institute of Neurosurgery (Russia). Inclusion criteria: patients must be 18-75 years old and undergoing open PCF or PR surgeries. Exclusion criteria: coagulation disorders, spinal or peripheral nerve dysfunction. The statistical analysis methods applied included a Chi-square or Fisher's exact test for tumor resection, and logarithmic-based T-test for blood loss, diuresis, and fluid infusions. Results: Group differences for total tumor resection and diuresis were statistically significant (p=0.0024 and p=0.047, respectively), while fluids administered and blood loss were not (p=0.86 and p=0.72, respectively). Conclusions: Since the study is still underway with only a fraction of the target number of participants, it's premature to make any strong conclusions. Additional areas of focus for future studies may become more evident after this study ends and a full analysis of the data is complete.
Haley Herman  
**Poster # 18**  
**Research Mentor:** Maryam Lustberg, MD  
**Project Title:** “Gait and Balance Changes in Taxane-Induced Neuropath”  
**Project Abstract:** Chemotherapeutic agents such as taxanes have allowed for significant improvement in the survivorship of breast and colon cancer patients. However, chemotherapy-induced peripheral neuropathy (CIPN) is a common dose-limiting toxicity. Despite its prevalence among cancer patients undergoing chemotherapy, CIPN and its associated symptoms have not been studied much beyond patient self-reports and individual nerve function testing. CIPN has been shown to lead to pain, falls, and difficulty walking and performing activities of daily living, often stemming from gait and balance deficits. This study aims to begin improving our understanding of the pathophysiology and risk factors associated with CIPN by hypothesizing that there are significant gait and balance parameter differences between CIPN patients and controls. Testing this hypothesis involved gathering volunteers to undergo a series of gait, balance, and proprioceptive tasks, including two 5-minute treadmill walks, quiet standing under various conditions on a balance plate, and ankle proprioception tasks utilizing a Biodex. Although testing is not complete, preliminary results suggest that patients with significant CIPN symptoms perform more poorly on most balance tasks than patients without significant symptoms. While tests for limits of stability (LOS) and reach distances were inconclusive or did not support the hypothesis, ellipse area (EA), root mean squared CoP excursion (RMS), and mean CoP velocity (MVEL) values, under both eyes open and closed conditions, were consistently higher in the CIPN group. These early findings support our hypothesis that patients with significant CIPN symptoms after receiving taxane-based chemotherapy experience greater deficits in their postural stability than comparable patients without significant CIPN.

Alex Hsieh  
**Poster # 26**  
**Research Mentor:** Don Hayes, MD, MS  
**Project Title:** “Influence of Transplant Center Procedural Volume on Survival Outcomes of Heart Transplantation for Children Bridged with Mechanical Circulatory Support”  
**Project Abstract:** Background: Transplant center expertise improves survival after heart transplant (HTx) but it is unknown if center expertise ameliorates risk associated with mechanical circulatory support (MCS) bridge-to-transplantation. Objectives: This study investigated whether center HTx volume reduced survival disparities among pediatric HTx patients bridged with extracorporeal membrane oxygenation (ECMO), left ventricular assist device (LVAD), or no MCS. Methods: Patients ≤18 years of age receiving first-time HTx between 2005 and 2015 were identified in the United Network of Organ Sharing registry. Center volume was the total number of HTx during the study period, classified into tertiles. The primary outcome was 1 year post-transplant survival, and MCS type was interacted with center volume in Cox proportional hazards regression. Results: The study cohort included 4,131 patients, of whom 719 were supported with LVAD and 230 with ECMO. In small centers (≤ 133 HTx over study period), patients bridged with ECMO had increased post-transplant mortality hazard compared to patients bridged with LVAD (HR = 0.29, 95% CI 0.12, 0.71; p = 0.006) and patients with no MCS (HR = 0.33, 95% CI 0.19, 0.57; p < 0.001). Interactions of MCS type with medium or large center volume were not statistically significant, and the same differences in survival by MCS type were observed in medium or large centers (136 - 208 or ≥ 214 HTx over the study period). Conclusions: Post-HTx survival disadvantage of pediatric patients bridged with ECMO persisted regardless of transplant program volume. The role of institutional ECMO expertise outside the transplant setting for improving outcomes of ECMO bridge to HTx should be explored.
Abdullahi Jama  
**Poster # 27**  
**Research Mentor:** Eugene L. Arnold, MD, MEd  
**Project Title:** “Effects of randomization with identical treatment; An epistemological exploration”  
**Project Abstract:** In this study we analyzed the randomization processes and results of the 2014 study "What does Risperidone add to parent training and stimulant in severe aggression in child attention deficit/hyperactivity disorder (Aman et al, 2014). This study is ideal for this epistemological study because of the fact that after randomization was done the two treatment arms were treated the exact same way for three weeks. An initial significant difference in dropouts was noticed which prompted this investigation. One of the most important purposes of the use of randomization in Randomized Clinical Trials is the production of equal comparable groups so that the differences that arise in the groups can be attributed to different types of treatment the different groups were given. In the 2014 study by Aman et al we used the treatment was the same so we would not be able to attribute those differences to different treatment. So what then could we attribute those differences to? Random chance? If so what implications would that have on the conclusions drawn by all Randomized Clinical Trials? In this investigation we ran a myriad of analyses to see if there were any differences that arose between the first three weeks. Significant differences were found in the data after three weeks. This demonstrated that it is worthwhile to study the randomization process in Randomized Clinical Trials.

Eric Jiang  
**Poster # 31**  
**Research Mentor:** Thomas Scharschmidt, MD  
**Project Title:** “Postoperative Acute Kidney Injury following Total Joint Arthroplasty: A Retrospective Analysis”  
**Project Abstract:** Background: The incidence of acute kidney disease (AKD) after total joint arthroplasty (TJA) as well as the factors associated with an increased risk of this complication have not been well characterized in the literature. Objectives: The primary objectives of this retrospective study were to calculate the incidence of post-operative AKD for patients undergoing total hip and knee arthroplasty and to identify risk factors associated with the development of AKD. Methods: A total of 1000 patients who underwent total knee arthroplasty (TKA) or total hip arthroplasty (THA) between January 2010 and May 2016 were identified via retrospective chart review. 79 Patients were excluded due to preexisting kidney dysfunction. Of the remaining 921 patients eligible for study inclusion, incomplete data regarding post-operative AKD were present in 23 patients, resulting in 898 patients (97.5%) that were included in the study. There were 492 females and 406 males with a mean age of 58.1 years (range 14-93). The RIFLE criteria and serum creatinine values were used to determine whether the patients suffered from AKD (defined as either at risk (AKR), acute kidney injury (AKI), or acute kidney failure (AKF)). Multiple logistic regression modeling was then utilized to identify risk factors for development of post-operative AKD. Results: The overall incidence of post-operative AKD was 6.8% (n=61). Of those, 36 suffered from AKR, 20 suffered from AKI and 5 suffered from AKF. Use of perioperative ARB or ACEi (p = 0.030), increasing BMI (p = 0.014), and use of vancomycin as a perioperative antibiotic (p = 0.021) were significantly significant risk factors associated with increased odds of development of post-operative AKD.
Sonya John  
**Poster # 59**  
**Research Mentor:** Craig Hofmeister, MD  
**Project Title:** “Testosterone's impact in newly diagnosed multiple myeloma”  
**Project Abstract:** Hypogonadism is present in approximately a quarter of men older than 70 years. Multiple myeloma patients are known to suffer from fatigue, mood disturbances, and anemia, and it has been theorized that this is related to elevated inflammatory cytokines, primarily increased serum levels of soluble IL-6 receptor (sIL-6r). We hypothesized that total testosterone levels will be associated with overall survival from the time of diagnosis, high-risk cytogenetic markers, renal disease, and anti-depressant use. We performed a retrospective chart review on patients enrolled in the OSU Myeloma database and included patients in our study with testosterone levels that were within 6 months of diagnosis. I used scatterplots to assess other continuous variables such as age, BMI, creatinine, albumin, Beta 2- Microglobulin, high-risk cytogenetic markers, as well as the calculated MDRD glomerular filtration rate (GFR). Using survival analysis we compared survival rates among patients of different testosterone levels and we compared testosterone levels within our cohort of patients with levels of the general public. We did not see a significant trend among testosterone and other variables, however testosterone levels among multiple myeloma patients were significantly lower than the general population (P < 0.05). This trend should be further explored, as it could be partially responsible for the symptoms of fatigue, mood disturbances, anemia, pathological fractures that are present in multiple myeloma patients. For future directions we should expand the study to include a larger patient cohort as well as analyze M-levels and skeletal health with testosterone levels.

Erica Kelly  
**Poster # 32**  
**Research Mentor:** Jennifer Aldrink, MD  
**Project Title:** “National Review of Perioperative Blood Transfusion in Children Undergoing Resection of Solid Tumors”  
**Project Abstract:** Solid tumor resection is a common indication for perioperative blood transfusion (PBT) in pediatric elective surgery, yet little data exists on outcomes related to PBTs in the pediatric population. Transfusions are thought to be associated with increased risk of postoperative complications, but adult studies are conflicting on this topic. The objective of this study is to assess whether PBT is associated with a higher risk of complication in pediatric patients undergoing resection of solid tumors. The 2012-2014 datasets of the ACS NSQIP Pediatric were retrospectively queried for patients who underwent solid tumor resection. Pre-operative characteristics and 30-day outcomes were evaluated to assess differences between groups that did and did not receive PBT. Propensity score matched analyses were utilized in order to determine the effect of PBT on 30-day postoperative outcomes. Results showed that 27.8% of children who underwent tumor resection received a PBT. Transfused patients did not have a higher overall rate of complications compared to those who were not transfused (p=0.07). PBT was, however, associated with an increased risk for postoperative mechanical ventilation (p< 0.001) and increased length of stay (LOS) (7 vs 5 days, p< 0.001). Considered separately, 52.8% of liver tumor patients required PBT. Those liver tumor patients who received PBT did not suffer from increased risk of overall complications, yet they were at risk for longer LOS (8 vs 5 days, p=0.004). In conclusion, more than 25% of pediatric patients undergoing tumor resection require PBT, and PBTs are not associated with an overall increased risk of postoperative complications in the majority of pediatric patients.
Lisa Kim
Poster # 73
Research Mentor: Robert Baiocchi, MD, PhD
Project Title: “Regulation of miR-15-a/16-1 and miR-15b/16-2 in a model of EBV driven lymphoma”

Project Abstract: Epstein-Barr virus (EBV) infects over 90% of the population worldwide and is involved in the pathogenesis of a broad spectrum of malignancies, including Hodgkin lymphoma, non-Hodgkin lymphoma as well as lymphoproliferative disorders that develop in the setting of immunosuppression. The development of EBV-associated malignancies requires expression of virally-encoded latent membrane protein 1 (LMP1), a critical oncogene that efficiently transforms B lymphocytes and causes overexpression of the pro-survival B cell lymphoma 2 (Bcl-2) protein during lymphomagenesis. Notably, overexpression of Bcl-2 is negatively regulated by microRNAs 15/16, two tumor suppressors that are often silenced in lymphomas. We hypothesize that LMP-1 driven signaling networks coordinate transcriptional silencing of the critical tumor suppressors miR-15/16 to induce Bcl-2 overexpression during B cell transformation. Our results demonstrated significant downregulation of miR-15/16 and induction of Bcl-2 and LMP1 as early as day 2 during a 28 day EBV infection of resting B lymphocytes isolated from peripheral human blood. In addition, transformed lymphoblastoid cell lines derived from healthy EBV-positive donors as well as a Burkitt's lymphoma disease model infected with wild-type (BL30-B95.8) or mutant (BL30-P3HR1) EBV strains showed significant under expression of miR-15/16, which inversely correlated with LMP1 and Bcl-2. Analysis of a newly described class of small noncoding RNAs called tsRNAs demonstrated differential expression, specifically downregulation of ts-50, ts-52, ts-60, and ts-112 and upregulation of ts-18, ts-81, and ts-98 in both LCLs and BL30-B95.8 compared to BL30-P3HR1. Identifying the mechanism of EBV mediated miR-15/16 silencing and Bcl-2 induction will lend insight into how EBV oncogenesis drives survival pathways. Ultimately, this may help uncover therapeutic strategies that restore expression of critical anti-cancer microRNAs in patients with EBV driven lymphomas.

Jeeho Kim
Poster # 11
Research Mentor: Benjamin Kopp, MD
Project Title: “Cigarette Smoke Induced Dysregulation of Arachidonic Acid Metabolism in Cystic Fibrosis Macrophages”

Project Abstract: Firsthand cigarette smoke's potential to increase bacterial virulence factors and alter host phagocyte function is becoming increasingly recognized. But the impact of secondhand smoke exposure (SHSe) on host-pathogen interactions in chronic lung disorders such as cystic fibrosis (CF) is insufficiently understood. Recently, the Kopp lab demonstrated that pediatric CF patients have high rates of SHSe resulting in abnormal serum arachidonic acid (AA) metabolite levels and increased bacterial infections. Thus, we hypothesized that SHSe results in limited phagocytic potential of macrophages by modulating AA metabolism. A protocol was established to expose macrophages to cigarette smoke extract (CSE). Changes in AA metabolite concentrations were then analyzed after CSE exposure. To understand the impact of CSE on phagocytic potential, the cells were infected with Pseudomonas aeruginosa (PSA), methicillin-resistant Staphylococcus aureus (MRSA), and Burkholderia cenocepacia following CSE or conditioned media challenge. Cells were challenged under two models: An acute challenge (2h exposure) and a chronic challenge (2h exposures 24hrs apart). Subsequently, an analysis of the pathogens' survival capacity under these models was performed. Studies demonstrated that multiple AA metabolites were dysregulated differentially based on CSE concentration. Furthermore, there were observable discrepancies in the dysregulation of AA between CF and non-CF cells. There was also a reduced killing of MRSA by macrophages challenged with either CSE or conditioned media under the chronic exposure model, but the results for PSA and B.cenocepacia were inconclusive. Overall the study established an experimental model for SHSe in CF macrophages, demonstrated its impact on AA metabolism, and implicated how an aberrant AA metabolite profile may diminish clearance of MRSA. Our results suggest that SHSe is a risk factor for worsened morbidity among CF patients with chronic bacterial infections.
Nicholas Koenig  
Poster # 69  
Research Mentor: Michelle Humeidan, MD, PhD  
Project Title: “Perioperative Cognitive Protection – Cognitive Exercise and Cognitive Reserve (The Neurobics Trial)”  
Project Abstract: Pre-operative cognitive impairment is a risk factor for post-operative delirium (PD). Most existing efficacious PD prevention measures center on behavioral based interventions, with some pharmacological interventions showing potential efficacy. This study tests the hypothesis that preoperative cognitive exercises exert a neuroprotective effect (presumably via increased 'cognitive reserve') that reduces the incidence of PD in at-risk, qualifying patients. The study requires 268 patients. Patients meeting the inclusion criteria are randomized to either the cognitive exercise group or the control group. The cognitive exercise group receives tablets with access to the application Lumosity and completes one (1) hour of cognitive exercise on a daily basis for at least ten (10) days prior to the surgery. Patients are assessed for the presence of PD twice daily following surgery using the Confusion Assessment Method (CAM) and the Memorial Delirium Assessment Scale (MDAS) until post-operative day 7 (POD 7) or discharge, whichever comes first. Additional assessments, including Postoperative Quality Recovery Scale (PQRS), Short-form 36 Health Related Quality of Life Measure (SF-36), Self-Administered Gerocognitive Form (SAGE), modified Mini-Mental Status Exam (MMSE), Geriatric Depression Scale (GDS), and Charlson Comorbidity Index (CCI) are administered for screening and comparison purposes at various pre- and post-operative time points. Among the 28 enrollees with complete data sets available for analysis at the time of this writing, the average age is 67.7 years. The enrollee population has an average of 14.6 years of education, an average body mass index (BMI) of 34.1, an average score of 26.1 in the cognitive domain of the PQRS, and an average score of 4.4 on the CCI. In order to preserve the accuracy and integrity of the study as-designed, outcome-related data has not been analyzed for inclusion in this early enrollment phase progress report.

Samuel Lazaroff  
Poster # 53  
Research Mentor: Stacy Ardoin, MD  
Project Title: “Assessing Patient and Parent Health Literacy in the Transition from Pediatric to Adult Care”  
Project Abstract: Objective: To assess patient and parental factors that impact readiness to transfer to adult care in adolescent and young adult (AYA) patients with chronic diseases. Methods: We enrolled patients and their parents/guardians from outpatient rheumatology clinics at Nationwide Children’s Hospital. All subjects completed questionnaires assessing demographics, health literacy, numeracy, patient activation, and transition readiness. We conducted Pearson Product-Moment Correlation to evaluate relationships between variables and transition readiness as measured by Transition Readiness Assessment Questionnaire (TRAQ) score and developed a multivariable linear regression model. Results: 91 patients and 54 parents/caregivers completed the study. In patients, there was a statistically significant correlation between TRAQ and Patient Activation Measure (PAM) score (p<0.0001). Female gender and higher education were also correlated with improved transition readiness. Objective numeracy, subjective numeracy, symbolic number mapping, and health literacy were not found to significantly predict transition readiness. No significant relationships were found between parental performance on the surveys and transition readiness in patients. Conclusions: Transition readiness as measured by the TRAQ in AYA patients is not readily predicted from markers of their health literacy or numeracy, nor by parent/guardian metrics. However, there is a strong correlation between patient activation and transition readiness in patients.
Wilson Lo  
**Poster # 64**  
**Research Mentor:** David Evans, MD  
**Project Title:** “CT Measured Psoas Density Predicts Outcomes After Trauma”  
**Project Abstract:** Objectives: We hypothesized that trauma admission CT can identify sarcopenia and be used to predict length of stay, discharge location, and complication rate. Methods: This retrospective cohort study examined patients admitted to Wexner Medical Center Level 1 Trauma service between January 1 and December 31, 2008 who underwent routine CT upon admission. L3 level psoas muscle cross-section CT studies were captured with EasyViz® software. Psoas size and density were measured as normalized total psoas area (NTPA) and mean psoas Hounsfeld unit density (MPHU). Patient information was collected upon admission including age, sex, BMI, Glasgow Coma Scale score, Injury Severity Score, number of injuries sustained, and number of comorbidities. Clinically relevant outcomes measured were length of stay, complication rate, 90-day mortality rates, discharge location, and 30-day readmission. Discussion: 151 patients were identified that met our criteria. Muscle cross-sectional area and density cutoff for sarcopenia was defined as the lowest 25th percentile value of NTPA and MPHU (sarcopenia by NTPA ≤ 600 mm²/m², MPHU ≤ 38.3HU). Sarcopenia by NTPA did predict increased mortality, but did not predict dependent discharge, complication rate, or length of stay. Sarcopenia by MPHU did predict increased risk of 90-day mortality, length of stay greater than seven days, complication risk, and discharge to a dependent facility. Conclusion: Psoas muscle density appears to be a significant predictor of complication rate, length of stay, and dependent discharge. It does not predict poor outcome. This objective measure of sarcopenia may aid identifying patients at highest risk of significant morbidity and mortality when assessing for traumatic repair.

Cindy Luan  
**Poster # 9**  
**Research Mentor:** Shu-hua Wang, MD, MPH & TM  
**Project Title:** “Understanding Clostridium difficile and transmission between dogs and humans”  
**Project Abstract:** Clostridium difficile is an anaerobic, spore-forming pathogen that survives and adapts to the intestinal tract of humans and animals. Although it has been traditionally described as a health-care associated infection, C. difficile has become increasingly prevalent as a community-associated pathogen (4). Recent research into the role of companion animals such as dogs can elucidate the various modes of transmission of this pathogen. This project has investigated the prevalence of colonization of C. difficile in dogs living with humans diagnosed and not diagnosed with a C. difficile infection at The Ohio State Wexner Medical Center (OSUWMC). Furthermore, the project has examined risk factors for C. difficile transmission between owners and their dogs based on responses from a pretest questionnaire. Notably half of the patients who experienced a C. difficile infection reported having a dog who also experienced diarrhea. Although statistical analyses that convey useful information could not be performed do to the low response rate, continued efforts in this field will help inform appropriate infectious disease guidelines to protect human and animal health.
Nathaniel Lundy
Poster # 74
Research Mentor: Robert Magnussen, MD, MPH
Project Title: “Understanding Clostridium difficile and transmission between dogs and humans”
Project Abstract: In a day and age where physical fitness and activity level have become more valued among various communities, knee disorders range in severity from unwelcome annoyances to severely debilitating conditions. A large amount of study has been committed to investigating the medial patellofemoral ligament (MPFL), its role in maintaining patellofemoral stability, and its repair and reconstruction to restore stability in injured patients. This study sought to compare allograft and autograft for MPFL reconstructions. 133 patients who underwent MPFL reconstructions were identified. 117 of these patients had isolated MPFL reconstructions (without a concurrent bony procedure). Patient-reported outcome data was obtained using IRB approved mailed packets containing appropriate logistical paperwork and several orthopaedic outcome surveys: the KOOS, Marx, and Norwich Patellar Instability surveys, as well as a general survey supplied by the principal investigating physician. Data were analyzed to determine differences between allograft and autograft surgical groups. There were no significant differences in demographic or physical exam factors. Recurrent dislocation occurred in 1 patient in the allograft group (2.7%) and 0 patients in the autograft group (0%), (p = 0.51). Recurrent subjective instability occurred in 9 patients in the allograft group (24.3%) and 5 patients in the autograft group (31.2%), (p = 0.74). 26 patients provided self-reported outcome responses. There is no definitive difference in surgical outcome and/or failure rate between allograft and autograft lone MPFL reconstructions. There are greater comorbidities that accompany autograft reconstructions. When available, cadaveric allografts may provide better patient-reported outcomes and lower pain scores for patients undergoing MPFL reconstruction.

Eleftheria Matsa
Poster # 33
Research Mentor: Julie Leonard, MD, MPH
Project Title: “Ocular Injuries in U.S. Children: Current Epidemiologic Trends”
Project Abstract: Insufficient data exists to describe the epidemiology of pediatric ocular injury in the United States. Our objective was to characterize the etiology, patterns, and outcomes of this phenomenon, using data from the 2006-2013 Nationwide Emergency Department Sample. We identified children < 18 years of age with emergency department International Classification of Diseases, Ninth Revision, Clinical Modification codes and/or External Cause of Injury codes, indicative of ocular injury. Children were excluded if their ocular disturbance resulted from chronic or non-traumatic injury, late-effects, or brain injury. To avoid double counting, patients with late effects codes or acute care facility transfers were omitted. Descriptive statistics and logistic regression modeling were used to explore the relationship between patient and injury characteristics relative to visual outcomes, mechanisms of injury, and risk of visual loss. Ocular injuries as a whole decreased by 26.4% from 2006-2013. This downward trend was noted across all variables and bore no relationship to stratified risk of visual loss (high risk -27.5%, variable risk -25.8%, and low risk -26.5%). Eye trauma was more common in males (64.0%) and in children 0-4 years old (34.8%). Affected children commonly lived in large metropolitan areas (51.4%), or the South (34.7%), and were often seen at Non-trauma, or Trauma Level III centers (67.3%). A majority of eye injuries occurred at the adnexa (47.0%), or via strikes (24.6%). Only 1.5% of children sustained a high risk ocular injury. However, victims of high risk injuries were unique in that a greater proportion were evaluated at Level I-II trauma centers (42.7%), and/or children's hospitals (15.9%). Overall, the national incidence of pediatric ocular injury is decreasing, and cannot be solely attributed to a single pattern or cause. It is likely that this steady change relates to the cumulative secondary effects of injury prevention policy and education measures.
Saurabh Mehta  
**Poster # 54**  
**Research Mentor:** Kevin Bailey, MD  
**Project Title:** “Understanding Clostridium difficile and transmission between dogs and humans”  
**Project Abstract:** The evidence supporting the use of compression therapy is inconclusive, yet compression garments continue to be a mainstay of burn scar treatment. We hypothesize that there is variability in therapy protocols including time to donning, type of garment utilized, and resultant applied pressure. We sought to quantify the variability at our center and nationally. All patients treated between March 1, 2014 and December 31, 2015 who had garments mentioned as part of their care plan were included (n=108). All U.S. burn centers (n=126) were sent two emails, requesting completion of an online survey. In cases of non-response, a follow-up phone call was made. Only 71 of 93 patients who were measured for garments received their garments. The mean number of days between the date of burn injury and garment order placement was 64.6 days and a mean of 55 days between the date of order and date of delivery for all patients. The survey response rate was 47%. All centers prescribe pressure garments for acute burn patients. The majority of respondents believed that pressure therapy is beneficial, while 11% believed the garment use was probably of uncertain benefit. The majority of centers state the goal time is 2-4 weeks (51%). After garment order, the majority of centers estimate that it takes 2-4 weeks (60%) for them to arrive. None of the centers identified a target application pressure and the majority of centers (95%) stated that the "percent reduction the garments are manufactured to" is not known. Centers identified non-compliance (62%), cost (55%), and lack of insurance coverage (67%) as barriers to use. The study supports the variability in goals for compression therapy and identifies a potential gap between goals and achievements. Most surveyed centers expect a delay of up to 4 weeks for delivery of garments alone, yet over half selected a goal time to application of no more than 4 weeks. Based on our local data, there may be a gap between goal and practice.

Simeng Miao  
**Poster # 75**  
**Research Mentor:** Brad Rovin, MD  
**Project Title:** “Exosome Analysis in Lupus Nephritis to Characterize Response to Treatment”  
**Project Abstract:** Background: Current treatment of lupus nephritis (LN) is based on standard-of-care immunosuppression therapies, but certain patients do not respond to this treatment. In this investigation, specific biomarkers that distinguish responders from non-responders are identified. Methods: Urine exosome miRNAs from 16 biopsy-proven LN patients and 4 healthy controls were screened for 800 miRNAs using the Nanostring nCounter® miRNA expression technique. Data analysis was conducted to look for significant differences in miRNA expression between responders, non-responders, and controls. Based these differences and primers available, miRNA-320, miRNA21-S, and miRNA1285-S were selected to validate the Nanostring data. Results: Of the 800 miRNAs analyzed, 322 showed significant increases in lupus nephritis patients (both non-responders and responders to induction therapy) as compared to normal controls. Furthermore, significant differences were seen in certain subsets of responders and non-responders. PCR data validated that the most significant difference in miRNA expression occurred between lupus nephritis patients and normal controls. Conclusion: We have shown that it is feasible analyze the urine of patients with lupus nephritis as a non-invasive process to monitor exosome miRNA expression. As such, exosomal miRNA in urine show promise as a non-invasive marker to predict response to standard therapy in lupus nephritis patients.
Rose Miller  
**Poster # 55**  
**Research Mentor:** Michael Knopp, MD, PhD  
**Project Title:** “Yttrium-90 Imaging Using Next-Generation Solid State PET Detectors”  
**Project Abstract:** Yttrium-90 (90Y) radiotherapy is a technique for treating cancer patients internally with high doses of targeted radiation. It has been described that a small fraction of the Y90 decay products can be imaged using conventional PET scanners but this requires long scan times which limits its routine clinical use. Next-generation solid-state digital photon counting detector (digital PET) technology may enable faster scan times with superior image quality and more accurate quantitation of 90Y radioactivity, which would fundamentally advance 90Y imaging. This proposal focuses on the clinical assessment of this new digital PET for cutting-edge 90Y radiotherapy management. For this project, we assessed and analyzed the isocontoured treatment volumes of the 90Y digital PET (dPET) scans as compared to the volume in the routine Bremsstrahlung SPECT scans, and conventional PET (cPET) currently in clinical use for 12 patients receiving 90Y radiotherapy. We found that not only would the digital scans be faster than the current standards, but that they would also be more accurate in their quantifications, due to their improved image quality. The use of digital PET images could assist physicians in quantifying the amount of 90Y dose actually reaching the planned target tumor, ensuring that the pre-therapy planned dose is met, potentially improving patient outcomes.

Nathan Nesbitt  
**Poster # 70**  
**Research Mentor:** Luanne Hall-Stoodley, PhD  
**Project Title:** “Antibiotic Susceptibility in Smooth and Rough Morphotypes of Mycobacterium abscessus, an Emerging Cystic Fibrosis Pathogen”  
**Project Abstract:** Mycobacterium abscessus is a pathogen responsible for causing an increasing number of chronic respiratory conditions and is difficult to manage clinically due to its antibiotic recalcitrance. One explanation for the difficulty experienced when attempting to eradicate M. abscessus with antibiotics is that the biofilms it forms in the context of chronic infection make it more antibiotic tolerant, thus leading to increased bacterial survival. In order to ascertain the effect biofilm formation has on bacterial survival during antibiotic insult, we performed an antibiotic susceptibility assay using a strain of M. abscessus transformed with mCherry that emits red light when excited at 575nm. Using M. abscessus mCherry fluorescence as a measure of survival, we assessed bacterial antibiotic susceptibility against amikacin and azithromycin which are considered to be the gold standard of clinical treatment. We assessed both major morphotypes of M. abscessus, by comparing single cell suspensions to biofilms grown for 24 or 48 hours, and using antibiotics across a range of 2 – 256ug/ml with measurements taken from 0 – 72 hours. Ultimately we found that biofilm formation results in a statistically significant (p<.01) increase in fluorescent signal when compared against planktonic data under almost all conditions tested. Based on our findings from the mCherry screening assay it is readily apparent that biofilm formation plays a significant role in M. abscessus’ bacterial recalcitrance and warrants further investigation to determine the specific mechanism(s) at work.
Weston Niermeyer  
Poster # 65  
Research Mentor: Sergio Bergese, MD  
Project Title: “Opioid Consumption in Patients Undergoing Ambulatory Surgery: A Prospective Three Days Follow-up Study”  
Project Abstract: The number of outpatient surgeries performed in the United States has been increasing over the last few decades. Pain is the most common contributor to postoperative patient distress, sleep disturbance, and delayed return to activities of daily living following discharge. Opioids are used regularly to treat postoperative pain, yet their side effects can delay discharge and recovery, especially for ambulatory procedures. In this study, we hypothesized that higher amounts of opioid consumption would have a negative relationship with patients' ability to resume activities of daily living. Patients in the study were being examined for the effect of methylphenidate on emergence time from isoflurane general anesthesia after hip arthroscopic surgery. Total opioid consumption, as well as pain and activities of daily living scores, were analyzed from 25 patients in the study. The comparison of opioid consumption to the various activities of daily living scores produced no statistically significant results. Trends in the data pointing toward higher pain and decreased ability to resume various daily tasks when larger amounts of opioids are consumed were not observed. Combinations of analgesics have been shown to result in better pain management with fewer side effects. The results for this study remain incomplete until all 54 subjects will be enrolled based on initial statistical study design. As a result of the high rates of opioid consumption in Ohio and the setbacks caused by this mode of therapy in functional recovery, the pending results have important implications for pain management in outpatient surgery.

Mercedes Nikzad  
Poster # 71  
Research Mentor: Samantha J. King, PhD  
Project Title: “Defining which of the Seven MsmK-dependent Carbohydrate Transporters is Required for Efficient Pneumococcal Biofilm Formation”  
Project Abstract: Streptococcus pneumoniae (pneumococcus) is a significant causative agent of human disease in part through its colonization of the nasopharynx and ability to persist as a biofilm. Studying biofilms may lead to methods to prevent or absolve disease. S. pneumoniae relies on carbohydrates as a carbon source, and the seven carbohydrate ATP binding cassette (ABC) transporters encoded by pneumococci are energized by a shared ATPase called MsmK. An msmK mutant shows greatly reduced biofilm formation, leading us to hypothesize that one of the seven transporters energized by MsmK is required for efficient pneumococcal biofilm formation. Four of the transporter mutants were previously available, so in this project we utilized a Janus cassette selection system to generate unmarked, in-frame deletions of the three remaining carbohydrate transporters. Differences in colony forming units (CFU) were observed between the parent and mutant strains when grown to the same optical density (OD600). It was also shown that a clear distinction exists between the pellet characteristics of the parent and the msmK mutant, and that individual transporter mutants either resembled the parent or msnk mutant. Therefore, cellular characteristics were compared between the parent and mutant strains using gram staining. While no significant variations were noted in chain length between the parent or msmK mutant strains, our observations suggest some type of difference in extracellular polysaccharide production exists. This study is the first step toward better understanding the mechanism of the msmK mutant biofilms, and additional research is needed to determine the effects of the mutant carbohydrate transporters on S. pneumoniae biofilm formation.
Phillip Nulty  
**Poster # 50**  
**Research Mentor:** Diana Greene-Chandos, MD  
**Project Title:** “Ohio Telestroke Patient Satisfaction Study”  
**Project Abstract:** This study aims to determine levels of patient understanding of telestroke care received through the Ohio State University Medical Center, along with satisfaction levels with the telestroke program. This study evaluates whether the perception of, and satisfaction with, the telestroke program and the care received via this program differ based upon tPA administration. Data from patient surveys and electronic health records was collected from 100 suspected stroke patients who received telestroke care. Patients who received tPA administration were found to have a significantly higher NIHSS score than those who did not receive tPA; 6.47 vs 1.81 (p < 0.0001). Both patients who received and did not receive tPA disagreed most with questions 1 ("I received an explanation of what telestroke is") and 8 ("I would not have received better care if I had seen the specialist/provider in person"). More tPA recipients agreed with the question 7, "telestroke made it easier for me to receive acute stroke care" (p = 0.0069). Similarly, more tPA recipients agreed with question 10, "overall, the telestroke experience had a beneficial impact on my stroke outcome" (p = 0.0005). Studies have proven telestroke to be a reliable method for patient evaluation and that the results of care provided by less experienced physicians guided by stroke specialists via a telestroke system are equivalent to those results obtained in the stroke specialists' centers. Despite this, patients disagreed with this fact more than any other survey question. More positive responses to questions 7 and 10 from patients receiving tPA indicates that patients are satisfied with their treatment via telestroke, and that program improvements should not stem from changes in treatment or methods of treatment. Negative responses to question 1 from both groups indicate that emphasis on clear explanation of the program to patients and family members is key and would serve to improve both understanding and satisfaction.

Damilola Olatunji  
**Poster # 10**  
**Research Mentor:** Elisa Bradley, MD  
**Project Title:** “U.S. Heart Transplant Outcomes in Infancy”  
**Project Abstract:** Hypoplastic Left Heart Syndrome (HLHS) has transformed from a lethal condition to a survivable congenital heart lesion. However, survival is dependent upon candidacy for multi-stage surgical correction. A substantial number of HLHS patients do not qualify for corrective surgery, and transplant is often sought in infancy. The goal of this study is to define overall and inter-stage transplant outcomes in Hypoplastic Left Heart Syndrome (HLHS). In doing this, we hope to identify potential pre and post-transplant clinical parameters associated with improved HLHS, as well as potential risk factors that lead to negative outcomes after transplantation in HLHS. The U.S United Network for Organ Sharing thoracic database was queried for variables specific to patients diagnosed with Hypoplastic Left Heart Syndrome listed for transplantation from inception through December 2015. The same variables were then queried for post-surgical patients under age 1 diagnosed with a congenital heart defect (CHD). Thus far, we have been able to obtain a ‘n’ of 87 for our main diagnostic code of interest – Hypoplastic Left Heart Syndrome, a ‘n’ of 177 for infants with CHD without surgical palliation, and a ‘n’ of 573 for infants with CHD and prior surgery. Specific to transplant outcomes, further statistical analysis is required in order to determine the percentage of our HLHS-coded patients that received transplant vs. those that did not. So far, the data have been formatted to be straightforward for our statistician to make comparisons based on post-transplant survival in the desired group of interest (infants with a HLHS diagnosis).
**Kishan Patel**
**Poster # 45**
**Research Mentor:** Robert A. Magnussen, MD, MPH
**Project Title:** “Meniscus Repairs: Retrospective chart study comparing gender and implant number with repair failure”
**Project Abstract:** INTRODUCTION: Surgical management of meniscus tears has changed considerably over the last several decades. Complete meniscectomy was once the standard procedure for meniscal tears; however, recommendations have evolved to performing repair whenever possible to minimize risk of osteoarthritis. This study explored the factors effecting the failure rate of all-inside meniscus repairs. METHODS: Chart review identified 481 all inside meniscus repairs performed in 431 patients between June 2006 and December 2012 by two sports medicine fellowship trained orthopedic surgeons at our center. Following exclusion of inside-out repairs, outside-in repairs, and bucket handle tears, 364 all-inside repairs were identified in 319 patients. Patient demographics (age and sex) and surgical data (side of repair, number of implants used, and whether concurrent ACL reconstruction was performed) were identified by chart review. Chart review and patient interviews were undertaken to identify repair failure as defined by a repeat surgery on the index meniscus. RESULTS: 158 patients (50%) with 181 repaired menisci with complete baseline data and minimum 1-year follow-up were contacted at a mean of 4.5 years following meniscus repair. Repair failure was noted in 37 menisci (20.4%). Logistic regression analysis demonstrated female sex (OR = 2.3, p = 0.045) and the use of five or more implants (OR = 4.6, p = 0.023) were associated with increased risk of repair failure, controlled for age, side of repair, and concurrent ACL reconstruction. CONCLUSION: The use of 5 or greater implants and female sex are associated with significantly increased odds of failure or meniscus repair.

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**Cory Pettit**
**Poster # 12**
**Research Mentor:** Terence Williams, MD, PhD
**Project Title:** “Evaluating Wee1 kinase inhibition as a radiosensitizing agent in esophageal cancer cell lines”
**Project Abstract:** Evaluating Wee1 kinase inhibition as a radiosensitizing agent in esophageal cancer cell lines Introduction Cell cycle checkpoint interference has become a very important method of radiosensitization in cancer therapy. AZD1775 is a Wee1 kinase inhibitor that has been shown to radiosensitize many cancer cell lines. Our study investigated whether AZD1775 could efficiently radiosensitize esophageal cancer cell lines. Methods In order to assess the IC50 of AZD1775 as a single agent, an Alamar Blue assay was conducted. Cells were plated in a 96 well format and treated with increasing doses of AZD1775 or control (vehicle) for 72 hours before quantification. A cell-proliferation assay was then conducted with the Alamar Blue reagent. The background and endpoint absorbance was read, and the absorbance difference was then calculated. To test the radiosensitizing effects of AZD1775, radiation clonogenic assays were conducted on four different p53-mutated esophageal cancer cell lines: FLO-1, OE-33, SK-4, and KYSE-30. The cells were trypsinized in order to create single cell suspensions, and seeded in triplicate into culture plates. They were then treated with AZD1775 (100 nM) or vehicle for 24 hours and irradiated with a dose of 113cGy/min. 7-14 days after seeding, colonies were stained and counted in order to calculate a dose enhancement ratio (DER). Results The DER of AZD1775 for the cell lines was found to be 1.24 (FLO-1), 1.20 (OE-33), 1.60 (SK-4), and 1.08 (KYSE-30). The IC50 values were 549.4nM (KYSE-30), 600.3nM (SK-4), 296.4nM (FLO-1), and 76.3nM (OE-33). Conclusions These results show that AZD1775 significantly enhances the efficacy of radiation treatment in esophageal cancer cell lines, and exhibited moderate inhibition as a single agent in only the OE-33 cell line. The high DER in three of the four cell lines suggests that AZD1775 is an effective radiosensitizing agent worthy of additional preclinical (and potentially clinical) study.
Alissa Prior  
Poster # 28  
Research Mentor: Jay Iams, MD  
Project Title: “Clinical Predictors of Short Cervix in Women at Risk for Preterm”  
Project Abstract: Preterm birth (PTB) is the underlying cause of 34% of infant deaths in the first year of life. Risk of premature birth before 35 weeks of gestation is increased in women with a history of spontaneous preterm birth and in women whose cervical length measured by ultrasound is below 25mm before 24 weeks of gestation. Supplemental progesterone, administered via weekly intramuscular injections of 17a-hydroxyprogesterone caproate, is the current treatment for these women but may not be as effective in women with a prior preterm birth who do not also have a short cervix in their current pregnancy. Prior studies to predict women at risk for PTB have been limited to demographic factors and have failed to identify women with a prior preterm birth who also had a short cervix. We sought to develop a model and subsequent risk score that included clinical elements of a woman’s history associated with a short cervix that could distinguish these women as candidates for supplemental progesterone therapy. We performed a retrospective cohort study of 637 patients who were treated between January 2003 and February 2014 in the OSUWMC Prematurity Prevention Clinic to identify predictors of short cervix before 24 weeks gestation. Short cervix was strongly associated with parity, gestational age of earliest prior preterm birth (PTB), gestational age of the most recent pregnancy, history of cerclage, history of self-initiating visits during a previous pregnancy, a family history of PTB, and marginally associated with race. Our risk scoring model had moderate discrimination between women with short cervix and non-short cervix overall, with a specificity of 66.8% and sensitivity of 60.8%, and could be used to identify women at highest risk of having a short cervix. Future studies of the risk prediction score are needed for external validation and to better identify women with short cervix in subsequent pregnancies.

Jessica Prokup  
Poster # 38  
Research Mentor: Susan Havercamp, PhD  
Project Title: “Healthcare disparities between Ohio children with developmental disabilities and typically developing children”  
Project Abstract: Objective: To examine the effects of insurance type and Care Consistent with the Patient-Centered Medical Home (CC-PCMH) on health disparities including health status, utilization, quality, access, and unmet healthcare needs between children with developmental disabilities (DD) and typically developing (TD) children. Methods: The 2015 Ohio Medicaid Assessment Survey is a stratified survey that targeted Ohioans residing in residential households. The survey assesses healthcare access, health status, and healthcare use among Ohioans. We constructed two mutually exclusive populations: (1) children with DD and (2) typically developing children. Results: Children with DD were more likely than typically developing children to have a fair or poor health status (27.7% vs. 1.1%; P< 0.001), have two or more overnight hospitalizations (8.5% vs. 0.7%; P< 0.001), experience delayed treatment (10.1% vs. 2.4%; P< 0.001), and have one or more unmet healthcare needs (19.6% vs. 5.7%; P < 0.001). Children with DD who had Medicaid were more likely to have two or more emergency room visits in the past year than typically developing children with private insurance (27.3% vs. 14.2%; P=0.006) and were less likely to experience delayed treatment (7.1% vs. 16.3%; P=0.02). Children with DD who had CC-PCMH experienced less delayed treatment (2.0% vs. 14.5%; P< 0.001) and fewer unmet healthcare needs than children with DD without CC-PCMH. Conclusions: Children with DD experience substantial healthcare disparities. In Ohio, Medicaid and CC-PCMH may reduce these disparities, providing potential avenues for achieving health equity.
Thushani Ratnarajah
Poster # 76
Research Mentor: Sakima Smith, MD, MPH
Project Title: “Comparative mRNA Analysis of Human Heart Failure Tissue”
Project Abstract: Left ventricular assist devices (LVADs) have recently evolved as an alternative for patients who are unable to receive a heart transplant (3). Research suggests that the volume overloading seen in heart failure puts tension on the LV wall, leading to myocyte stretching, which is implicated in changes in cytoskeletal elements, extracellular matrix (ECM) and cell signaling (1). This eventually results in "adverse remodeling", characterized by LV hypertrophy and dilatation (2). Mechanical stress and injury may cause an increase in the activity of the renin-angiotensin-aldosterone system (RAAS) and sympathetic nervous system (SNS), thereby increasing angiotensin II (Ang II) production, fibroblast proliferation, and excessive ECM collagen deposition; all of which leads to hypertrophy and ventricular dilatation (1). We hypothesized that genes will be significantly up or down-regulated in LV versus RV and pre- versus post-LVAD tissue. Data was collected in accordance to an IRB approved protocol (which has been submitted, NEW-29777) for acquisition of right and left ventricular cardiomyopathy tissue of consenting adults. Tissue microarray construction: RV, LV, and LVAD apical core cardiomyopathy tissue was acquired from the Ohio State biorepository. RNA was screened for quality of the RNA, using the Agilent 2100 Bioanalyzer. After this, 200ng of degraded RNA was obtained from FFPE tissue. RNA was reverse transcribed via biotinylated primers in order to create a cDNA product. The product was then analyzed via standard quantitative real time PCR on the Applied Biosystems 7900 HT Sequence Detection System in 96 and 384 well standard and FAST block formats. Genes of interest was then quantified and run in duplicate to test for reproducibility. Many genes were significantly up or downregulated in LV tissue when compared to RV tissue and LVAD tissue.

Varun Rawal
Poster # 60
Research Mentor: Somashekar Krishna, MD, MPH
Project Title: “Weight loss surgery reduces healthcare resource utilization and all-cause inpatient mortality in morbid obesity: A propensity matched analysis”
Project Abstract: Background: The prevalence of obesity and number of patients undergoing bariatric surgery (BRS) are increasing. Prior studies have demonstrated long-term reduction in total mortality after BRS; however, there is no large population data on the impact of BRS on inpatient mortality and healthcare resource utilization. Aims: Determine the impact of prior weight loss surgery on all-cause inpatient mortality and healthcare utilization in hospitalized patients. Methods: We utilized the US Nationwide Inpatient Sample (2007-2013) to perform a retrospective study on all adult inpatients (≥18 years) with a diagnosis of morbid obesity or history of BRS. We compared outcomes (mortality and healthcare resource utilization [hospital stay and costs]) among patient groups (morbid obesity vs. prior BRS) using univariate and multivariate analyses. We subsequently performed a propensity-score matched analysis to compare outcomes of patients with morbid obesity vs. prior BRS. Results: There were 9,044,105 patient admissions with morbid obesity and 1,066,779 with prior BRS. For all hospitalizations, the proportion of patients with morbid obesity significantly increased during the study period. The inpatient mortality rates for all inpatients, morbid obesity, and prior BRS were 331.76, 211.10, and 78.60 per 100,000 patient admission-years, respectively. Univariate analysis revealed that patients with prior BRS were younger, more female, and had lower prevalence of cardiovascular and respiratory conditions, sleep apnea, and metabolic disorders than those with morbid obesity. However, depression, substance abuse, hypothyroidism, and chronic anemia were more prevalent in prior BRS. Multivariate analysis associated prior bariatric surgery with lower mortality, shorter duration of hospitalization, and lower hospital costs than in patients with morbid obesity. A propensity-score matched cohort analysis from an unweighted cohort of patients validated these findings. Conclusion: Weight-loss surgery can mitigate the obesity-associated adverse prognostication for hospitalized patients. These observations are pertinent for future research, since the prevalence of obesity and morbid obesity-associated hospitalizations are increasing.
Erika Reese  
**Poster # 13**  
**Research Mentor:** Carlo Croce, MD  
**Project Title:** “Development of a soluble NCL short chain fragment variable antibody and negative Control”  
**Project Abstract:** Nucleolin (NCL) is a protein found in the nucleocytoplasm of human cells, but on cancer cell membranes, and aids in post-transcriptional modification of miRNAs. A novel, fully human single-chain Fragment variable (scFv) antibody named 4LB5 was recently developed in Dr. Croce's lab. 4LB5 prevents NCL-dependent processing of miR-21, miR-221, and miR-222 leading to decreased cancer aggressiveness and progression. Because 4LB5 is an insoluble protein, the extraction and purification process is markedly more difficult than if it were a soluble protein. Demand for 4LB5 is increasing, resulting in a need to improve the time and cost-consuming purification process. We believe that there are soluble scFv proteins previously developed and stored within the original phagemid library created during 4LB5 development. We hypothesize that we can select and develop a soluble scFv that binds to NCL as well as a soluble scFv that does not bind to NCL; these will act as positive and negative controls of an NCL-binding scFv, respectively, and will function to validate future experiments. Methods of this project involve the following: extraction of the original scFv inserts from their pHEN2 plasmids, insertion into pET22b plasmids, transformation of BL21(DE3) E. coli bacteria with the pET22b plasmids, induction of bacteria via Isopropyl β-D-1-thiogalactopyranoside (IPTG), soluble and insoluble phase separation using sonication, sodium dodecyl sulfate and polyacrylamide gel electrophoresis (SDS-PAGE) and Coomassie blue staining. Promising soluble scFv antibodies have been identified and these antibodies will continue to be developed to determine their binding, or lack thereof, to NCL as a time and cost-effective alternative to 4LB5 for the down regulation of NCL-dependent miRNA processing. Support: This work was supported in part by the OSU College of Medicine Roessler research scholarship (ER).

Stephen Revilla  
**Poster # 61**  
**Research Mentor:** Nicoleta Stoica, MD, PhD  
**Project Title:** “Use of High Fidelity Simulation in Cardiac-specific Anesthesia Scenarios for Resident Education and Assessment”  
**Project Abstract:** Second and third year anesthesiology residents volunteered to participate in three original cardiac anesthesiology simulation labs. High fidelity simulation has become prevalent in medical training, especially in the field of anesthesiology. Simulation training allows clinical skills development without compromising patient health. To evaluate the difficulty of the scenarios along with resident stress, cognitive workload was measured after completion of the three labs. Workload was quantified through completion of the widely accepted NASA-TLX multidimensional subjective scale by each resident. This data was collected on a 0 – 20 unit scale. Total workload was assessed by taking the average value of the six various subsets of the NASA-TLX survey. This widely accepted method of determining workload was used to compare and contrast 2nd and 3rd year anesthesiology residents. The average total workload score for 2nd and 3rd year residents was 11.81 and 11.88 respectively, and were not significantly different. Data was also evaluated to specifically compare three of the six subjective subsets of the TLX survey across all participants. Frustration and performance categories were significantly lower than mental difficulty (P < 0.001), but not from each other (P = 0.27). This implies that feelings of performance are more based upon frustration than mental difficulty of exam. We postulate that decreasing frustration could lead to increased performance.
Austin Roebke  
**Poster # 14**  
**Research Mentor:** Kanu Goyal, MD  
**Project Title:** “Fracture Gap Reduction with Variable Pitch Headless Screws”  
**Project Abstract:** Introduction Fully-threaded variable pitch headless screws are used in many different settings in orthopaedic surgery and has been extensively studied in this context, especially in regards to scaphoid fractures. However, it is not well understood how screw parameters such as diameter, length, and pitch variation as well as technique parameters such as depth of drilling affects the fracture gap closed. Methods Acutrak 2 fully-threaded variable pitch headless screws (Acumed) of various diameters (standard, mini and micro) and lengths (16-28 mm) were inserted into polyurethane blocks of normal and “osteoporotic” densities (Sawbone) utilizing a custom jig. Three drilling techniques (drill only through first block, 4 mm into second block, or completely through both blocks) were used. During screw insertion, we took fluoroscopic images and later analyzed these digitally to primarily measure fracture gap reduction. We also tested the effect screw back out would have on fracture gap after compression was obtained. A student's t-test was performed to evaluate statistical significance (p = 0.05). Results Of note, change in pitch between the proximal/distal parts of the screw and fracture gap closure per screw turn is correlated. Drilling 4 mm past the fracture site reduces distal fragment push off compared to drilling only through the proximal fragment. After fragment contact and two subsequent full forward turns, backing the screw out by one full turn resulted in gapping between the fragment blocks. Conclusion Overall, this study has illuminated the differences in screw parameters that have not previously been researched. Screw length, screw diameter, bone density, and drill depth have been shown to have an effect on screw parameters.

Anthony Sanchez  
**Poster # 4**  
**Research Mentor:** Seuli Brill, MD  
**Project Title:** “EHR Documentation Patterns of Recorded Primary Care Visits Focused on Complex Communication: A Qualitative Study”  
**Project Abstract:** Effective communication between physicians and their patients is a very important part of treatment. Thus, proper documentation of the discussions that take place during an encounter is just as critical, especially considering the increasingly interdisciplinary, technologically connected healthcare landscape. Previous research regarding provider documentation suggests that it can be inconsistent, and there are various reasons for this. Two likely factors are the widespread implementation and use of electronic medical records (EMRs), and the differences in providers' writing styles. Therefore, this study aimed to investigate documentation habits and we hypothesized that discussions regarding social and emotional details would be underrepresented in EMR documentation. Data included 11 patient-physician encounters, which consisted of the transcribed conversations and the corresponding charts, and these were analyzed and coded by two research team members. Details from each encounter transcript and corresponding progress note were categorized into four groups, in order to determine if a particular discussion topic was documented. Results showed that 91.7% of "chronic care", 87.5% of "acute/new problem", and 88.9% of "disease prevention" discussion topics were documented, while only 28.3% of "patient care preferences and social determinants of health" topics appeared in the documented note. This suggests that providers are much more likely to document medical details related to chronic, acute, or preventative health than the emotional and social factors that impact the patient. This is relevant because psychosocial factors are important in the overall health of a patient, and a failure to document those details could have a negative effect on patient care. Future studies are needed to further investigate the motivation behind provider documentation habits.
Youssra Saqr  
**Poster # 66**  
**Research Mentor:** Christopher Hanks, MD  
**Project Title:** “Addressing medical needs of adolescents and adults with autism spectrum disorders in a primary care setting”  
**Project Abstract:** Much has been written about medical care for the children with autism spectrum disorder (ASD) but little has been reported about how to improve health care access and delivery for adolescents and adults with ASD. The Center for Autism Services and Transition (CAST) at The Ohio State University was created in April 2014 to address the needs of adolescents and adults with ASD as they transition into adult medical settings. To understand the contributions to the health disparities in the ASD population, we conducted two independent research approaches to capture data about their current medical needs. A retrospective chart review was carried out to collect data about medical comorbidities and medication use in this study group. A focus group was also created to address barriers faced in providing medical care at CAST. Of the 143 electronic patient charts reviewed, 47% (n=67) had intellectual disability, 52% (n=74) had ADHD, 51% (n=73) had anxiety, 37% (n=53) had obesity, 32% (n=46) with a history of aggressive behavior, 29% (n=41) had depression, 22% (n=32) had seizures and 8% (n=11) had hypertension. A Medical Regimen Complexity Index (MRCI) score was determined to comprehensively examine medication use trends in the ASD population. MRCI scores were significantly higher for patients with intellectual disability having a MRCI score of 20.4 (p < 0.001), patients with seizures having a MRCI score of 21.2 (p < 0.001), and patients with a history of aggressive behavior having a MRCI score of 23.7 (p < 0.001). Furthermore, both the focus group and our pre-visit assessment identified the waiting room and waiting time as a barrier to care. Understanding the comorbidities, polypharmacy, and medical barriers should provide a better understanding of the current health care access and delivery needs of adolescents and adults with ASD.

Jeanette Schnierle  
**Poster # 39**  
**Research Mentor:** Cynthia Sieck, PhD  
**Project Title:** “Patient Perspectives about the Use of OSUMyChart in the Management of Chronic Cardiopulmonary Conditions”  
**Project Abstract:** Patient portals have the potential to increase patient engagement and improve self-management of chronic conditions. Understanding the perspectives of patients, particularly those with chronic conditions, about portal use may provide insight about their perceived benefits, improve the understanding of how patients use portals to manage chronic conditions, and identify current limitations that portals present to patients. The purpose of this study was to improve our understanding of patients' perspectives about the overall use of a patient portal in the context of managing a chronic cardiopulmonary condition. 28 patients with at least one cardiopulmonary condition seen in the Department of Family Medicine and having used OSUMyChart to communicate with their primary care physician were invited to participate in semi-structured interviews related to their experiences with OSUMyChart. Topics explored in the qualitative interviews included motivations for using OSUMyChart, the way patients use OSUMyChart, patient-provider communication, and what else patients wish they could do with their patient portal. Significant themes emerging from the interviews included patient portal facilitation of patient engagement; impact of portal use on communication with providers; benefits of portal use including convenience and efficiency, access, direct communication with providers, empowerment, and increased trust; and limitations including confusion over available features, concerns about design and usability, requirement of high health literacy, requirement of high e-literacy, and patients' perceived burden on their providers. Participants generally had positive experiences using OSUMyChart to manage their health care and would recommend its use to others. Future studies should explore the benefits and limitations identified by this study to better utilize patient portals to both increase patient engagement and improve health outcomes in chronically ill patient populations.
Annaliese Seidel  
Poster # 5  
Research Mentor: Laura Schmitt, PT, MPT, PhD  
Project Title: “Patient Decision-Making Factors in Treatment of Knee Articular Cartilage Defects: A Comparison between Autologous Chondrocyte Implantation and Palliative Surgical Management”  
Project Abstract: Articular cartilage defects (ACDs) in the knee are common and detrimental injuries, and can have serious impact on individuals' function and activity levels. Current treatment considers primarily lesion characteristics, patient age, and physical activity level, delegating surgical procedure choice predominantly to the surgeon. However, many patients forego reparative or restorative surgical procedures for palliative surgical management. The purpose of this study is to understand the decision-making process of individuals with knee ACDs who undergo autologous chondrocyte implantation (ACI) vs those who undergo palliative debridement only. Prospective phone interviews were conducted with a cohort of 24 ACI surgery recipients and compared to 23 patients choosing palliative surgery alone. Data collected included: symptoms leading to seeking treatment, factors influencing surgical treatment decision, and overall treatment satisfaction. Data was categorized by frequency, count, and descriptive measures. Both ACI and palliative patients identify pain as the primary reason to seek care for their knee. The decision to have surgery for ACI patients is primarily based on pain, level of function, and a desire to return to activities. Patients who forego ACI surgery cite the amount of life disruption and uncertainty regarding the ACI procedure as primary reasons not to have surgery. ACI recipients had higher satisfaction levels overall, as well as in pain, function, and activity levels following treatment. Ultimately, both cohorts would make the same surgical decision to have or forego ACI surgery, with similar percentages of affirmative responses. These findings demonstrate that patient understanding regarding the ACI procedure and successful outcomes may influence patients' perception in decision-making. Patient outlook of quality of life improvement vs life disruption following ACI surgery remain impactful even after treatment decision with a range of satisfaction outcomes.

Mit Shah  
Poster # 46  
Research Mentor: Debra Zynger, MD  
Project Title: "Impact of the Case Pathologist on Prostate Needle Core Biopsy Diagnosis within a Single Institution"  
Project Abstract: We sought to determine whether pathologists at a single, tertiary care institution vary in diagnostic practice patterns within prostate needle core biopsies. A retrospective search for prostate needle core biopsies performed at our institution from 2008-2013 was conducted. Reports were evaluated for case pathologist, worst diagnosis per case, and highest Gleason grade for cases containing prostatic adenocarcinoma. A blinded review of selected cases was performed by 2 fellowship-trained genitourinary pathologists to assess for accuracy of Gleason grade. Statistical analyses were performed using the Pearson χ2 test, standardized Pearson residuals, K-sample equality-of-medians test, and a one-way ANOVA. The cohort included 1,777 prostate biopsies diagnosed by 9 pathologists. Diagnostic reporting varied significantly between pathologists (non-neoplastic 24-48%, HGPIN/ASAP 5-20%, adenocarcinoma 46-56%; p < 0.001). Two pathologists had lower rates of non-neoplastic cases than expected for the cohort, while 1 pathologist had a higher rate. Gleason grade for cases diagnosed as adenocarcinoma varied significantly between pathologists (Gleason score ≤6, 35-49%; Gleason score 3+4=7, 21-40%; Gleason score 4+3=7, 7-30%; Gleason score 8, 5-12%; Gleason score ≥9, 0-13%; p < 0.001). Gleason score 4+3=7 contained the greatest degree of variation between pathologists. A blinded review of cases with Gleason score 4+3=7 from the farthest outlying pathologist revealed discrepant Gleason scores in 45% of cases (9/20). Two cases differed by more than 1 grade group upon review. The case pathologist significantly impacted prostate needle core biopsy diagnosis and Gleason score. Institutions should be aware that there may be significant variation in practice patterns among individual pathologists within a single practice. Comparing data between individual pathologists from routine clinical practice may help identify errors and reduce diagnostic variability.
**Samantha Sovich**  
**Poster # 56**  
**Research Mentor:** Yousef Hannawi, MD  
**Project Title:** “Total Cerebral Small Vessel Disease Burden and Acute Ischemic Stroke”  
**Project Abstract:** Objectives: Cerebral Small Vessel Disease (CSVD) is a major cause of cognitive decline in the elderly and increases the risk for future Acute Ischemic Stroke (AIS). However, its presence and contribution to AIS are largely unknown. We aimed to identify various MRI features of CSVD in a cohort of patients presenting with AIS.  
Methods: Retrospective analysis of prospectively collected AIS data as part of the Cerebrovascular Disease and Neurocritical Care Stroke Registry at The Ohio State University. First MRI obtained during admission was visually scored for presence of white matter hyperintensity (WMH), perivascular spaces (PVS), lacunes, microbleeds and atrophy according to previously defined methods (Staals et al, Neurobiol Aging, 2015 and Pasquier F et al, Eur Neurol 1997). Stroke volume and location were also scored. Patients' clinical data were collected. Results: 99 patient clinical and MRI data were collected (mean age 65.4±13.7, 52.5% females). 28.7% of AIS were cardioembolic, 13.8% large vessel, 11.7% lacunar and the rest were cryptogenic. 41.2% had MRI features of lacunes, 26.4% had microbleeds, 70.1% had more than 10 PVS in the basal ganglia and 42.4% had Fazekas score of periventricular white matter hyperintensity (PVMH) of 3 or deep white matter hyperintensity (DWMH) of 2 or above. Total CSVD score was (1.6±1.3). Presence of lacunes and microbleed statistically correlated with the severity of PVMH and DWMH (P< 0.0005 for both). In addition, lacunes and microbleeds correlated with PVS severity in the basal ganglia (P=0.0016, 0.0009, respectively). Total CSVD score correlated with the atrophy score (P< 0.0005). Total CSVD score, however, did not correlate with the volume of lobar AIS (P=0.7).  
Conclusions: Preliminary analysis of 99 subject data suggests that CSVD features are common in patients presenting with AIS and the total burden correlate with brain atrophy. The rest of the cohort clinical and MRI data analysis is currently undergoing.

**Benjamin Sugar**  
**Poster # 20**  
**Research Mentor:** Loren Wold, PhD  
**Project Title:** “Mechanisms of Air Pollution Induced Toxicity”  
**Project Abstract:** Particulate matter (ambient particulates with diameters < 2.5 μm, PM2.5) exposure in utero and postnatal developmental periods results in electrical remodeling and cardiac dysfunction during adulthood. This indicates that PM2.5 gestationally reprograms developing hearts leading to adulthood dysfunction; however the cardiac effects of pre-gestational exposure remain elusive. This study examines the priming effects of preconception exposure of PM2.5 on cardiac dysfunction at adulthood.  
METHODS: Male and female FVB mice were exposed separately to either filtered air (FA) or PM2.5 at a concentration of ~ 51.69 μg/m³ for 6 h/day, 7 days/wk (consistent with exposure in a large metropolitan city) for 3 months. Mice were then cross bred in two groups: (1) FAm X FAf (both parents were FA exposed) and, (2) PMm X PMf (both parents were PM exposed). Offspring born to these crosses (FAFA and PMPM) were analyzed at 3 months age for cardiac dysfunction via echocardiography, followed by isolation of ventricular cardiomyocytes for in vitro cardiomyocyte function. RESULTS: Echocardiographic analyses identified increased LVEDd (3.97 ± 0.11 FAFA, 4.32 ± 0.10 PMPM, P=0.04) and LVEFs (2.58 ± 0.13 FAFA, 2.93 ± 0.13 PMPM, P=0.1) dimensions in mice born to PMm X PMf parents. Morphological alterations were associated with lower systolic function as indicated by reduced fractional shortening% (35.13 ± 1.67 FAxF, 29.29 ± 1.38 PMxPM, P=0.03) in mice born to PMm X PMf parents. Cardiomyocyte isolated from PMPM offspring showed reduced peak shortening %PS (13.21 ± 0.67 FAFA, 10.15 ± 0.68 PMPM, P=0.002). -dL/dt was significantly increased (-5.38 ± 0.28 FAFA, -4.32 ± 0.33 PMPM, P=0.01) whereas +dL/dt remained unchanged between the groups. CONCLUSION: Preconception exposure to particulate matter results in global cardiac dysfunction at adulthood. Future studies are warranted to determine environmental influences on cardiac development, not only during gestation but also prior to conception.
Eric Tretter  
Poster # 34  
Research Mentor: Debra Zynger, MD  
Project Title: “Does the gross prosector impact pT3 substaging in bladder cancer?”  
Project Abstract: Grosser analysis of perivesicular adipose tumor invasion is the sole differentiator between pT3 substages, yet no prior studies exist evaluating the effect of the gross prosector on this pathologic parameter. The pT3 subclassification of bladder carcinoma into pT3a and pT3b has uncertain prognostic significance on oncologic outcomes. We sought to assess the relationship of the gross prosector on pT3 substaging in bladder cystectomy cases. Pathology reports from cystectomy cases performed for primary bladder cancer from 2007 to 2011 and from 2014 to 2015 were reviewed (n=560). Pearson's chi-squared test and Fisher's exact test were used to compare groups. Grosser interventions were made in July 2009 and January 2013 that included changes to the gross protocol and direct education via didactic lecture. Grossers did not document the presence or absence of macroscopic perivesicular adipose invasion in 17% of cases. There was a decrease in the frequency of cases that lacked documentation after interventions (33% to 5%, p< 0.01). The majority of pT3 cases that lacked documentation were classified as pT3a (75%). Notably, the percent of pT3 cases classified as pT3a decreased after grosser interventions (68% to 35%, p< 0.01). Microscopic invasion was present in 75% of cases in which a grosser identified macroscopic invasion, and microscopic invasion was absent in 83% of cases in which a grosser recorded that macroscopic invasion was absent. Grosser type (pathology resident, pathology assistant, pathology assistant student) was not associated with documentation of the perivesicular adipose status or with agreement between microscopic and macroscopic assessment of the perivesicular adipose (p=0.37). We demonstrated the impact of the gross prosector on pT3 substaging within bladder cancer resection specimens. This novel variable may confound the relationship of this parameter with oncologic outcomes and should be incorporated into quality assurance programs.

Danielle Tsevat  
Poster # 15  
Research Mentor: Electra Paskett, PhD  
Project Title: “Evaluation of knowledge, beliefs, and attitudes toward HPV and the HPV vaccine among parents of female adolescents in Appalachian Ohio”  
Project Abstract: Uptake of the human papillomavirus (HPV) vaccine is low among girls in Appalachian regions of Ohio. Individual knowledge, beliefs, and attitudes regarding HPV and the HPV vaccine are important predictors of health behaviors regarding vaccine uptake. We sought to determine and isolate certain predictors of knowledge, beliefs, and attitudes in the parents in Appalachian Ohio whose daughters had not yet received the HPV vaccine. In addition to demographic, socioeconomic, educational, psychosocial, and health status characteristics of 337 parents of daughters living in Appalachian Ohio, we assessed knowledge, beliefs, and attitudes regarding HPV and the HPV vaccination by scoring parents' responses to the survey, evaluating those factors that predict higher scores, according to univariate analyses and multivariable linear regression models. Knowledge, beliefs, and attitudes varied among certain groups of parents in the sample studied. Significant predictors of higher knowledge scores included higher education achieved by parent (p=0.0030), history of abnormal Pap history or HPV diagnosis, or history of cervical or breast cancer diagnosis of the female parent (p=0.0043, 0.0302, and 0.0385, respectively), and history of flu vaccine ever given to daughter (p=0.0010). Significant predictors of more positive beliefs and attitudes at baseline included parents working full-time or part time (p=0.0074), higher education achieved by parents (p=0.0273), nonsmokers (p=0.0039), parents reporting being less religious (p=0.0039), parents identifying as Democrats (p=0.0566), households with fewer children (p=0.0159), and history of flu vaccine ever given to daughter (p = 0.0002). Improving HPV vaccination uptake within Appalachian Ohio may require interventions targeting more specific subgroups of parents who are less knowledgeable about the vaccine and have negative beliefs and attitudes toward the vaccine.
Zachary Tugaoen  
Poster # 67  
Research Mentor: Joel Mayerson, MD  
Project Title: “The impact of operating room traffic on air particle concentration and its relationship to surgical site infection”  
Project Abstract: Surgical Site Infections (SSIs) are common issues that have profound medical and economic impacts on both patients and the healthcare system. SSIs have been linked to extended hospital stays, increased expenditures, and poor patient outcomes. SSI prevention has the potential to directly affect long-term and short-term patient outcomes, as well as providing significant economic benefits. This project studied the correlation between operating room (OR) traffic and its correlation with particle counts in relation to door openings and possible interventions to reduce surgical implant contamination. Increased OR traffic and OR door openings have been correlated to increased air bacterial counts. It is hypothesized that the use of automated air particle counters will show increased air particle concentration correlating with increased door openings. Data was collected by a photodetection device (HandiLaz Mini, Particle Measuring Systems) and analyzed in the packaged software and with Microsoft Excel. Initial data observation reveals no clear correlation between door openings and increased particle count. Issues with device calibration hindered data collection and would need to be resolved to gather more precise correlations between door openings and particle count. Based on our initial data collection, it can be recommended that future studies will be necessary. Proper calibration with more granular measurements and direct correlation with door opening frequency will be necessary to further explore this topic.

Rebecca Wang  
Poster # 57  
Research Mentor: Jessica Kaffenberger, MD  
Project Title: “A retrospective review of new-onset dermatitis in patients 60 years or older”  
Project Abstract: Dermatitis of immune senescence is a poorly understood new-onset dermatitis; it is suspected to arise from age-related declines in the normal immune responsiveness of the skin, but it may be difficult to distinguish from other disorders such as contact dermatitis or drug-induced pruritus. We hypothesized that dermatitis of immune senescence is a distinct disorder from other new-onset dermatitis conditions in the elderly based on differences in demographic affected, prior medications used and treatments prescribed, as well as other clinical and laboratory findings. A retrospective chart review was conducted of 433 patients age 60 or over with new onset dermatitis from 10/30/2011 to 2/25/2016. Patients were assigned into one of two groups, "Dermatitis of Immune Senescence" or "Alternate Diagnosis" based on their chart review and physician documentation along with patch testing and biopsy results. Dermatitis of Immune Senescence group patients had longer follow-up times compared to Alternate Diagnosis group patients. Intramuscular steroids, oral steroids, and anti-histamine treatments were used significantly more in the Alternate Diagnosis group. Patch testing and biopsy assisted in providing an etiology and affected the rate of immunosuppression use. Our data suggests that dermatitis of immune senescence is not significantly associated with different demographic features; however, different treatments may be more favored based on the etiology of the dermatitis. Elderly patients with new-onset dermatitis should potentially undergo patch testing and biopsy more frequently to assist in the diagnosis and treatment of their condition.
Joshua Wang
Poster # 72
Research Mentor: Vinay Puduvalli, MD
Project Title: “Targeting Heat Shock Protein 90 to sensitize glioblastoma to ionizing radiation and temozolomid”
Project Abstract: Introduction: Despite years of marginal improvements in the standard of care for newly diagnosed glioblastoma (GBM), median overall survival remains 12-15 months. Sensitization of GBM to standard therapies may extend progression-free and overall survival. Heat-shock protein 90 (Hsp90) is overexpressed in GBM and allows for proper folding of proteins involved in repair of DNA double-strand breaks (DSBs), the most deleterious form of DNA damage. Targeting Hsp90 sensitizes GBMs to chemoradiation, though the specific pathways of sensitization are not fully elucidated. Here, we investigate the role of Rad51 and the homologous recombination directed repair in sensitization induced by AT13387, a novel Hsp90 inhibitor. Methods: U251HF and LN229 cells were pretreated with AT13387 prior to receiving ionizing radiation (IR) or were concurrently treated with AT13387 and temozolomide (TMZ). Transient knockdown of Rad51 was achieved using small-interfering RNAs (siRNAs). Activity of the treatments were measured by Rad51 and pH2AX expression, immunocytocfluorescence, and clonogenicity. Nude mice were xenografted with GBM30 cells and treated with chemoradiation. Results: AT13387 results in significant chemo- and radiosensitization of GBM cells, and treatment with AT13387 results in increased DSBs compared to single-agent therapy. Strong increases in pH2AX expression were noted in AT13387 treatment with IR, and numerous nuclear foci of pH2AX expression were observed. AT13387 abolished the ability of GBM cells to form colonies following IR. Conclusions: AT13387 demonstrates significant promise for sensitizing GBMs to chemoradiation. This effect is likely due to impairment of Rad51-mediated homologous recombination directed repair of DSBs. More study is warranted to characterize this relationship.

Bernard Wen
Poster # 21
Research Mentor: Colleen Cebulla, MD
Project Title: “Vitreous and plasma levels of MIF in retinal detachment patients with and without proliferative vitreoretinopathy”
Project Abstract: Proliferative vitreoretinopathy (PVR) is one of the most common causes of post-surgical failure in retinal reattachment surgeries for patients with retinal detachment (RD). To date, no complete mechanism has been established for the development of PVR, and thus, no preventative measures are available. It is known, however, that PVR develops like an aberrant wound-healing process and several inflammatory cytokines are implicated in its progression. Previous unpublished studies by our lab discovered an increased expression of the inflammatory cytokine MIF (macrophage migration inhibitor factor) in the eyes of a mouse PVR model. To further study the role of MIF in PVR development, we analyzed the protein level of MIF in vitreous and peripheral plasma patient samples. Enzyme-linked immunosorbent assay (ELISA) was used to measure the levels of MIF, and a bicinchoninic acid (BCA) assay was used to measure the total protein content in order to normalize values between patient samples. In plasma, the normalized median MIF level in RD patients without PVR was 1.62%, while the normalized median plasma MIF level in RD patients with PVR was 0.925% (U=372, p=0.17). In vitreous, the normalized median MIF level in RD patients without PVR was 2.79%, while the normalized median vitreous level in RD patients with PVR was 2.44% (U=283, p=0.35). While both plasma and vitreous MIF levels seemed to demonstrate a lower value in RD patients with PVR, when we replicated our experiments, we discovered a significant amount of inter-assay variation, especially among the vitreous samples, which obscures the certainty of our data. Past literature suggests that the viscous nature of vitreous makes it difficult to accurately measure. Though our results are inconclusive thus far, we were able to establish a new method to obtain consistent measurements from vitreous samples, which will be utilized in future experiments.
Nicole Wenger
Poster # 83
Research Mentor: Michel Torbey, MD, MPH
Project Title: “Neuroinflammation in intracerebral hemorrhage: Thrombin upregulation is associated with poor neurological outcome following ICH”
Project Abstract: Introduction: Hematoma expansion after intracerebral hemorrhage (ICH) has been associated with worse outcomes and hence is a potential therapeutic target. We sought to characterize the relationship between thrombin, the thrombin inhibitor protease nexin-1 (PN-1), and neurological deficits in a rat model of ICH. We hypothesized that thrombin levels would rise as PN-1 levels fell after induced ICH. We also hypothesized that neurological outcome would worsen as the thrombin level in the brain increased. Methods: We induced an ICH in adult male rats with injection of collagenase type IV (0.1 U) into left striatum. We performed a modified Neurological Severity Score (NSS), TruScan moving time evaluation, Rotarod test, and cylinder test at 3, 6, 24, 48 and 72 hours after ICH. Rats were sacrificed at 1, 3, 6, 24, and 72 hours after ICH. Western blotting was used to determine thrombin and PN-1 protein levels in the area of injury. The resolution of protein bands was compared between each group. Results: We noted a significant increase in both thrombin and PN-1 levels (P< 0.01) in injured rats compared to controls. The peak increase of PN-1 levels preceded the increase in thrombin level. PN-1 level increased within 1 hour of injury and peaked at 3 hours, remaining above control levels until 72 hours (P< 0.01 vs control at 1H, 3H, 6H, and 24H). Thrombin level started to increase at 6 hours and peaked 24 hours post injury (P< 0.001 vs control at 6H, 24H, and 72H). Neurological deficits were noted to be significantly worse at 24 hours post injury associated with a high thrombin level. Conclusions: The increase in thrombin after ICH is associated with worse neurological function. The initial increase in PN-1 may have neuroprotective properties as it precedes thrombin release. Manipulating thrombin or PN-1 may affect hematoma expansion and neurological deficit, and these associations warrant further investigation.

Timothy Wetzel
Poster # 62
Research Mentor: Michael Meara, MD, MBA
Project Title: “Evaluation of a Virtual Reality Training Curriculum in Laparoscopic Surgery”
Project Abstract: Abstract Background: The evidence in the literature is overwhelming for a shift towards simulation based curricula, specifically in surgery. We have evaluated a novel virtual reality curriculum, specifically in laparoscopic surgery, in an attempt to further shift the surgical education training paradigm. Methods: A two-year long study recruited 2016-2017 PGY1 surgical residents as the experimental group (n =11). They were given a laparoscopic simulation (LapSim) baseline test at the beginning of their intern year. They then will go through a novel virtual reality simulation based curriculum, and will be given the same baseline testing tasks at the end of their first year of residency. 2015-2016 PGY1 residents served as the control group (n =9), with no formal virtual reality training, and identical testing. Paired t-test and linear mixed model will be done to compare pre and post test metrics between and among groups after completion of the curriculum. Preliminary results were found with paired t-test and median values. Preliminary Results on Control group: The change in total time to complete the task did not show significant improvement in 10 out of 11 (91%) tasks. Three tasks had 5 subjects (55%) take longer to complete the task. The pattern cutting task showed a significant increase in maximum cutting error (p = 0.030), mean cut error (p =0.024), and in the median number of cuts from 9 to 18. Conclusions: Year 1 pre-test/post-test scores did not significantly differ, suggesting that little laparoscopic skill is obtained by our first year surgical residents in a self-directed LapSim training model.
**Project Abstract:** Recent studies in animal models have raised significant concerns that anesthesia exposure in infancy may lead to permanent neurocognitive deficits later in life. Specifically, increased apoptosis has been observed in immature animals after anesthetic exposure. This project combines four key factors: 1) novel use of a piglet model to study anesthesia-induced neurotoxicity (AIDN); 2) modulation of miRNA expression in response to anesthesia; 3) miRNAs as tools to measure changes in neurochemistry; and 4) the effect of gender on modulation of miRNA expression. It is hypothesized that clinically-relevant exposure to general anesthetic isoflurane will affect brain neurochemistry as evidenced by modulation of miRNA expression and that this modulation will favor a more robust neuroinflammatory response in male piglets when compared with female piglets. Six female and six male healthy piglets, 4-7 days old, were obtained and given 24 hours to acclimate to the environment. All piglets were anesthetized with 2-3% isoflurane in room air for 3 hours (clinically relevant exposure). Throughout the experimental period, piglets received full physiologic monitoring. After exposure, the animals were sacrificed and fresh brain tissue was collected. Untreated animals (6 male, 6 female) served as controls. Brain tissue was homogenized and total RNA extracted. Relative concentrations of miRNAs via a GeneChip Porcine miRNA 4.0 Array (Affymetrix, Santa Clara, CA, USA) were assessed. Analysis of relative miRNA from the brain samples showed a significant upregulation in miRNAs related to apoptosis in experimental piglets compared to control piglets (P< 0.05). Several miRNAs were significantly modulated in female compared to male piglets: miRNAs related to cell cycle were upregulated and those related to apoptosis were downregulated. This evidence suggests that there is a neuronal modulation of miRNA following general anesthesia in piglets and that this response is greater in male piglets.

**Project Abstract:** Background. Congenital syphilis (CS) remains a major public health problem worldwide. In the United States, there has been an increase in CS from 8.4/100,000 live births in 2012 to 11.6/100,000 cases in 2014. The CDC recommends treatment of syphilis-infected women during pregnancy with penicillin to decrease vertical transmission. Failure to prevent CS can occurred despite maternal treatment more than 4 weeks before delivery. However, its frequency using research methodologies is not well documented. Objectives. To 1) determine the frequency of fetal infection with Treponema pallidum among infants born to mothers who received syphilis treatment during pregnancy and greater than 4 weeks before delivery; and 2) describe the clinical, laboratory and radiographic findings in these infants. Methods. Retrospective analysis of prospectively collected data on infants and their mothers who had reactive serologic tests for syphilis, received treatment during pregnancy and >4 weeks before delivery, and delivered at Parkland Hospital, Dallas, TX from 1984-2002. CS was defined as abnormalities on physical examination, laboratory testing, bone radiographs, IgM immunoblotting, blood/cerebrospinal fluid PCR, and/or rabbit infectivity testing (RIT). Results. 182 mothers (68% Black; 24% Hispanic; 24% cocaine users; 5% HIV co-infection) had syphilis (16%, primary; 34, secondary; 62, early latent; 34, late latent; 36, unknown duration) treated during pregnancy and greater than 4 weeks before delivery. 92% of mothers received penicillin therapy appropriate for stage of infection. Of the 184 infants, 12 (6.5%) had CS: 9, abnormal physical examination; 3, abnormal bone radiographs; 10, positive IgM immunoblot; 1 of 10 had positive blood PCR; 1 of 2 had positive blood RIT. Conclusion. Failure to prevent CS occurred in ~7% of women who received syphilis treatment during pregnancy, supporting the CDC recommendation for assessment and treatment of their newborns.
Trudy Wu  
**Poster # 84**  
**Research Mentor:** Kristen Ciombor, MD  
**Project Title:** “Next Generation Sequencing to reveal mutations in IDH1 and its effect on patient outcomes in advanced biliary tract cancer who received gemcitabine and cisplatin”  
**Project Abstract:** AIM: Cholangiocarcinoma (CCA) is an aggressive and often times fatal malignancy with poor prognosis. To date, there is only one approved therapy in the treatment of BTC which all patients eventually develop resistance. There is an urgent need to further study the pathogenesis and genetic signature of BTC to improve the current limited treatment platform. The prognostic significance of IDH1/2 mutations in CCA has been recently under debate by several published studies. This paper correlates the patient outcome on IDH mutant patients in comparison to wild–type in intrahepatic disease. METHOD: This is a retrospective chart review of 62 patients diagnosed with cholangiocarcinoma (CCA) and were treated at The Ohio State University James Cancer Hospital between 2008 and 2015. Tumor samples were sent for targeted Next Generation Sequencing (NGS) at Foundation Medicine (Cambridge, MA) a Clinical Laboratory Improvement Amendments (CLIA)--certified laboratory. RESULTS: IDH mutations are reported exclusively in 5/34 (15%) intrahepatic primary tumors using Next Generation Sequencing. Progression Free Survival (PFS) was calculated from date of Gemcitabine Cisplatin initiation to progression for IDH mutant vs. wildtype (5.9 months vs. 5.4 months, p=0.96) as well as overall survival (OS) defined as date of diagnosis to date from any cause (14.5 months vs. 23.1 months, p=0.062). DISCUSSION: This study illustrates there is no statistical significance in OS between IDH mutant and wild–type groups. Therefore, we are unable to conclude with statistical confidence that IDH mutation in CCA is a prognostic factor. There have been many conflicting publications regarding the significance of IDH tumor variants. Due to these disparities, should we redirect our research efforts or continue focusing on IDH mutations?

Jason Xia  
**Poster # 22**  
**Research Mentor:** Emmett Whitaker, MD  
**Project Title:** “In-vivo, real time measurement of glutamate activity in sevoflurane-anesthetized neonatal piglets”  
**Project Abstract:** Sevoflurane is one of the most commonly used inhalational anesthetics worldwide. Concerns that sevoflurane may cause neurotoxicity in children have spurred a spike in research on this topic. Recent studies have shown that sevoflurane can modulate neurotransmitter release via mGluR-induced release of Ca2+ from intracellular stores, which may lead to excitotoxicity and neuronal apoptosis. We used novel microelectrode array technology to record in-vivo glutamate transmission in the hippocampus in sevoflurane anesthetized piglets. We hypothesized that there would be a significant increase in glutamate neurotransmitter release in response to prolonged sevoflurane exposure. The project is still in progress, with preliminary data collected and analysis available in the near future.
Tian You  
**Poster # 77**  
**Research Mentor:** Fedias Christofi, PhD  
**Project Title:** “Hemodynamics and Cognitive Outcomes in Total Hip Arthroplasty”  
**Project Abstract:**  
Introduction: Postoperative delirium occurs in about 20% of elderly orthopedic patients. It results in prolonged hospitalization, poorer outcomes, and higher healthcare costs, but its etiology is still unknown. Intraoperative hemodynamic status such as hypotension may be a risk factor for developing delirium. Methods: This is a pilot prospective study to examine the association between hypotension, transfusion status, and duration of anesthesia and delirium. 50 patients that were scheduled for hip arthroplasty were followed throughout their stay in the hospital for incidence of delirium. Results: The incidence of delirium was 18%. There was no evidence that intraoperative hypotension, transfusion status, and duration of anesthesia were associated with postoperative delirium. Conclusions: We encountered negative results when studying hemodynamic status and delirium. Several studies reported conflicting results as well. This suggests that further research on perioperative hemodynamic status in orthopedic patients and the incidence of delirium is required.

Nichole Zayan  
**Poster # 51**  
**Research Mentor:** Vimal Narula, MD  
**Project Title:** “Comparison of Robot-Assisted to Laparoscopic Hernia Repair: A Cohort Study”  
**Project Abstract:** Since the approval of the da Vinci robot in 2000, its use has expanded, with special attention given to advanced laparoscopic procedures such as hernia repairs. It has been shown that robot-assisted hernia repairs are technically feasible, safe, and effective, and that outcomes are comparable to laparoscopic procedures. In fact, robot-assisted hernia repairs may actually have several advantages over laparoscopic procedures. These include the ability to circumferentially suture mesh into place, as opposed to fascial closure with transabdominal sutures and tackers, and less post-operative pain as a result. They also may facilitate lower infection and hernia recurrence rates and a faster return to normal function. However, they may also be costlier than laparoscopic procedures, and there is a well-documented learning curve that is required before operative times are decreased and stabilize. We hypothesized that robot-assisted hernia repair will be associated with better outcomes than laparoscopic repair, and that it would be beneficial to patients and health systems alike to more widely implement robot-assisted hernia repair. With analysis of 29 robotic cases and 101 laparoscopic ones, it was found that the robotic patients had no significantly different length of stay or 30-day Carolinas Comfort Scale scores from the laparoscopic patients. The robotic cases did have longer operative times and costs; however, upon examining a breakdown of OR costs, the majority of the increased cost is attributable to longer operative times. Once one-year follow-up data from the robotic group is collected, it can be compared with the laparoscopic group to determine differences in outcomes and complications rates. In addition, as more robotic cases are performed, we expect operative times to decrease and will reanalyze costs. At this point, we have not found a difference in outcomes between laparoscopic and robotic hernia repairs.
Research Mentor: Jeffrey Parvin, MD, PhD  
Project Title: “MDSR Pilot Program: Bioinformatics Integrative Genomics”  
Project Abstract: This project was intended to Bioinformatics and data mining is a growing field in many aspects, but in biology, it has been used to enable the ease of hypothesis generation in genetics. On this team pilot project, our intention was to generate a hypothesis (using bioinformatics) of a gene hub that affected the development of triple negative breast cancer (TNBC), investigate that gene using shRNA knockdown and cell culture, and then to investigate potential biomarkers for TNBC. My portion of the project was specifically aimed at investigating the genes STUB1 and JMJD8, which were hypothesized to cause the development of TNBC when knocked down in a normal mammary epithelial cell model (MCF-10A). Had everything gone according to plan, a virus would have delivered the knockdown shRNA to the genes, I would have checked for protein knockdown on the cells via Western Blot, and then I would have compared the normal knockdown cell models to existing TNBC cell models (MDA-MB-231). I would have looked specifically for changes in cell nucleus morphology, as a team of bioinformatics data scientists and pathologists noted that this would be the most efficient way to check for cancer pathology. Unfortunately, as with many things in science, things do not always go according to plan. I was able to find shRNA that knocked down the genes, but had difficulties this summer reviving my cell lines after infecting cells with antibiotic-resistant lentivirus. Therefore, I have not been able to collect data necessary to draw conclusions on the hypothesis. This project is still a work in progress, which I hope to continue after my board exams.