

Abstract #: 1

Session: Poster

PATHOPHYSIOLOGICAL ROLE OF INTERLEUKIN-6 & PARATHYROID HORMONE-RELATED PEPTIDE (PTHrP) IN PROSTATE CELLS

Authors: Farrokh Asadi and Barbara Swanson Rush University of Medical Sciences, College of Nursing, Chicago, Illinois

Introduction: During early stages of prostate cancer, tumor cells are dependent on androgen as a growth factor and withdrawal of androgen results in apoptotic cell death and clinical remissions. However, tumor recurrences after therapeutic interventions are commonly associated with increasing androgen independence of the tumor cells and increasing resistance to pro-apoptotic and chemotherapeutic agents. Overexpression of IL-6 and PTHrP has been implicated in prostate cancer progression and bone metastases.

Objective: High serum IL-6 and PTHrP levels in patients with prostate cancer correlates with poor prognosis and chemoresistance.

Methods: Human prostate cancer cell culture, RT-PCR, Western, Proliferation and Apoptosis assays.

Results: Recently, has been shown that IL-6 induces the expression of PTHrP in human osteoblastic cells, however, no studies have directly tested the IL-6 mediated PTHrP expression in prostate cancer progression. Previously, we have reported that the expression of PTHrP is enhanced in prostate cancer and is greater in poorly differentiated carcinoma as compared with the well-differentiated tumors. We have also reported that the expression of PTHrP may contribute to the apoptosis-resistant phenotype in prostate cancer cells, and repression of PTHrP expression increases the caspase-3 activation and sensitivity of androgen-independent prostate cancer cell line to apoptosis. In the present study, we show that IL-6 and PTHrP mRNA and protein are highly expressed in androgen-independent prostate cancer cells. In addition, exposure to exogenous IL-6 induces the overexpression of PTHrP in androgen-dependent prostate cancer cells and makes them to become apoptosis-resistant. Furthermore, repression of PTHrP expression by anti-IL-6 antibody increases the caspase-3 activation and apoptosis sensitivity of IL-6 exposed androgen-dependent and -independent prostate cancer cell lines.

Conclusion/Significance: These findings provide indirect evidence for the importance of IL-6 induction of PTHrP expression in mediating the progression of prostate tumor and its transformation to an androgen-independent phenotype.

Abstract #: 2

Session: Poster

LANGERHANS CELL HISTIOCYTOSIS THERPAY FOR THE TREATMENT OF LIFE-THREATENING ROSAI DORFMAN DISEASE

Authors: Nadia Chaudhry-Waterman (VCOM); Paul Kent, MD (RUMC)

Introduction: Rosai Dorfman Disease (RDD), or Sinus histiocytosis with massive lymphadenopathy (SHML), is a rare condition of immune dysregulation of unknown etiology arising from the massive accumulation of non-Langerhans type histiocytic cells inside lymph nodes. It classically presents as bulky, painless lymphadenopathy often associated with infection. Biopsy shows abundant histiocytic cells (CD1a(-), S-100(+)/CD68(+)). The disease can be self-limiting, but in cases with a prolonged chronic course, extranodal involvement, or disease that threatens vitals structures, treatment may be necessary. There is no treatment consensus.

Objective: To describe a case of life-threatening, unresectable, recurrent RDD successfully treated with Langerhans Cell Histiocytosis (LCH) 2009 - inspired therapy.

Methods: We compared this case to the current literature on chemotherapeutic treatments for RDD. We searched PubMed, Ovid, and Google Scholar. We believe this to be the first reported case of using LCH therapy to successfully treat RDD. An 8-year-old male presented to an outside hospital with two years of massive neck swelling causing torticollis. Biopsy confirmed RDD. He was intermittently treated with antibiotics with partial response. Surgical removal of the affected lymph nodes was unsuccessful due to proximity to the spinal cord. Two years later, the patient presented to our institution. He was initially treated with prednisone with a fast tapering dose, but after a second relapse the decision was made to try chemotherapy following the LCH-2009 protocol of weekly vinblastine(6 mg/m²), 6-MP(75 mg/m²), and high-dose steroid bursts. He experienced two additional relapses off therapy, including CMV(+) associated septic shock and cytokine storm requiring rapid response, PICU admission, and ionotropic support. An extended and slowly tapered maintenance therapy regimen of 2.5 years of daily 6-MP, monthly vinblastine and steroids with a slowly tapered dose has resulted in 38-months of continuous remission - the longest stretch of his life.

Results: No similar cases were found. Literature search demonstrated no consensus regarding the most effective treatment of RDD, with no previous cases being successfully treated following LCH protocols.

Conclusion/Significance: We hypothesize that the LCH-2009 therapy mitigates the immune dysregulation of RDD. This case suggests that LCH-2009 therapy can be used to treat cases of RDD that is not amendable to surgery or observation.

Abstract #: 3

Session: Poster

IGF-1 Induces Phenotypic Trans-differentiation in Lung Adenocarcinoma Cell Lines and Associated Modifications in Metabolic Regulation

Authors: Alison C. Coogan (Rush University), Gabriela C. Lobato (Rush University), Mike Littau, David Gerard (Rush University), Christopher W. Seder (Rush University), Michael J. Liptay (Rush University), and Jeffrey A. Borgia (Rush University)

Introduction: We previously reported that patients with locally-advanced NSCLC have circulating insulin-like growth factor-1 (IGF-1) levels many-fold higher than those observed in control populations and are linked to increased tumoral aggressiveness and inferior clinical outcomes.

Objective: We hypothesized that elevated IGF-1 levels induce an epithelial-mesenchymal-transition (EMT) and associated metabolic changes in vitro.

Methods: A549 and H359 lung adenocarcinoma cells were treated for 7 days using a 5-point curve (0-250 ng/mL) of IGF-1 in RPMI-1640. Cellular lysates were interrogated via standard Western blots for EMT biomarkers, including E-cadherin (epithelioid phenotype) and vimentin (mesenchymal phenotype); preferentially expressed as a ratio of mesenchymal character (i.e. V/E). Immunoblots were also probed for peptide-O-GlcNAc transferase (OGT), a biomarker for metabolic regulation. Images were captured on a ChemiDoc Touch and densitometry performed on each series with total-protein normalization and values expressed relative to the 10 ng/mL, defined as physiologic IGF-1 level.

Results: Elevated levels (100 and 250 ng/mL) of IGF-1 led to a 1.51 and a 1.66-fold increase ($p=0.010$ and $p=0.040$, respectively) in V/E, respectively, in A549 cells consistent with the induction of EMT. Similarly, a 1.21 and 1.34-fold increase in V/E was observed in H358 cells at 100 and 250 ng/mL IGF-1, respectively. OGT levels were inversely associated with IGF-1 levels in both cell lines, decreasing by 24% in the H358 cells and by 38% in A549 cells.

Conclusion/Significance: Elevated IGF-1 levels are associated with the induction of EMT in lung adenocarcinoma cell lines, suggesting IGF-1 plays a role in tumorigenesis.

Abstract #: 4

Session: Poster

A survey of multidisciplinary breast cancer providers in the Chicagoland area of the management of axillary disease in the elderly.

Authors: Chandler S Cortina MD Laurel L Mulder MD Sucheta Ravindran BS Stephanie E Iantorno BS Katherine Kopkash MD Andrea Madrigano MD

Introduction: Nearly 33% of breast cancer diagnoses and deaths are in patients over age 70. Guidelines suggest deviation from routine care is reasonable in this age group.

Objective: We aimed to investigate which patient factors have the largest impact on how physicians manage axillary cancer in the elderly.

Methods: 106 surgeons, radiation oncologists, and medical oncologists who specialize in breast cancer in Chicagoland were identified and sent a 7-question survey using Survey Monkey. Participation was anonymous, data was stored to a secure server, descriptive analysis was done by the survey platform, and analyses was conducted in R 3.3.2.

Results: 30% of providers completed the survey. 57% identified as surgeons, 23% as medical oncologists, and 20% as radiation oncologists. 80% of participants were in academic practice, 13% in community practice, and 3% in a hybrid academic/community practice. Average years in practice was 17.2 and did not vary by specialty. Physicians had to identify up to 3 patient characteristics (from a list of 22) that most greatly influence how they would determine treatment for a patient over the age of 70 with either clinically or pathologically positive axillary nodes. The most commonly selected characteristics included anticipated life expectancy (47%), number of medical conditions (33%), and TNM stage (30%). Factors which saw the greatest variation among specialty type included prior radiation therapy (50% radiation oncologists and 0% surgeons and oncologists), age (35% surgeons and 0% radiation and medical oncologists), ER/PR status (57% medical oncologists, 18% surgeons, 17% radiation oncologists), and Her2Neu status (43% medical oncologists, 12% surgeons, 0% radiation oncologists).

Conclusion/Significance: From surveying physicians from all aspects of breast cancer care, we believe providers should strongly consider factoring anticipated life expectancy, number of medical conditions, and TNM staging into the coordinated multidisciplinary decision model for this patient group. With an ever-growing aging population, it is of utmost importance for physicians to consider a patient's biologic age rather than chronological age for cancer management. Further clinical investigation is needed to aid in developing evidence-based clinical guidelines for older patients with advanced breast cancer.

Abstract #: 5

Session: Podium Presentation - Deans' Award

LOSS OF MEASLES IMMUNITY IN PEDIATRIC ONCOLOGY PATIENTS: RISK WITH THE RISE OF UNDERVACCINATION

Authors: Ayoolamide Gazal (Rush Medical College); Karen Tamulonis (Pediatrics, RUMC); Kimberly Vavra (Pediatrics, RUMC); Stephen Dvorak (Pediatrics, RUMC); Paul Kent (Pediatrics, RUMC); Nupur Mittal (Pediatrics, RUMC).

Introduction: Pediatric cancer patients undergoing chemotherapy are at risk of losing immunity to illnesses such as measles. Measles infection in cancer patients has mortality rates up to 50%; up to 35% of children under 7 lose humoral immunity as a result of chemotherapy. Because of volitional vaccine refusal, there has been a dramatic increase in measles infection from 63 in 2010 to 677 in 2014, including a California outbreak (110 cases), a recent Minnesota outbreak, a smaller outbreak in Chicago, and 358 US cases in our study period. Small and medium pediatric oncology practices frequently share floor/clinic space with the general pediatric patients putting them at risk, especially given the virulence of the disease starting 48 hours prior to symptoms.

Objective: We wished to characterize the risk of measles infection to our patients. Measles protective humoral immune status was checked in all of our patients from January 1, 2015 to June 15, 2017.

Methods: Patients less than 21 years of age receiving chemotherapy between January 2015 - June 2017 in our institution's pediatric oncology department were included in a retrospective review. Loss of measles immunity according to titer lab results was defined as less than or equal to 0.90.

Results: A total of 46 patients were included. Five patients (10.8%) had non-protective measles antibody levels. Two of our patients had sarcoma, 3 had leukemia/lymphoma and all were seen frequently in both clinic and the floor. For patients who had initial measles immunity, IgG titers trended down in the majority of cases while on chemotherapy. None of the patients developed measles.

Conclusion/Significance: Measles outbreaks in the US are potentially fatal to immunocompromised oncology patients. This danger is increased because of shared clinic space with the general patient population. Given the increase in measles cases in the last five years and the vulnerability of oncology patients to this disease, it should be standard practice to check all patients for measles immunity prior to starting chemotherapy and throughout the course of treatment. Patients who are infected with measles should be isolated from this susceptible patient population.

Abstract #: 6

Session: Podium Presentation - Deans' Award

Pharmacologic Activation of Integrin CD11b as a Novel Therapeutic Strategy Against Lung Cancer

Authors: Terese Geraghty (Rush), Anugraha Rajagopalan (Rush), Samia Khan (Rush), Judith Varner (UCSD) and Vineet Gupta (Rush)

Introduction: Lung cancer is the leading cause of cancer related deaths in the United States. With a 5-year survival rate of 18%, lung cancer patients are in immediate need of new therapeutic options. A major problem facing immunotherapy for cancer is the active immune suppression by the tumor. Tumors show presence of large numbers of tumor-associated macrophages (TAMs), which suppress the adaptive immune response, increase neovascularization to the tumor, and promote tumor survival.

Objective: Integrin CD11b is highly expressed on TAMs and is essential for their recruitment and biological functions. Reasoning that CD11b activity is important for controlling tumor growth, we developed a novel small molecule agonist called leuhadherin-1 (LA1), which activates CD11b. Our objective is to determine the efficacy of LA1 in suppressing tumor growth.

Methods: We inoculated C57BL/6 wildtype mice with one million Lewis lung carcinoma (LLC) cells subcutaneously on their rear right flank. We allowed the tumors to establish over one week before beginning treatment. Mice were treated with 6mg/kg LA1 once a day for 2 weeks after palpable tumors formed. We also compared tumor growth in CD11b^{-/-} mice to wild type mice with and without LA1 treatment. Tumors were measured by calipers and experiments were repeated at least twice.

Results: We found that CD11b activation by LA1 significantly reduced tumor growth in wild type mice bearing Lewis lung carcinoma (LLC) tumors as early as one week post treatment. Conversely, LLC tumors grew at a faster rate in CD11b^{-/-} mice, compared to wild type mice, showing that CD11b is important for controlling tumor growth. Importantly, LA1 treatment in tumor bearing CD11b^{-/-} mice did not show any efficacy, demonstrating the specificity of LA1 to CD11b.

Conclusion/Significance: These data suggest that CD11b activation via LA1 modulates TAMs in tumors and is a novel therapeutic strategy against lung cancer. Our approach is novel because it activates CD11b instead of antagonizing or blocking it. Many therapies aim to deplete or block CD11b⁺ macrophages from tumor, but our data significantly show that CD11b activation is an important macrophage function needed to elicit a potent anti-tumor immune response.

Abstract #: 7

Session: Poster

Epidemiology and Prognostic Indicators in Laryngeal Lymphoma: A Population-Based Analysis

Authors: Scott Hong (RMC), Bobby Tajudeen (RUMC), Inna Husain (RUMC)

Introduction: Lymphoma of the larynx is an unusual malignancy with relatively few reports in literature; evidence-based information regarding epidemiology, prognosis, and treatment is lacking. This is the largest population-based analysis of primary laryngeal lymphoma patients to date.

Objective: To characterize the epidemiology of primary laryngeal lymphoma and to determine the prognostic factors affecting survival in patients with this disease.

Methods: A population-based analysis was conducted with patients from more than 15 different geographic regions across the United States. Patients were chosen based on a diagnosis of lymphoma and a primary lymphoma site within the larynx. 200 cases were eligible based on those inclusion criteria, and variables including age, race, sex, primary site of lymphoma involvement, general histology, specific histologic subtype, tumor grade, Ann Arbor staging, and exposure to radiation therapy and/or chemotherapy were extracted for statistical analysis. Overall survival (OS) and disease-specific survival (DSS) were the main outcomes calculated using multivariate analysis.

Results: A total of 200 cases of laryngeal lymphoma were identified. The mean age at diagnosis was 64.2 years. The cohort was composed of 53% males. B-cell non-Hodgkin's lymphoma (NHL) accounted for 74% of cases, while natural killer (NK)/T-cell NHL accounted for 10% of cases. The median OS was 9.15 years and median DSS was 24.5 years. OS at 2, 5, and 10 years was 74%, 63%, and 44%, respectively. On multivariate analysis, older age, male sex, and advanced Ann Arbor staging were associated with worse OS, while only male sex and advanced Ann Arbor staging were associated with worse DSS (all p-values < .05). Radiation and chemotherapy were not associated with improved survival.

Conclusion/Significance: Female sex and lower Ann Arbor staging are independent positive prognostic indicators for survival in laryngeal lymphoma, while other clinical variables such as grade and histology do not have an effect on survival. Though radiation therapy has conventionally been the treatment of choice for laryngeal lymphoma, our study shows that radiation and chemotherapy do not appear to confer a mortality benefit in patients with primary laryngeal lymphoma, which may have implications on clinical decision making as well as patient education about disease prognosis.

Abstract #: 8

Session: Poster

Interfraction Tumor Size Changes During Lung SBRT: What Factors Matter?

Authors: Kevin King (Rush), Sonal Mayekar (Rush), Gaurav Marwaha (Rush)

Introduction: Prior studies have suggested that lung stereotactic body radiotherapy (SBRT) can cause volumetric tumor size changes on setup imaging during treatment, however predictors for such changes have not been well described. With the advent of kilovoltage (kv) cone beam computed tomography (CBCT) scans in the SBRT setup process, visualization of tumor changes are more readily apparent.

Objective: The purpose of this study was to evaluate the role played by patient, tumor, and dosimetric factors in the interfraction tumor changes seen in our lung SBRT patient population.

Methods: A retrospective chart review was conducted on patients from our IRB-approved lung SBRT database treated between 2014-2017. Each patient was set up under daily stereoscopic x-ray and kv CBCT guidance. A single radiation oncologist retrospectively re-contoured the tumor volume on each sequential kv CBCT image to determine volumetric variances. A univariate and multivariate analysis with a linear model were employed in SPSS R 3.3.1.

Results: Forty patients with either squamous cell carcinoma (12.5%), adenocarcinoma (52.5%), or metastatic renal cell carcinoma (5%) of the lung were identified and treated with either 3 or 5 fractions. The median pretreatment neutrophil lymphocyte ratio (NLR) was 3.03 (range: 0.09-67.21) and the median post-treatment NLR was 2.74 (range: 0.17-12.59). Within the 3 fraction group, there was a median decrease in tumor size of 10% between the first and third fractions; within the 5 fraction group, a total decrease in tumor size of 4% was observed between the first and the fifth fractions. On univariate analysis, only location ($p=0.0843$), dose ($p=0.0881$), and histology ($p=0.0903$) correlated with interfraction tumor size reduction. On multivariate analysis, only adenocarcinoma histology ($p=0.0736$) and renal cell carcinoma histology ($p=0.0221$) trended towards statistically significant.

Conclusion/Significance: In this study, we observed interfraction tumor size reduction in patients treated with SBRT. Of all the patient, tumor, and dosimetric factors analyzed, histology was the only factor to significantly correlate with interfraction tumor size reduction. Further lung SBRT interfraction volumetric studies are needed to better characterize which types of patients/tumors experience which type of changes. This may play a role in optimizing setup imaging further and/or individually tailoring planning treatment volumes moving forward.

Abstract #: 9

Session: Poster

Efficacy and Safety of the Addition of Lipiodol to DEB-TACE for Transarterial Chemoembolization for Hepatocellular Carcinoma

Authors: Joseph Kramkowski (RU) and Jordan Tasse, MD (RUMC)

Introduction: Incidence of hepatocellular carcinoma (HCC) worldwide is increasing at a concerning rate and is one of the leading diagnoses of cancer related death. Trans arterial chemoembolization with Drug Eluting Beads (DEB TACE) is a widely accepted loco-regional therapy for the treatment of patients with early to intermediate stage HCC. The IR team at Rush uses a combination of Ethiodized oil and the drug eluting beads, which has been named DEB-TACE plus ethiodized oil (EDEB-TACE). This technique utilizes the effective tumor cell seeking behavior of ethiodized oil and the drug delivery of the drug eluting beads.

Objective: As ethiodized oil has been historically used due to its apparent tumor seeking properties, patients who had and had not received this supplement to their chemotherapeutic regiment were compared to assess safety and potential benefits of this treatment.

Methods: We retrospectively reviewed all HCC patients treated using a form of TACE at Rush University Medical Center in the time period between January 2010 and June 2016. To evaluate the patient populations, a comprehensive analysis of the patients' medical records to compare treatment parameters, patient demographics, disease characteristics, explant histology, imaging, survival status, and treatment-related liver toxicity was carried out. Cohorts were stratified to obtain a full view of the various factors that may affect EDEB-TACE's efficacy. To assess the safety of this treatment, we will review post-procedure AST/ALT/Bilirubin and categorize the patients using Southwest Oncology Group (SWOG) criteria.

Results: Patients who received the EDEB-TACE treatment have a greater amount of tumor shrinkage without increased toxicity. Odds ratio for obtaining a complete response is 4.29 (95%CI 1.31-14.03, P=0.016). (maybe give some specific results, # patients, mrecist percent CR, PR, etc in this section if you have room)

Conclusion/Significance: EDEB-TACE appears safe and efficacious in treatment of patients with HCC. Further evaluation with prospective trials and larger sample sizes are necessary. provides an alternate option to cTACE and DEB-TACE adding to the possible treatment options available for patients with hepatocellular carcinoma.

Abstract #: 10

Session: Poster

Transarterial Radioembolization of Large Hepatocellular Carcinoma

Authors: Brandon M. Larson, BS (RUMC); Jordan C. Tasse, MD (RUMC); Thymur Ali Chaudhry, MD (RUMC)

Introduction: Hepatocellular carcinoma (HCC) is a primary malignant neoplasm of the liver with a high mortality-to-incidence ratio and limited treatment options. Trans-arterial chemoembolization (TACE) and radioembolization (Y90) are standard of care loco-regional techniques used to treat HCC; however, outcomes of TACE have not been promising in treatment of large HCC. To our knowledge, there has been no specific analysis focused on the safety and efficacy of TARE in the treatment of large HCC.

Objective: This is a single-center study designed to evaluate the safety and efficacy of TARE in the management of large HCC.

Methods: We retrospectively evaluated 19 patients with un-resectable advanced stage HCC who underwent Y-90 at our institution from October 2012 through July 2017. 8 patients had a large solitary tumor greater than 10cm in diameter. 8 patients had multifocal HCC with a total tumor burden greater than 10cm. 3 patients had both characteristics. Endpoints included liver toxicity, radiologic response to treatment using mRecist criteria, percent tumor response and overall survival.

Results: 42% (8/19) and 25% (3/12) of patients demonstrated liver toxicity via change in LFTs at 1 month and 6 months post-treatment, respectively. At 3 month follow-up imaging, 36% (4/11) of patients had complete response to therapy, 64% (7/11) had partial response to therapy, 18% (2/11) had stable disease and no patients had progressive disease. Of note, 5 patients had been lost to follow-up and 3 patients were awaiting imaging. At 6 month follow-up imaging, 75% (6/8) of patients had complete response to therapy, 25% (2/8) had partial response to therapy, and 3 additional patients were lost to follow-up. Mean follow-up time was 7 months from last treatment. Median overall survival for patients in Child-Pugh A and Child-Pugh B disease were 37.3 and 36.7 months respectively.

Conclusion/Significance: Treatment options are very limited in patients with large HCC. TACE have shown very modest benefit in this patient population. Our data suggests safety of Y-90 therapy and compares very favorably to other TACE in terms of efficacy. Further evaluation with prospective studies and larger sample sizes is necessary.

Abstract #: 11

Session: Poster

Clinical Features and Outcomes in Young Adults with Oral Tongue Cancer

Authors: Courtney Miller, BS, Aryan Shay BS, Bobby Tajudeen MD, Peter Revenaugh MD, Neilayan Sen MD, Mary Fidler MD, Kerstin Stenson MD, Samer Al-khudari MD, Rush University Medical Center

Introduction: Patients with HPV-associated head and neck squamous cell carcinoma (SCC) are typically younger and more likely to be never-smokers/never-drinkers, with tumors characterized by wild-type p53, p16 overexpression, and more favorable outcomes. The role of HPV and p16-positivity in oral tongue cancer remains unclear because of the disparity of results published in the literature. We examined recurrence free and overall survival data as it relates to p16-expression and other tumor characteristics in this population.

Objective: To evaluate outcomes and survival in young patients with oral tongue squamous cell carcinoma.

Methods: This is a retrospective chart review of patients between 18-40 years with oral tongue SCC. p16 expression, perineural invasion, lympho-vascular invasion, patient age, cancer stage, and smoking/alcohol status were evaluated. Recurrence free and overall survival data were analyzed according to Kaplan-Meier method with univariate analysis.

Results: Twenty-three patients were identified. Twelve had stage I disease; 11 had stage III or IV disease. Seventeen (74%) were men and 6 (26%) were women. Mean age at presentation was 34.5 months. Mean follow-up was 46.6 months. Five-year recurrence-free survival was 62%, and overall survival was 66% for all patients. Recurrence-free survival for patients with early vs advanced stage disease was 73% and 25% respectively ($p = 0.011$). Overall survival for early vs advanced stage disease was 100% and 55% respectively ($p = 0.012$). Twenty-two percent of this sample had significant tobacco use (>5 pack years); 9% had significant alcohol use (daily use), but were not seen as significant risk factors. Factors associated with significantly worse overall survival were presence of neck disease ($p = 0.073$), positive surgical margins ($p = 0.0001$), and lymph-vascular invasion ($p = 0.002$). Five cases (22%) were p16-positive but this was not significantly associated with overall ($p = 0.205$) or recurrence-free survival ($p = 0.762$).

Conclusion/Significance: Factors associated with worse outcomes are similar to those in adults with oral tongue cancer, such as lymph node involvement and perineural invasion. Survival outcomes are reasonable in young patients with early stage disease, but are significantly worse in patients with advanced stage disease.

Abstract #: 12

Session: Poster

The Accuracy of Prostate Cancer Localization using Transrectal Ultrasound-Guided Biopsy vs. MRI

Authors: Maxime Montour, BS (Rush University) Alexander Chow MD (Rush), Christopher Coogan, MD (Rush University)

Introduction: Focal therapies for prostate cancer is a novel, minimally invasive technique for the treatment of low-risk prostate cancer. However, identifying candidates for these procedures requires diagnostic techniques that can accurately predicate the laterality of prostate cancer on preoperative biopsy.

Objective: We sought to compare the laterality of disease on standard 12 core trans-rectal ultrasound guided biopsy and combined MRI fusion biopsy to final surgical pathology.

Methods: We performed a retrospective review of the UroPartners database of all patients who underwent surgical removal of the prostate (radical prostatectomy), from January 2015 to May 2017. Pathology reports from biopsy and prostatectomy specimens were reviewed to determine disease laterality. Performance measures and chi-square tests were calculated in R 3.3.2.

Results: 422 men underwent RP, of which 349 were diagnosed by transrectal ultrasound guided biopsy (TRUS) and 73 by multi-parametric MRI/US guided fusion biopsy (mpMRI/US). Based on final pathology, overall prevalence of bilaterality was 86%. Laterality was concordant in 221/349 (63%) in the TRUS biopsy group and in 31/73 (42%) in the mpMRI/US biopsy group ($p=.002$). On all measures calculated, TRUS outperformed mpMRI/US. Sensitivity was 0.60 in the TRUS group and 0.39 in the mpMRI/US group ($p = 0.003$); specificity was 0.80 in the TRUS group and 0.67 in the mpMRI/US group ($p = 0.67$).

Conclusion/Significance: Although TRUS outperformed mpMRI/US, the most important consideration may be the underlying base rate. The oncologic control of focal prostate therapy needs to be investigated further given the significant amount of bilateral disease, which was missed on clinical pathology with both biopsy modalities. In our interim analysis, we found some differences between mpMRI/US and TRUS. Limitations to our study include a small sample size in the mpMRI/US arm compared to TRUS arm.

Abstract #: 13

Session: Podium Presentation - Student Award

Implementing Survivorship Care Plans for Gynecology-Oncology Patients and the Financial Implications in Practice

Authors: Caitlin Murphy (Rush) Diane McNaughton (Rush) Masako Mayahara (Rush) Bridget O'Brien Fagen (Rush) Margaret K Wilson (Rush)

Introduction: Nature/Scope of Project: The purpose of this project was to pilot test a survivorship care plan template for gynecology patients. The specific aim was to evaluate financial implications of using the template. Synthesis and Analysis of Supporting Literature: Cancer survivors are at higher risk of having future health problems. An IOM report highlights the lack of long term personalized care of cancer survivors. The Commission on Cancer mandates accredited centers to provide comprehensive care plans upon completion of treatment.

Objective: Evaluate SCP in oncology arena

Methods: Project Implementation A team of a DNP student, PA, and IT specialist at a major academic medical center developed a cancer survivorship care plan template. This template provides guidelines for cancer surveillance, monitoring late- and long-term side effects of therapy, and health promotion recommendations. The template was pilot tested among gynecology patients who completed curative surgery, radiation, or chemotherapy. Evaluation Criteria: The total cost of the care plan was calculated by multiplying the total time the PA spent on care plan by PA salary. The total time of using the template was calculated by adding the time spent in customizing (non-billable) and discussing the care plan with patient in clinic (billable). The total revenue for providing the care plan was calculated by subtracting the salary of the PA from the reimbursement for PA services.

Results: Outcomes: Thirty-three patients participated in this pilot project. The average time to customize a care plan was 12.5 minutes per patient. The average time to discuss the care plan was 31.1 minutes per patient. The total amount of time to provide this service was 43.6 minutes per patient. The total cost of implementing the care plan was \$37.9 per patient. The mean reimbursement rate for the care plan template was \$105.3 and the revenue was \$67.5 per patient

Conclusion/Significance: Recommendations: The cancer survivorship care plan template is a financially feasible service and provides an efficient process for providers to complete the comprehensive care plan. Future work should include disseminating this care plan to other cancer populations and assess the long term benefit of this cancer survivorship care plan template on patient health outcomes.

Abstract #: 14

Session: Abstract

Oligometastatic Breast Cancer to the Scalp

Authors: Anish Raman BS (Rush); Courtney Miller BS (Rush); Ritu Ghai MD (Rush); Katherine Kopkash MD (North Shore); Samer Al-khudari MD (Rush)

Introduction: Head and neck metastasis is an uncommon manifestation of oligometastatic breast cancer, and involvement of the scalp as the sole metastatic focus following resection of the primary with adjuvant chemotherapy warrants discussion regarding its presentation, diagnosis, and management.

Objective: Our study is a case report that aims to present a unique case of breast cancer metastasis involving only the scalp.

Methods: Literature review of breast cancer metastasis to the head and neck with discussion of a representative case treated at our institution.

Results: We report the case of a 73-year-old woman with T1N1 cancer of the right breast who underwent right mastectomy and sentinel lymph node biopsy. Pathology after mastectomy revealed grade 2 infiltrative ductal carcinoma with lymphovascular invasion and micro-metastatic carcinoma to the right axillary sentinel lymph node. The primary site specimen was estrogen receptor (ER) positive and progesterone receptor (PR) negative, and recommendations for adjuvant chemotherapy were made. Five months postoperatively, the patient's hairdresser noted a lesion on her scalp. Dermatopathological evaluation by punch biopsies revealed metastatic carcinoma that was ER and PR positive, consistent with a breast primary. Review of the patient's MRI at initial primary diagnosis did not reveal a prior abnormality in the area of the newly metastatic focus. Chemotherapy was discontinued and the patient underwent wide local excision of the metastatic scalp lesion and reconstruction with a full thickness skin graft. The resected tissue contained metastatic carcinoma in greatest dimension with wide tumor-free margins, and the postoperative course was uncomplicated. Adjuvant radiation therapy to the scalp and right breast was considered but ultimately withheld. Three weeks postoperatively, the patient was initiated on anti-hormonal therapy. Eight months post resection of the metastatic focus, there is no evidence of recurrent or progressive disease. Clinical pre and post images are provided.

Conclusion/Significance: Oligometastatic breast cancer involving the head and neck is uncommon, with prior reports describing laryngeal, nasal, and temporal involvement. To our knowledge this is the first case to describe oligometastatic breast cancer metastasis to the scalp.

Abstract #: 15

Session: Poster

Syndrome of Inappropriate Antidiuretic Hormone Secretion due to High-Dose Methotrexate

Authors: Kelsey Romatoski, Sara Brown, PharmD, Allison Byrne, Ariana M. Pavlopoulos, Jennifer Misasi, APN, Paul M. Kent, M.D

Introduction: Standard chemotherapy for osteosarcoma includes high dose methotrexate (HD-MTX), doxorubicin, and cis-platinum with common side-effects including alopecia, mucositis, nausea, vomiting, myelosuppression, cardiotoxicity, nephrotoxicity, and ototoxicity. Although syndrome of inappropriate antidiuretic hormone secretion (SIADH) has been associated with several cancers and chemotherapy drugs, SIADH following HD-MTX is not documented within pediatric patients undergoing osteosarcoma treatment.

Objective: Describe two cases of SIADH following HD-MTX administration.

Methods: We conducted a literature search via PubMed with terms 'methotrexate,' 'SIADH,' and 'osteosarcoma.' We were unable to identify any literature demonstrating SIADH after HD-MTX in patients with osteosarcoma undergoing treatment.

Results: A 14-year-old female and 17-year-old male, both with localized tibia osteosarcoma undergoing standard therapy of HD-MTX, doxorubicin, and cis-platinum, were diagnosed with SIADH following administration of HD-MTX with objective and subjective signs and symptoms of fluid overload. The 14-year-old female experienced edema, 2.0 kg weight gain, mild increase in blood pressure (97/61 to 109/61), and hemodilution (Hb 8.7 to 7.8 g/dL). Specific gravity increased (1.006 to 1.017) 2 hours after HD-MTX with stable creatinine (0.78 to 0.64). Symptoms resolved and lab values normalized after low dose furosemide. SIADH was diagnosed again following her next HD-MTX treatment with resolution after low dose furosemide. Subsequently, low dose furosemide was scheduled with future HD-MTX administration and she had no further episodes of SIADH. The 17-year-old male experienced edema, 3.7 kg weight gain, increase in blood pressure (129/66 to 159/77), and hemodilution (Hb 8.7 to 8.2 g/dL). Specific gravity increased (1.007 to 1.016) 4 hours after HD-MTX with stable creatinine (0.98 to 0.85). Symptoms resolved and lab values normalized after low dose furosemide. After his next HD-MTX treatment, he was diagnosed with SIADH and successfully treated with low dose furosemide again. In both cases, no delay in subsequent chemotherapy or noted side-effects occurred following administration of low dose furosemide.

Conclusion/Significance: Pediatric oncologists treating osteosarcoma with HD-MTX who observe signs and symptoms of fluid retention should consider SIADH as a potential side-effect. Fluid retention causes prolonged exposure to methotrexate and thus, increases risk of toxicity. Furosemide may be an effective treatment for HD-MTX-induced SIADH preventing delay in chemotherapy or undue toxicity.

Abstract #: 16

Session: Poster

PROGRESSIVE PARASPINAL GANGLIONEUROBLASTOMA DUMBBELL TUMOR SUCCESSFULLY TREATED WITH MICROWAVE ABLATION SPARING LAMINECTOMY OR RADIATION IN A CHILD

Authors: Sarah Rumler, DO (RUMC), Nadia Chaudhry-Waterman (VCOM), M. Mafraji, MD (RUMC), A. Ali, MD (RUMC), F. Mir, MD (RUMC), L. Munoz, MD (RUMC), J. Dombrowski, MD (RUMC), P. Kent, MD (RUMC)

Introduction: Neuroblastic tumors are the most common extracranial tumors in pediatric patients. They arise from immature cells of the sympathetic nervous system and are most commonly seen in the suprarenal gland and the paraspinal region. Varying levels of microscopic differentiation can be appreciated, with neuroblastomas being the most malignant and ganglioneuromas being the most benign. Between these two extremes, ganglioneuroblastomas (GNBs) are malignant or potentially malignant tumors, histologically composed of primitive neuroblasts and mature ganglion cells. Traditionally GNBs found in the paraspinal region are treated with radiation or laminectomy, however these procedures carry significant morbidity in the pediatric population.

Objective: To describe a case of progressive paraspinal GNB dumbbell tumor successfully treated with microwave ablation, and therefore sparing the increased morbidity associated with radiation or laminectomy.

Methods: We compared this case to the current literature on the treatment of GNB in pediatric patients. We searched PubMed, Ovid, and Google Scholar. We believe this to be the first reported case of using microwave ablation to successfully treat GNB. A 16-month-old female presented with back pain and leg weakness. Biopsy showed neuroblastoma (NBL) (MYCN (-)), non-metastatic, favorable histology, MIBG-avid, 2.7x2.9x2.9cm paraspinal tumor and was treated according to COG protocol as intermediate risk with 6 cycles of chemotherapy and decompressive laminectomy. Tumor progressed 309% in volumetric size but differentiated into biopsy-proven GNB. At 39-months-old, her lower extremity weakness returned and imaging showed further increase in size, spinal impingement, and increased MIBG avidity. Members of a multi-disciplinary tumor board and second opinions from outside physicians agreed that paraspinal radiation or T2-T8 paraspinal resection would carry significant morbidity. Microwave ablation was performed and the patient experienced near immediate relief of symptoms. At 44-months of age, imaging shows approximately 90% necrosis of the mass and the patient remains symptom free.

Results: No similar cases were found. Literature search demonstrated no reported cases of microwave ablation successfully being used to treat GNB.

Conclusion/Significance: This case suggests that microwave ablation can be used as a more conservative treatment option for symptomatic paraspinal GNB, while sparing the short and longer term morbidity associated with radiation or spinal surgery.

Abstract #: 17

Session: Poster

Tolerability, radiographic response, and efficacy of stereotactic body radiotherapy using volumetric-modulated arc therapy with adjunctive and/or concurrent systemic therapy for oligometastatic adrenal metastases

Authors: Jacob Y. Shin, M.D.(RUMC); Neilayan Sen, M.D.(RUMC)

Introduction: The interaction between stereotactic body radiotherapy (SBRT) and systemic therapy for adrenal metastases is not well known.

Objective: The objective of our retrospective study is to assess the tolerability, radiographic response, and efficacy of stereotactic body radiotherapy (SBRT) using volumetric-modulated arc therapy (VMAT) with systemic therapy for adrenal metastases.

Methods: We identified 15 patients with 16 lesions treated between 2012 and 2017 at a single institution for adrenal metastases. The endpoints analyzed were incidence and severity of treatment-related acute toxicity, local control (LC), and overall survival (OS).

Results: The median follow-up was 15.2 months (range: 1-56.1). The most commonly reported acute toxicity was grade 1 fatigue in 6 patients (40.0%). Two patients (13.3%) had both grade 1 pain and nausea, respectively. No patients experienced grade 2 to 5 acute toxicities, and no late toxicities were reported. Three patients received immunotherapy concurrently with SBRT with two experiencing grade 1 fatigue, and otherwise no other toxicities. For patients receiving chemotherapy, the pre-SBRT administration was last infused at a median of 24.5 days (range: 3-52), and the post-SBRT administration was next infused at a median of 7 days (range: 7-28). Six lesions (40.0%) had a complete tumor response, 4 (26.7%) partial response, 4 (26.7%) stable disease, 1 (6.7%) progressive disease, and 1 patient with one lesion (6.7%) died shortly after discontinuing treatment due to respiratory failure. Two patients (13.3%) experienced local failure at the tumor site corresponding to a LC rate of 100% at 1 year and 80.0% at 3 years. Both patients were noted to have development of fat stranding (7 months and 18 months post-SBRT, respectively) in close proximity to the adrenal metastasis on post-SBRT CT scans prior to diagnosis of local failure. Nine patients (60.0%) died, corresponding to an OS rate of 71.5% at 1 year and 45.4% at 3 years.

Conclusion/Significance: SBRT using VMAT with adjunctive and/or concurrent systemic therapy for oligometastatic adrenal metastases confers durable local control. The combination is safe with low rates of acute and late toxicities. Development of surrounding fat stranding on post-SBRT CT scans may be associated with local failure.

Abstract #: 18

Session: Poster

Age Related DNA Damage and Epigenetics in Brain Cancer

Authors: Adrian Tira MSc (Rush University, College of Health Sciences), Lela Buckingham (RUMC)

Introduction: Gliomas are solid tumors occurring in the brain and spinal cord, originating in the glial cells that surround nerve cells. Based on tumor morphology, the World Health Organization classifies gliomas as low-grade or high-grade, on a scale from I-IV, with Grade IV (Glioblastoma) carrying the worse prognosis. Past studies and research efforts have identified genes and biochemical pathways involved in the development of glioblastoma. This research study investigated genomic hypermethylation and DNA damage in aging brain, as suggestive of an overall effect of epigenetic phenomena in cancer.

Objective: The objectives of this research were to determine if genomic methylation is altered in high grade glioma and to determine the contributions, if any, of DNA methylation and DNA damage to glioblastoma with age.

Methods: Archival fixed tissues from 127 cases of glioblastoma and adjacent nonmalignant tissues were included in this study. Enzyme-linked immunosorbent assay (ELISA) was used to determine global methylation and DNA damage of samples. This non-competitive assay uses specific antibodies with a high DNA affinity detecting 5-methylcytosine (5-mC). Quantification of the methylated fraction of the DNA was based on colorimetric detection. DNA damage was similarly measured targeting 8-hydroxy-2'-deoxyguanosine (8-OHdG), a sensitive marker of oxidative DNA damage resulting from radiation, smoking and other factors.

Results: A Kruskal-Wallis test revealed a significant decrease ($p = 0.002 < 0.05$) in genomic methylation in glioblastoma compared to non-malignant brain tissue, consistent with tumor hypomethylation. Methylation levels also decreased with age from 0.20 pg% in patients older than 60 to 0.06 pg% in patients younger than 20. No difference in the degree of DNA damage was observed between the non-malignant and tumor tissue, possibly due to field effect. There was marginally increased DNA damage in older patients (>60 ; $p=0.059$), compared to the younger population in both tissue types.

Conclusion/Significance: These data support a role for genomic hypomethylation in glioblastoma. Such epigenetic factors could potentially promote tumorigenesis in younger patients with glioblastoma given the degree of hypomethylation and slightly less DNA damage compared to the older group. This could lead to more patient-specific treatment strategies in brain cancer.

Abstract #: 19

Session: Poster

Measuring Epigenetic Variation in Malignant Gliomas: Why Treatment Has Not Improved in Decades and How High-Throughput Can Help

Authors: Matthew Trawczynski, BA (Rush Medical College); Andrei Mikheev, MD, PhD (Houston Methodist, UW); Daniel Mar (UW); PJ Cimino, MD, PhD (UW); Luis Gonzalez-Cuyar, MD (UW); Robert Rostomily, MD (Houston Methodist, UW); Karol Bomsztyk, MD (UW)

Introduction: Epigenetic processes, which are reversible and druggable, are thought to play an important role in tumorigenesis. While intra-tumor phenotypic heterogeneity is well known to be associated with a worse prognosis, little is known about intra-tumor epigenetic heterogeneity (ITEH). The progress in understanding ITEH has, until now, been hampered by lack of efficient technologies to study multiple samples from the same tumor and from different individuals. We applied novel high-throughput sample preparation (PIXUL), chromatin (Matrix-ChIP) and transcript (RT-qPCR) platforms to explore a correlation between ITEH (permissive and repressive marks, gene expression) and glioma tumor grade.

Objective: We hypothesized a correlation between glioma tumor grade and ITEH, as well as differences in heterogeneity between permissive vs. repressive epigenetic marks and gene expression.

Methods: 8 brain tumors (3 GBM, 3 Grade III AA/AO, 2 control normal brain tumors) were sectioned into 5 regions each, with 1 matched adjacent normal tissue sample collected per tumor (n=48; UW IRB approved). We performed high throughput PIXUL-ChIP-qPCR and RT-qPCR at known glioblastoma stem cell (GSC) and epithelial-mesenchymal transition (EMT) oncogene loci. Epigenetic data were correlated with blinded neuropathology histology scoring.

Results: ITEH increased with tumor grade for the marks studied ($p=0.001$). DNA methylation (5mC and 5hmC) as well as gene expression showed significantly higher ITEH than either permissive or repressive marks, and RNA polymerase II density (measure of transcription) at these loci. Among the genes analyzed, HIF1A and NANOG were most heterogeneous while SOX2 (a key GBM oncogene) and ZEB2 were least heterogeneous along with housekeeping genes.

Conclusion/Significance: To our knowledge this is the first report to show that ITEH increases with tumor grade in gliomas, and that ITEH is both mark and gene dependent. Cancer dependency genes (e.g. SOX) whose expression is altered and ones that exhibit the least ITEH for a particular mark could be effective targets for epigenetic therapies. Thus, high-throughput epigenetic platforms provide powerful means to study ITEH in the identification of more robust epigenetic drug targets.

Abstract #: 20

Session: Poster

Comparison of Screening Electrocardiogram and Transthoracic Echocardiogram Abnormalities with ASCVD Risk Score among Community Dwelling Women

Authors: Arianne Clare C. Agdamag, MD (Rush); Joanne Michelle D. Gomez, MD (Rush); Kumar B. Rajan, PhD (Rush); Emma Fleisher (Tufts); Isabel Kats (Tulane); Neelum T. Aggarwal, MD (Rush); Lynne Braun, PhD, CNP (Rush); Rupa Sanghani, MD (Rush); Kim A. Williams, MD

Introduction: Increased detection of heart disease in women has been advocated nationally in recent years. The atherosclerotic cardiovascular disease (ASCVD) risk score was validated as determinant of the 10-year risk for first occurrence of nonfatal myocardial infarction, coronary heart disease death, or fatal or nonfatal stroke, cerebrovascular disease, and peripheral artery disease in 2013. While measurement of blood pressure, glucose, and lipid levels are common in screening, the utility of non-traditional methods such as electrocardiogram (ECG) and transthoracic echocardiography (TTE) remains unknown.

Objective: In this study, we examined the association of ECG and TTE abnormalities with ASCVD risk score among asymptomatic women from a community-based event.

Methods: Data were gathered from 355 women (mean age 53 ± 13 years, 24.2% African American, 59.7% Caucasian, 6.2% Hispanic, 9.9% Others) from a voluntary cardiovascular community screening event sponsored by the 2BigHearts Foundation and Rush University Medical Center in February 2007 and May 2008. Demographics, lipid panel, blood pressure, self-reported medication lists, co-morbidities, screening TTE, and screening ECG were obtained. The 10-year ASCVD risk score was ascertained for the cohort (283 persons, 79.7%). Chi-square testing was used to determine association of ECG and/or TTE abnormalities with ASCVD risk score.

Results: The average ASCVD risk score for the entire cohort was 5.49%, with a range from 0.1-49.2. The mean ASCVD risk score was elevated in patients with either ECG or TTE abnormalities compared to those with normal findings (ECG: 7.59 ± 9.46 vs. 4.62 ± 5.39 , $p < 0.0014$; TTE: 8.19 ± 10.12 vs. 4.81 ± 5.73 , $p < 0.037$). The presence of both ECG and TTE abnormalities was associated with a higher mean ASCVD risk score compared to having either ECG or TTE abnormalities alone (ECG+TTE: 13.07 ± 14.32 vs. ECG: 5.7 ± 6.19 vs. TTE: 5.27 ± 4.65 , $p < 0.006$).

Conclusion/Significance: Detection of ECG and/or TTE abnormalities are associated with elevated ASCVD risk scores in this cohort of asymptomatic women and could potentially identify patients at higher risk for cardiovascular events, and facilitate aggressive risk factor modification. Further studies are needed to confirm ECG and TTE as viable additional screening tools to traditional risk screening.

Abstract #: 21

Session: Poster

Exploring the Development of a Standardized Respiratory Care Language

Authors: Zoë Bilello, BA, BFA (RU); Bethlehem Markos, BSc (RU); Courtney Wesley, BSc (RU); Constance Mussa, PhD, RRT-NPS (RUMC); and Ellen A. Becker, PhD, RRT-NPS, RPFT, AE-C, FAARC (RUMC)

Introduction: Standardized terminologies support unambiguous, concise descriptions of health problems and conditions to facilitate clear and consistent communication between caregivers, patients, and the public. The benefits of recording and maintaining indexed terminologies include: increased transparency regarding the association between interventions and outcomes, enhanced safety and quality of care through more effective clinical documentation, and demonstration of healthcare providers' value. While standardized terminologies exist for specific groups of healthcare practitioners, it is apparent that a standardized language for the respiratory care profession is needed.

Objective: To create a standardized terminology relevant to cardiopulmonary problems for which respiratory therapists provide diagnostic and therapeutic interventions.

Methods: Practicing respiratory therapists and respiratory therapy students worked in small groups to develop a standardized terminology of frequently encountered problems specific to cardiopulmonary dysfunction guided by the grounded theory approach. Descriptive labels were sourced from discussions of clinical practice, experience in the clinical setting, respiratory care coursework, textbooks, peer-reviewed journals, and detailed content outlines for respiratory care licensing examinations. Each group developed a list of 20 patient problems encountered on a daily basis by respiratory therapists. Content validity of the descriptive labels and initial definition of each patient problem was assessed by expert respiratory therapists. Once the patient problem lists were refined, each patient problem was defined using the NANDA International, Inc. Nursing Diagnoses format.

Results: A fragment of a respiratory care domain ontology was generated from the finalized patient problem lists. Six categories and fourteen sub-categories of respiratory care patient problems were identified based on similarity of etiological characteristics.

Conclusion/Significance: Standardized terminologies such as the Systematized Nomenclature of Medicine - Clinical Terms (SNOMED-CT) and the World Health Organization International Classification of Functioning Disability and Health (ICF) have improved many aspects of the healthcare process. A standardized respiratory care language is essential to support evidence based practice, respiratory care research, and education, and enables respiratory therapists to clearly demonstrate their valuable contribution to patient care. A respiratory care ontology can be created, validated, and expanded in the future to include additional patient problems. However, it would require testing in clinical applications before adoption and mapping to SNOMED-CT.

Abstract #: 22

Session: Poster

Heart Failure Transition Program: An Interdisciplinary Approach to Reducing Heart Failure Readmissions

Authors: Amanda C. Cornick (Rush University) and David W. Jung (Rush University)

Introduction: As of October 1, 2012, the Patient Protection and Affordable Care Act required healthcare systems to reduce 30-day heart failure readmissions or receive lowered reimbursement. A lack of transitional care services has led to a readmission rate of 21.9% nationally and 27.5% at Rush University Medical Center (RUMC). In response, the Heart Failure Transition Program (HFTP) was instituted on November 1, 2016 to decrease heart failure (HF) readmissions to below 20%.

Objective: The purpose of this project was to: (1) decrease 30-day heart failure readmission to below 20%, (2) enhance care coordination for heart failure patients from inpatient through 30 days post-discharge, (3) increase follow-up appointment compliance at RUMC, and (4) increase engagement in self-care management for heart failure patients via newly designed education materials.

Methods: The HFTP is guided by a care delivery approach where each team member interacts with the patient at a specified time point beginning at admission and ending at 30 days post-discharge. While admitted, patients meet with a nurse case manager to coordinate post-acute care needs and a social work case manager to reduce barriers to care. A follow-up appointment with a cardiac nurse practitioner or cardiologist is scheduled within 10 days of discharge.

Results: Outcomes are tracked through manual collection of data in Epic. From November 2016 through May 2017, monthly readmissions rates ranged from 14.29% to 25.58%, resulting in a cumulative readmission rate of 18.71%.

Conclusion/Significance: Based upon this study, it is recommended to increase comprehensive transitional care services to reduce readmission rates. Cardiology follow-up should occur within 7 to 10 days and primary care follow-up should occur within 30 days.

Abstract #: 23

Session: Poster

Association Between Thoracic Irradiation and Increased Progression of Coronary Artery Calcium

Authors: Mark A. Davison (RUMC); Anel Yakupovich (RUMC); Michael Z. Kharouta (RUMC); Julius Turian (RUMC); Christopher W. Seder (RUMC); Marta Batus (RUMC); Dinesh Kalra (RUMC); Mark Kosinski (RUMC); Tuncay Taskesen (RUMC); Tochukwu M. Okwuosa (RUMC)

Introduction: Thoracic irradiation (TIR) is associated with increased risk of coronary artery disease (CAD) and coronary death. Coronary artery calcium (CAC) is the result of coronary plaque accumulation and has been shown to predict CAD and overall cardiovascular mortality. We hypothesized that TIR in lung cancer patients receiving radiotherapy would be associated with CAC progression.

Objective: To determine if TIR is associated with CAC progression

Methods: We evaluated CAC progression (pre- and post-TIR) from chest CT scans of lung cancer patients identified from a cancer registry at an urban academic medical center. A 2:1 matched control population was established controlling for age, gender, race, and CT scan interval. Vessel-specific CAC progression and extension in pre- and post-interval CT studies was evaluated by 2 independent reviewers using existing standard methodologies. Whole heart and the left anterior descending (LAD) coronary artery were retrospectively segmented on the CT study used for treatment planning. The volume of each structure and associated dose metrics were obtained using the standard tools available in the Pinnacle Treatment Planning software. Chi squared tests were used to compare vessel-specific CAC progression (increase in CAC volume) and extension (CAC lengthening within a vessel) between groups. Pearson correlation analysis explored associations between radiation volume and CAC progression.

Results: We included 35 patients and 65 controls (50% female). Mean and max whole heart TIR doses: 13.5 Gy (95% CI 10.3-16.7 Gy) and 52.1 Gy (95% CI 46.2 - 58.0 Gy); LAD: 21.4 Gy (95% CI 16.0 - 26.8 Gy) and 34.9 Gy (95% CI 28.7 - 41.1 Gy), respectively. CAC progression and extension in LAD and left circumflex coronary artery (LCx) were significantly greater in patients vs. controls ($p < 0.03$ for all). There was statistically significant correlation between LAD radiation volume and CAC progression in the left main coronary artery (LM) ($r = 0.33$, $p = 0.05$).

Conclusion/Significance: TIR is associated with CAC progression in the LAD and LCx. For LAD and LM, the CAC progression correlated with the irradiated volume of these structures although neither a dose nor a volume threshold could be established. Future studies examining the utility of CAC screening for radiation-induced CAD and cardiovascular mortality are required.

Abstract #: 24

Session: Poster

RELEVANCE OF InsP3 RECEPTOR ROS REGULATION IN ATRIAL MYOCYTES

Authors: Jaime DeSantiago, Physiology & Biophysics Kathrin Banach, Internal Medicine/Cardiology

Introduction: In atrial tissue InsP3 induced stimulation of InsP3 receptor type 2 (InsP3R2) signaling has been linked to positive inotropy as well as to increased arrhythmic Ca²⁺-dependent after-depolarizations. InsP3 production in atrial myocytes is regulated through Gq protein coupled receptors like α_1 -adrenergic, endothelin-1 or Angiotensin II receptors and concomitant stimulation of PLC.

Objective: Here we tested the hypothesis that post-translational modifications of InsP3Rs in cardiomyocytes have significant consequences for cardiac excitation-contraction.

Methods: Superfusion of field stimulated mouse atrial myocytes with AngII (1 μ M) induced a significant increase in diastolic [Ca]_i, the Ca transient amplitude as well as arrhythmic after-depolarizations. This increase in [Ca]_i was suppressed by treatment of the cells with the InsP3R2 blocker 2APB as well as by the PLC inhibitor U73122 supporting the involvement of IICR in this process. Simultaneously to changes in [Ca]_i, AngII promotes the stimulation of NADPH oxidase (NOX2) dependent ROS production.

Results: To determine if ROS contributes to AngII induced changes in [Ca]_i the experiments were repeated in mice deficient for the expression of NOX2 (gp91phox^{-/-}, p47phox^{-/-}). In NOX2 KO atrial myocytes, AngII remained without effect on [Ca]_i supporting the notion that the IICR mediated increase in [Ca]_i depends on presence of NOX2/ROS. ROS-dependent S-glutathionylation of InsP3R increases their affinity to InsP3 whereas it increases the ryanodine receptors (RYR) open probability. To determine the role of S-Glutathionylation, atrial myocytes were superfused with Diamide (100 μ M). Diamide, comparable to AngII, induced an increase in basal and Ca transient amplitude leading to arrhythmic events. The change was reversible upon superfusion with the antioxidant DTT (1mM) and preventable by pre-treatment with 2APB.

Conclusion/Significance: The data support that ROS-dependent regulation of IICR plays a prominent role in the regulation atrial [Ca]_i handling properties and is a sensitive readout for NOX2/ROS production.

Abstract #: 25

Session: Poster

Takotsubo Cardiomyopathy Mortality: Racial Differences, Gender Association, and Trends from 2003-2012

Authors: Joanne Michelle Gomez, M.D. (RUMC), Jiaqi Hu (Stanford); Katie Hastings, M.P.H. (Stanford); Latha Palaniappan, M.D. (Stanford); Annabelle Volgman, M.D. (RUMC)

Introduction: Takotsubo cardiomyopathy (TCM) is a syndrome characterized by left ventricular apical ballooning with similar presentation as myocardial infarction. Though TCM is known for female predominance and favorable prognosis, small studies have described mortality up to 3.2%, with males having worse prognosis. There is knowledge gap on the racial predisposition and gender predilection for TCM.

Objective: The purpose of this study is to determine the association of race and gender with TCM mortality. The study also aims to recognize possible health disparities among racial groups using longitudinal mortality trends.

Methods: U.S. mortality records from the National Center for Health Statistics (NCHS) from 2003-2012 were examined for adult deaths at ages >25 years (n=23,290,842) due to TCM, stratified by race (Asian, Black, Hispanic, White) and gender. Direct-standardized age-adjusted mortality rate (AMR) and proportional mortality ratio (PMR) were determined among the racial groups compared to Whites, and mortality due to TCM was trended longitudinally by year and race. Chi-square test was used to determine association between gender and TCM mortality in racial groups.

Results: Takotsubo cardiomyopathy accounted for 0.018-0.043% of all-cause mortality from 2003-2012. Whites had the highest TCM mortality risk from both AMR and PMR (AMR: 2.5 times higher than Asian and 1.9 times higher than Hispanics; PMR: double the risk in Asians and Hispanics, and 27% more than Blacks). Subgroup analysis revealed a significantly increasing TCM mortality trend in Blacks ($p<0.0001$) and Whites ($p<0.0001$), but not among Hispanics ($p=0.1866$) and Asians ($p=0.3599$). No significant association between TCM mortality and gender was observed among all racial groups ($p=0.0634$).

Conclusion/Significance: TCM is a rare cause of death, with increased mortality in Whites compared to Asians, Blacks, and Hispanics. The lack of proportionate increase in mortality trend in the Asians and Hispanics could represent underdiagnosis in these sub-populations. Gender did not play a role in TCM outcomes, in contrast to prior studies.

Abstract #: 26

Session: Poster

Atrial calcium alternans can be prevented by the shortening of action potential

Authors: Giedrius Kanaporis (Rush); Jaime DeSantiago (Rush); Zane M. Kalik (Rush); Kathrin Banach (Rush); and Lothar A. Blatter (Rush)

Introduction: Alternans is a risk factor for cardiac arrhythmia, including atrial fibrillation. At the cellular level alternans manifests as beat-to-beat alternations in contraction strength, action potential (AP) duration and magnitude of the Ca transient (CaT). Bidirectional coupling between AP and intracellular Ca cycling plays a key role in the generation of alternans, however, the precise mechanisms are still unknown.

Objective: Determine the role of AP morphology for the induction and development of CaT alternans in atria.

Methods: Pacing-induced AP and CaT alternans were studied in isolated rabbit atrial myocytes using combined Ca imaging and electrophysiological measurements. Atrial repolarization alternans were monitored also in Langendorff perfused intact hearts.

Results: Development of CaT alternans was strongly affected by AP morphology. APs of longer duration and beat-to-beat alternations in AP morphology lowered the pacing frequency threshold and increased the degree of CaT alternans. AP morphology contributed to the development of CaT alternans by affecting diastolic sarcoplasmic reticulum (SR) Ca levels and the efficiency of L-type Ca currents to trigger SR Ca release. Pharmacological modulation of AP morphology determined the severity of Ca alternans. Inhibition of Ca-activated Cl channels reduced beat-to-beat AP alternations and prolonged AP duration, but failed to suppress Ca alternans. In contrast, AP shortening induced by K channel agonists ML277 and NS1643, activating Kv7.1 and Kv11.1 channels respectively, significantly reduced the degree of Ca alternans in field-stimulated and current-clamped atrial myocytes. K channel activators had no effect on the degree of Ca alternans in voltage-clamped cells, demonstrating that suppression of Ca alternans was primarily caused by the changes in AP morphology. Finally, activation of Kv11.1 channel significantly reduced the degree of or even abolished pacing induced atrial T-wave alternans in isolated Langendorff perfused hearts, demonstrating that AP shortening is a potential intervention to prevent alternans at whole heart level.

Conclusion/Significance: Alternation in AP morphology plays a significant role in the development and stabilization of atrial alternans. The demonstration that CaT alternans can be controlled or even be prevented by modulating AP morphology has important ramifications for arrhythmia prevention and therapy.

Abstract #: 27

Session: Poster

Correlation between clinical symptoms and flow-volume loop abnormalities in patients suspected to have vocal cord dysfunction

Authors: Suzanne LaBelle BS, Neha Sharma BS, Mollie Brinkman BS, RRT, RPFT, Sarah Peterson PhD, RD, and Girish Sharma MD, FCCP, FAAP

Introduction: Vocal Cord Dysfunction (VCD) is an under-recognized condition characterized by paradoxical movement of vocal cords during inspiration, or a tonic contraction phase resulting in a narrowed glottis, leading to airflow obstruction causing wheezing, chest tightness, and shortness of breath. Symptoms can be either exercise induced (EIVCD) or provoked by psychological symptoms, referred to as spontaneous VCD (SVCD). VCD is often misdiagnosed as asthma, resulting in overuse of medications, frequent preventable hospitalizations and intubations. When correctly diagnosed, VCD is easily treatable by speech therapy. Laryngoscopy, a somewhat invasive and distressing procedure, is the current gold standard for diagnosis.

Objective: This study aims to determine the relationship between flow-volume loop abnormalities and VCD diagnosis.

Methods: After approval by the IRB, we performed a chart review of exercise challenge test results during the last 5 years for pediatric patients. Information was collected on flow-volume loop results, patient age, gender, presenting symptoms, presence of asthma, comorbidities, treatment or therapy prescribed, and therapy outcome. Logistic regression was used to determine the association between collected variables with VCD diagnosis.

Results: Data from 147 patients was analyzed. 61% (n=89) were female with a mean age of 15.3 ± 3.1 years. 56% (n=82) of the patients had a diagnosis of VCD. Patients with VCD were significantly more likely to have an inspiratory abnormality on all volume-flow loops including truncation, indentation, or partial truncation. They were also more likely to have an FEV/FEF inconsistent with a diagnosis of asthma.

Conclusion/Significance: This study shows preliminary support for the use of exercise challenge testing with volume-flow loops as a component of VCD diagnosis. The current gold standard diagnosis of VCD via laryngoscopy entails a somewhat invasive procedure that can cause distress to an already vulnerable pediatric population. In order to avoid misdiagnosis of VCD and distress from laryngoscopy, we will continue to seek clinical features most related with flow volume loop abnormalities to develop a scoring system, and ultimately provide a reliable, noninvasive, and cost-effective diagnostic tool for VCD. We plan to use the VCD diagnostic scoring in a future prospective study and correlate with endoscopic findings.

Abstract #: 28

Session: Poster

Race and Socioeconomic Status are strongly associated with Racial Disparities in Cardiovascular Health and Outcomes in Chicago

Authors: Claudia D Ofori-Marfoh (RMC); Caroline Volgman (Vanderbilt University), Annabelle Volgman (RUMC), Sarah Alexander (RUMC), IL, Kim Williams, (RUMC).

Introduction: The unique distribution of Chicago's population along racial/ethnic lines promotes disparity in Cardiovascular Disease (CVD) prevalence and higher mortality in certain racial groups and neighborhoods. We sought to identify the factors contributing to racial disparities in cardiovascular (CV) health, interventions that have been initiated to address these risk factors and lastly, solutions to decrease this gap in Chicago.

Objective: We hypothesize that unique risk factors put certain racial groups, especially African Americans (AAs), at greater risk for CVD and mortality.

Methods: Literature search was performed using PubMed, Scopus and Chicago Department of Public Health (CDPH) Epidemiological database with the search terms health disparities, CVD, mortality, life expectancy and Chicago to identify contributing factors to racial disparities in CV health and outcomes.

Results: Race and socioeconomic status (SES) were repeatedly significantly associated with increased prevalence of CV risk factors. One study found no association between residence in a primary care health provider-deprived area and increased prevalence of CV risk factors after adjusting for SES and race. Elderly African Americans (AAs) had poorer control of hypertension (45% vs 51%, $p < 0.001$) relative to Non-Hispanic Whites (NHWs) regardless of their Medicare eligibility status and after adjusting for potential confounders such as SES and obesity. Life expectancy for AAs was the lowest at 71.7; Hispanics the highest at 84.6; and NHWs at 78.8 years. CVD claims the most lives in Chicago with AAs at greatest risk for CVD mortality contributing to unfavorable longevity in this racial group. Interventions identified include city-level efforts such as the Healthy Chicago 2.0 initiative and partnerships with public, community and healthcare organizations striving to narrow the health disparities gap.

Conclusion/Significance: AAs in Chicago suffer the greatest burden of CVD and mortality with studies strongly suggesting that race, itself, and SES are leading players in this racial disparity. This awareness is necessary to effectively tackle the disproportionate burden of CVD in this subgroup.

Abstract #: 29

Session: Poster

Evaluating fraction of oxygen extraction in splanchnic, renal, and cerebral circulation in extremely low birth weight infants

Authors: Claire O'Grady (Rush), Dr. Robert Kimura (Rush)

Introduction: Patent Ductus Arteriosus (PDA) occurs when the fetal connection between the pulmonary artery and aorta remains patent after 72 hours of birth, and is clinically symptomatic in 55-70% of infants delivered below 1000g or prior to 28 weeks of gestation. Indomethacin is currently the leading option for medical closure of PDA. However, it may increase the risk of gut ischemia, as Indomethacin can decrease blood flow in mesenteric circulation. At the same time, the exact likelihood of experiencing complications from PDA is poorly understood, and the best tool has not been delineated for identification of infants at greatest risk of adverse effects. Near infrared range spectrophotometer (NIRS) is a noninvasive bedside tool that is able to continuously monitor tissue oxygenation that potentially may be used to indicate hypoxia.

Objective: Using NIRS, this study aims to evaluate the effects of PDA on intestinal, renal, and cerebral blood flow and oxygen saturation before PDA closure, during treatment with Indomethacin, and after PDA closure. This data will also be evaluated against data from premature infants without PDA, to understand normal physiologic perfusion patterns in the first weeks of life.

Methods: A sample size of 10 infants is anticipated, with post-conceiving age less than 36 weeks and birth weight less than 1000 g -5 subjects with PDA and 5 without. After enrolling the baby at day three of life, three NIRS probes (FS -Elite Absolute Tissue Oximeter) are applied. Readings for both NIRS and pulse oximeter are recorded until 14 days of life. (IRB: 17052603-IRB01)

Results: Data collection is ongoing, but preliminary studies (three patients) measuring fractional extraction of oxygen (FEO₂) by the splanchnic system with NIRS indicated that patients with PDA have a high FEO₂ (60-70%). Following closure of the PDA, the FEO₂ decreased to 20%. These results supported our initial hypothesis that a decrease in splanchnic perfusion caused by left-to-right shunt through a PDA will result in an increase in the FEO₂ by the splanchnic organs.

Conclusion/Significance: We believe that obtaining continuous data about fractional oxygen extraction and perfusion will aid in the timely evaluation of PDA severity and the hemodynamic risks of Indomethacin administration.

Abstract #: 30

Session: Poster

Drugs Prescribed at Hospital Discharge after Surgery for Pain Control

Authors: Ashley Adams, BS (Rush), Sherry J. Robison, MBA (Rush), Mario Moric, MS (Rush), Jeffrey S. Kroin, PhD (Rush), Asokumar Buvanendran, MD (Rush)

Introduction: In the U.S., 45 million in-patient surgeries are performed annually. A recent publication showed that the number of opioids prescribed at hospital discharge after surgery and the number of opioids actually taken are significantly different. There is also concern about how patients dispose of leftover opioid medications.

Objective: Therefore, we wanted to evaluate if overprescribing opioids was a practice in an academic center where the awareness of opioid crisis is well known. We would like to examine what medications patients were prescribed at hospital discharge to control pain, and what medications patients actually used over the following 4 weeks to control their pain.

Methods: With Institutional Review Board approval, written informed consent was obtained from each subject prior to discharge. At discharge, the subjects were asked a set of questions about their pain experience and medications. Specifically, their Pain Intensity on NRS scale and medications prescribed for pain control. After discharge, patients were called every 7 days (± 2 days) for up to 4 weeks and asked a similar set of questions about their postoperative pain experience. Opioid consumption and NRS scores at different time points were compared using the repeated measures mixed procedure with post-hoc tests adjusted using the Tukey method.

Results: Questionnaires were obtained from 143 subjects. Figure 1 shows that the greatest use of medications was in the 1st week and decreased steadily over the remaining weeks. Mean opioid medications morphine equivalence given at discharge was 1144 mg total or 286 mg per week, and the mean actual used morphine equivalent per week was significantly lower, 131 mg per week. Pain scores showed a decrease from 3.7 (2.3) in the 1st week to 2.1 (2.1) in the 4th week.

Conclusion/Significance: At RUMC, the amount of opioid medications consumed was significantly lower than the amount prescribed, indicating that much of the prescribed medications were not utilized by the subjects. Due to the high variability of the amount of medications used, prescribing practices seem to vary greatly by patient population and/or diagnosis. Further stratification based on patient's parameters should help to further refine our understanding of prescribing practices, opioid use and adherence.

Abstract #: 31

Session: Poster

Respiratory Therapists' Awareness and and Intention to Use the Electronic Modified Early Warning Score (MEWS)

Authors: Afnan Al-Raimi MS, RRT (Rush) Constance Mussa (Rush)

Introduction: The modified early warning score (MEWS) detects early clinical deterioration in patients to prevent catastrophic events. Respiratory therapists usually do not use the MEWS even though it is implemented as a default in the electronic health record (EHR) system. To optimize patient care, clinicians could use special guidelines and protocols that incorporate the MEWS.

Objective: To determine if an educational intervention designed to increase respiratory therapists' knowledge of the MEWS would influence their intention to use the MEWS.

Methods: A web-based self-administered survey based on the constructs of the TAM as well as awareness, attitude, and job-relevance was developed and validated using traditional scale development process and distributed to 75 respiratory therapists (RTs) from the respiratory care department of Rush University Medical Center. RTs were recruited for participation in the study using consecutive sampling. The RTs were then given a training session on the MEWS after which they were again asked to complete the survey.

Results: The response rate to both the pre and post survey was 60 percent. Of the 46 participants recruited to the study, the educational intervention elicited an increase in the MEWS knowledge score in 45 participants compared to the knowledge score prior to the educational intervention. Additionally, there was an increase in the behavioral intention score post intervention in 30 participants compared to the behavioral intention score prior to the educational intervention. A Wilcoxon signed-rank test determined that there was a statistically significant median increase in MEWS knowledge score (2.0) post educational intervention (4.0) compared to pre educational intervention (2.0), $p < .0005$. There was also a statistically significant median increase in behavioral intention score (0.667) pre educational intervention (4.0) compared to post educational intervention (3.0), $p < .0005$.

Conclusion/Significance: Numerous studies over the last four decades have demonstrated that change in behavioral intention is a good predictor of change in behavior. Consequently, the increase in the respiratory therapists' behavioral intention score post MEWS education suggests that they may be more inclined to incorporate the MEWS score in their assessment of patients if they are educated about its clinical relevance.

Abstract #: 32

Session: Poster

New Hire Skills Standardization: Putting the Piece Together to Decrease High Risk Care Variation and Improve Clinical Nurse Specialist Role Efficiency

Authors: Shirley Ambutas, DNP, APRN, CCRN-K, CCNS; Barb Gulczynski, DNP, APRN, CCRN-CMC; Jessica Margwarth, MSN, APRN, AGCNS-BC

Introduction: In January 2017, the CNS team developed and implemented a 4 hour new hire registered nurse (RN) skills event occurring the week post general-nursing orientation (GNO). During the event, nursing best practices focused mainly on a standardized curriculum with didactic and hands-on experiences in the Clinical Simulation Laboratory. Curriculum topics included: trends in patient safety, low volume-high risk skills, and concerns impacting clinical practice and nursing quality indicators. This project included new hire RNs onboarding to adult critical care, medical, surgical, emergency department, or rehabilitation nursing units.

Objective: The learner will be able to perform a new hire RN needs assessment and will understand how to develop curriculum to standardize education of high risk skills in a simulated setting.

Methods: The effectiveness of the skills lab was measured with pre and post-surveys of orientees' knowledge and comfort with subjects and skills included in the curriculum, pre and post-surveys to the CNS group to measure individual versus team work, and a six month evaluation regarding how this lab helped staff function better in their respective units.

Results: Since skills lab implementation, more than 180 adult new hire RNs have attended. Evaluation results show that nurses who attend skills lab report a higher level of confidence than the group who did not attend skills lab at three months.

Conclusion/Significance: Results demonstrate positive participant feedback, improved CNS role efficiency and decrease practice variations at the point of care across the involved units.

Abstract #: 33

Session: Poster

Correlating Demographics, Screening Modalities, and Health Literacy in an Urban Emergency Department

Authors: Samuel Auger BA (RUMC) Sonali Gandhi, M.D., (CCHHS) Jason Murphy, M.D., (CCHHS) Katrece Outlaw, M.D., M.P.H., (CCHHS) Toni Riveros, M.D., M.P.H., (CCHHS)

Introduction: Emergency department (ED) patients with low health literacy often have worse outcomes. Screening modalities like the Short Test of Functional Health Literacy in Adults (STOFHLA) have been validated in English-speaking clinic patients but rapidly and effectively identifying low health literacy in the ED setting is limited.

Objective: We aimed to identify alternative screening questions from past studies to replace the lengthier STOFHLA.

Methods: This was a cross-sectional study of English and Spanish-speaking patients in an urban ED. A convenience sample of patients was approached by a research associate weekdays 7am-11pm to complete a survey of demographic data, the STOFHLA, and three screening questions. The STOFHLA grades health literacy via reading comprehension on a scale of 0-36. Scores of 0-22 indicate inadequate to marginal literacy. Medically cleared patients were ineligible if altered for any reason, visually impaired, imprisoned, had major trauma, or admitted to an ICU. A two stage multiple regression was conducted with the STOFHLA score as the dependent variable. After controlling for statistically significant demographic factors we determined which of three screening questions impacted the STOFHLA score.

Results: From December 2016 to November 2017, 411 patients were approached with 32 unwilling or unable to participate. 379 (318 English, 61 Spanish) were enrolled. 48% of English-speaking patients had inadequate or marginal health literacy (95%CI 42-53), and 64% of Spanish-speaking patients had low literacy (95%CI 51-76). Factors impacting low literacy were: age, Asian/Pacific Islander, and lack of high school education ($R^2=0.329$ $F(5,307)=30.07$, $p<.001$). Only the question 'How often do you have someone (like a family member, friend, hospital/clinic worker or caregiver) help you read hospital materials?' influenced scores when controlling for demographic factors ($R^2=0.369$, $F(8,304)=22.2$, $p<.001$).

Conclusion/Significance: Low health literacy is a serious, under addressed issue in over half of the patients screened in our study. We found that screening for patients who seek assistance with written materials may be a useful proxy for recognizing low health literacy. More work is needed to develop screening tools to identify these patients more efficiently.

Abstract #: 34

Session: Poster

A community outreach program to improve pediatric influenza immunization

Authors: Katherine Bauer, DNP-C, BSN, RN (Rush University)

Introduction: Despite ongoing public health initiatives to increase pediatric influenza immunization rates to at least 80%, few U.S. health centers have met this goal. Absent and delayed influenza immunity pose individual and societal risks such as uninhibited disease transmission, hospitalizations, and death due to vaccine-preventable cases of influenza and its complications in children under two years of age. To decrease pediatric morbidity and mortality from influenza, a quality improvement program at an urban federally-qualified health center elicited parents' perceptions of the influenza vaccine and designed a program based on their feedback to increase immunization rates.

Objective: This program aimed to increase the influenza immunization rate among children ages 6-24 months from 57% in 2016 to 67% in 2017-2018.

Methods: To identify underlying causes of and barriers to influenza immunization, an open-ended telephone survey was created and administered via randomized sampling to 30% of parents whose children were eligible for the influenza immunization. Based on a literature review and the parents' survey responses, a program was designed that included reminder calls, parent education, proactive appointment scheduling, and social media reminders.

Results: As of January 2018, 56% of the target population (n=166) received both doses of the influenza vaccine. This program will continue through March. Assuming the trend increases as it has been, this program is expected to surpass last year's rate.

Conclusion/Significance: This community-based program appears to be on track for increasing pediatric influenza immunization rates as compared to last year. Limitations included initiating the program after flu season began, unfeasibility to implement text message reminders per parents' requests, and inability to reach patients who have not had an appointment in over a year. Childhood immunization is a critical priority to protect the health and wellness of children. According to parents, the primary barriers to influenza immunization included forgetfulness, unawareness that the vaccine can be given at age 6 months, and beliefs that the vaccine is unnecessary and causes a flu-like reaction. Programs that specifically target immunization efforts towards parental concerns have the potential for increased acceptance, increased immunization rates, and decreased morbidity and mortality from infectious disease.

Abstract #: 35

Session: Poster

Improving Chemotherapy Education Process and Patient Experience

Authors: Ellen Berg MSN, RN, OCN Jennifer Lerner MSN, RN, OCN

Introduction: In the past, the new patient chemotherapy education process entailed a visit with one of several nurses with varying levels of knowledge and experience. No formal written guidelines for content or materials provided were utilized. The infusion nurses discovered that some patients did not have teaching prior to their first treatment. The nurse assigned to the patient was tasked with providing education at their initial chemotherapy visit. This is suboptimal as the nurses felt unprepared; not having appropriate time to educate the patient.

Objective: To standardize the chemotherapy teaching process for new patients to improve the overall patient experience and increase compliance of education sessions being completed appropriately prior to initiation of chemotherapy.

Methods: A subcommittee was formed to investigate the need for a process change. They examined the current process as mentioned above. Designated team members performed a literature search on chemotherapy teaching practices and components to support a new process. Two core measures were identified for evaluation; the number of patients receiving a teach prior to their first treatment and overall patient satisfaction. The new standardized teaching process included an evidence based practice teaching checklist, uniform written materials, and two experienced chemotherapy nurses to complete the sessions. The patients received a separate teaching appointment, which offered broader availability. The team developed a tool to evaluate patient perception about the teaching visit.

Results: Retrospective data collection over two months revealed out of twenty three new patients starting chemotherapy, only ten received a teaching session prior to their first treatment. The three months following initiation of the new teaching process, 40 of 42 patients received a teaching visit. Surveys following the process change revealed higher ratings in response to materials given, presentation of materials, and relevance of the information.

Conclusion/Significance: Total number of teaching experiences prior to actually receiving chemotherapy improved from <50% to 100% in 3 months. Evidence states after diagnosis of cancer, patients and families experience anxiety and a need for information. A good education process prior to beginning treatment can result in improved coping strategies and appropriate responses to conditions during treatment.

Abstract #: 36

Session: Poster

Morally injurious events and social functioning: The role of anger as a mediator

Authors: Karyna Bravo, BS (RUMC), Jennifer A. Coleman, PhD. (RUMC), Brian J. Klassen, PhD. (RUMC), Alyson K. Zalta PhD. (RUMC), Mark H. Pollack PhD. (RUMC), Niranjan S. Karnik. MD, PhD. (RUMC), & Philip Held, PhD (RUMC)

Introduction: Veterans with posttraumatic stress disorder (PTSD) frequently report challenges with their interpersonal relationships, as well as struggling with social functioning more broadly. Recent research with veterans has explored how morally injurious events are related to issues such as PTSD and anger, and how these issues in turn affect social functioning. For example, experiencing a morally injurious event has been associated with perceptions of belonging and this relationship was moderated by aggression and anger. Given the previously stated relationship between moral injury and anger, and between anger and social functioning, we sought to determine whether anger played a mediating role in this relationship.

Objective: The purpose of this study was to investigate whether anger mediates the relationship between experiencing a morally injurious event and veterans' social functioning. We hypothesized that anger would mediate the relationship between three facets of moral injury (Transgressions by Self, Transgressions by Other, and Betrayal) and social functioning.

Methods: Self-report data from 142 treatment-seeking veterans was collected prior to starting an intensive outpatient program for PTSD. Questionnaires assessed anger, moral injury, and social functioning.

Results: Three separate mediation models were developed using Hayes' PROCESS macro to determine whether anger mediated the relationship between the three facets of morally injurious events and veterans' social functioning. After controlling for PTSD, there was a significant indirect effect between Transgressions by Self and social functioning through anger, $B = -.021$, $SE = .010$, 95% CI $[-.042, -.004]$, and Betrayal and social functioning through anger $B = .040$, $SE = .024$, 95% CI $[.004, .095]$.

Conclusion/Significance: Veterans who reported committing transgressions and being betrayed by other veterans reported more anger, which was associated with worse social functioning. It is plausible that breaking one's own moral code by committing transgressions and being betrayed may drive anger more so than witnessing or learning about transgressions committed by another. Addressing symptoms resulting from moral injury, such as anger, in therapy may aid in improving veterans' social functioning. One major limitation of the present study was its cross-sectional design, which prevents us from establishing true causality.

Abstract #: 37

Session: Poster

Improvement in identification of malnutrition and obesity among pediatric patients

Authors: Asante Brown, BS (CHS) Jean Ziegenhorn, BS; Macy Mears, BS; Christine Sharp MS, RD, CNSC; Leslie Klemp MS, RN, NE-BC; Sarah Peterson PhD, RD, CNSC; Diane Sowa MBA, RD

Introduction: To improve recognition and documentation of malnutrition and obesity, a best practice alert (BPA) was created to alert pediatric providers via the electronic medical record whenever a patient was identified as malnourished or obese by the registered dietitian (RD). The BPA prompted the provider to add the appropriate nutrition diagnosis to the problem list. After implementing the BPA, preliminary data suggested providers were more likely to add the diagnosis of malnutrition to the BPA compared to obesity.

Objective: The objective of this quality improvement project was to determine if the addition of malnutrition and obesity to the problem list improved after a training in-service among pediatric providers.

Methods: Data were collected from January 2017-May 2017 (pre in-service) and October 2017-December 2017 (post in-service). The RD completed nutrition assessments on pediatric patients deemed at nutritional risk. Patients were categorized as malnourished (mild, moderate, or severe) or obese based upon institution guidelines and documented in a flowsheet within the EMR. Upon documentation, a BPA would fire and prompt the provider to add the appropriate diagnosis to the problem list. The provider had the option to add to the problem list, disagree with the malnutrition/obesity classification or ignore the BPA until the patient was discharged. A total of five in-services were completed to train resident and attending physicians. The total number of malnourished and obese patients and provider response to the BPA was recorded and compared between the two timeframes.

Results: A total of 114 patients were identified as malnourished (n=88) or obese (n=26) from January 2017-May 2017 and 74 patients (malnourished =22 and obese =52) were included in the post-in-service timeframe. From January 2017-May 2017, 76% of nutrition diagnoses were added to the problem list (malnourished = 77% and obese 73%). Following the in-service training, 92% of nutrition diagnoses were added to the problem list (malnourished = 95% and obese 90%).

Conclusion/Significance: Provider training increased agreement with the BPA considerably. Regardless of nutritional concern, pediatric providers are adding malnutrition and obesity to the problem list at equal rates. Follow-up data will provide additional information regarding the sustainability of BPA concordance.

Abstract #: 38

Session: Poster

Superinfection of atopic dermatitis: a case report

Authors: Sarah Burbank BS (RMC) Elizabeth Van Opstal, MD (RUMC)

Introduction: Atopic dermatitis (AD) is a common condition that predisposes the skin to a variety of skin superinfections. While the most common etiology is *Staphylococcus aureus*, eczema herpeticum is a rare but dangerous viral infection that should be considered with rapidly spreading vesiculopustular hemorrhagic lesions.

Objective: The purpose of this case report is to review the clinical presentation of atopic dermatitis and its potentially life-threatening complications.

Methods: N/A

Results: Case Description: A 10-month old boy with history of atopic dermatitis and reactive airway disease is admitted for acute-onset, rapidly spreading rash. On exam, his temperature is 98.2F, blood pressure 117/83, heart rate 144, respiratory rate 30, SpO2 100%. Skin examination reveals eczematous plaques with yellow crusting and fissuring of the periorbital region and lip margins and thick, eczematous erythematous plaques with several crusting, hemorrhagic papules over the bilateral dorsal hands, back, buttocks, and bilateral lower lateral legs. HSV-1 and HSV-2 DNA not detected by PCR. Cephalexin PO 50 mg/kg/day for 10 days is started for suspected impetiginization with *Staphylococcus aureus*. For the atopic dermatitis flare, proper skin care recommendations are reviewed and hydrocortisone 2.5% and triamcinolone ointments are provided for affected areas.

Conclusion/Significance: This patient presented with a severe atopic dermatitis (AD) flare, characterized by decreased skin barrier function, transepidermal water loss, and increased entry of pathogens. While honey-colored, weeping pustules are indicative of *S aureus* infection, the punched out, hemorrhagic crusted lesions on the boy's back and legs raised suspicion for infection with herpes simplex virus (HSV). HSV DNA testing with PCR can aid in the diagnosis of eczema herpeticum. While the decision was made to not empirically treat with an anti-viral agent such as acyclovir, this could be a life-saving measure if eczema herpeticum is suspected. Most cases of impetigo are caused by methicillin-susceptible strains of *Staphylococcus aureus*, and cephalexin is an appropriate systemic antibiotic for extensive impetigo. Education about proper skin care for AD and the signs of complicated bacterial, viral or fungal infections can significantly reduce morbidity of this common pediatric condition.

Abstract #: 39

Session: Poster

Treatment of Intra-Abdominal Hypertension Prevents Progression to Abdominal Compartment Syndrome in Complex Ventral Hernia Repair

Authors: Raghav Chandra, B.A., Richard Jacobson, M.D., Keith Millikan, M.D., Jennifer Poirier, Ph.D., Nicole Siparsky, M.D.

Introduction: Abdominal compartment syndrome (ACS) is a devastating complication of abdominal surgery. Very little is known about intra-abdominal hypertension (IAH), the condition which precedes ACS. Patients who undergo separation of components (SOC) for complex ventral hernia repair (CVHR) are at risk for developing ACS.

Objective: To determine the utility of IAH screening and treatment for the prevention of ACS, we conducted a retrospective cohort study of a single-surgeon CVHR experience.

Methods: We conducted an institutional review board-approved chart review of 175 consecutive patients over 7 years (2009-2016) who underwent SOC for CVHR by a single surgeon at Rush University Medical Center. Demographic information, body mass index (BMI), prior hernia repair, concurrent panniculectomy, operative time, bladder pressure (BP), post-operative serum creatinine (Cr), sedation, paralytic therapy, and ventilator support from the first post-operative week were reviewed.

Results: BP was measured every 2 hours during the first 24 hours after surgery, and as needed thereafter. Fentanyl and propofol were administered for sedation (to a Richmond Agitation Sedation Scale -3 to -4) in 113 patients (65%) who were felt to have a tight abdominal closure. Paralytic therapy (cisatracurium, vecuronium, rocuronium) was employed in 29 patients (17%) with an elevated BP (BP > 20 mmHg) combined with an elevated Cr (Cr > 1mg/dL) or a subjectively tight closure. IAH (BP > 20 mmHg) was identified in 33 patients (19%). Of these patients, 11(6%) were noted to have elevated BP and Cr, consistent with ACS. The mean BMI for patients with an elevated BP was 42 kg/m², whereas the mean BMI was 35.8 kg/m² in patients without an elevated BP (p=0.005). Longer operative time was significantly associated with an elevated BP (p=0.01), as well as the administration of sedation (p<0.0001). Neither panniculectomy nor previous hernia repair were significantly associated with elevated BP. No patient required re-operation for IAH or ACS.

Conclusion/Significance: IAH occurs commonly in patients who undergo SOC for CVHR. Longer operative time and higher BMI were associated with the development of IAH. Rigorous screening for, and treatment of, IAH is effective in preventing ACS in the early post-operative period.

Abstract #: 40

Session: Poster

The Effect of Language Barriers on the Rate of CT Utilization in a Large, Urban Emergency Department

Authors: Daniel Doherty (RMC) Ernesto Romo MD(CCH, Wash U) Erik Nordquist MD(CCH, UTSA) Lum Rizvanolli (CCH) Errick Christian MA (CCH) Neeraj Chhabra MD (CCH) Veronika Kneblova (UIC) Jeffery Budweg (RMC) Samuel Auger (RMC) Ryan Kuhn (RMC) Jason Murphy MD (CCH,UIC)

Introduction: The literature indicates that patients with limited English proficiency (LEP) receive suboptimal care throughout the healthcare system. Computed tomography (CT) usage in adults has significantly increased in recent years and this modality carries risks for future health problems.

Objective: We set out to determine if there is a difference in CT utilization between English proficient and LEP patients in a large, urban emergency department.

Methods: A retrospective chart review of 4501 patients from May 1, 2015 to November 11, 2015 was conducted. The EMR system was altered to force the provider to input the patient's preferred language and the method of interpretation (physician speaks the language, in-person professional interpreter, phone interpreter, or ad-hoc interpretation). We included all adult, non-trauma, non-detainee, non-pregnant patients with a chief complaint of abdominal pain or flank pain. All CT or ultrasound (US) imaging orders and pain medications administered, as well as vital signs and Emergency Severity Index triage score were recorded. Preliminary data analysis was performed but full statistical analysis is pending.

Results: Preliminary analysis of 3334 enrolled patients showed 2094 (62.8%) English-speaking, 1028 (30.8%) Spanish-speaking, and 212 (6.4%) other-language-speaking patients. Within the Spanish-speaking group, the provider spoke Spanish in 474 cases while in the other-languages group, the provider spoke the language in 33 cases. Among the English-speaking group, there were 778 (37.2%) CT and 181 (8.6%) US orders. The Spanish-speaking group received 169 (35.7%) CT and 62 (13.1%) US orders when method of interpretation was listed as physician-speaks and 226 (40.8%) CT and 67 (12.1%) US orders when another method-of-interpretation was used. Other-language speakers received 11 (33.3%) CT and 3 (9.1%) US orders when language was listed as physician-speaks and 69 (38.8%) CT and 11 (6.2%) US orders when another method-of-interpretation was used.

Conclusion/Significance: It preliminarily appears that a relationship exists between method of interpretation and CT ordering percentage in the Spanish-speaking patient group. Further chart review is being conducted to identify the negative and positive pathology found on the CT and US studies.

Abstract #: 41

Session: Podium Presentation - Deans' Award

Calorie Delivery Between Continuous and Bolus Enteral Nutrition in General Medicine and Surgical Patient Populations

Authors: Lauren Fieldhouse, BS (Rush University); Julia Cohen, BS (Rush University); Elizabeth Mathews, BS (Rush University); Marisa Mozer, MS, RD, CSO, CNSC (Rush University); Kristen Nowak MS, RD, CNSC (Rush University); Diane Sowa, MBA, RD (Rush University); Sa

Introduction: Among hospitalized patients, those who are unable to consume an oral diet often receive enteral nutrition (EN) to provide supplemental nutrition. Two methods of EN delivery exist: continuous, EN administered at a constant rate over 24 hours, and bolus, EN administered multiple times per day over a shorter period of time. Minimal information exists to describe differences in calorie delivery between the two methods among hospitalized patients.

Objective: Compare calorie delivery between patients who receive continuous versus bolus EN delivery.

Methods: Data were collected for six weeks (July-August 2017). Adult patients (≥ 18 years of age) were included if they required EN and were admitted to the general medicine and surgical floors. Daily calorie delivery was recorded and documented as percent of goal calories received (calories delivered per day/calorie requirement per day). Percent of goal calories received was averaged over the total feeding days. Method of EN delivery was recorded as continuous versus bolus. Type of feeding tube was documented as short-term (naso-gastric or oro-gastric tube) or long-term (gastric tube). Age, gender and body mass index (BMI) were also collected. Statistical analysis was conducted by comparing demographic variables and percent of goal calories received between patients who received continuous versus bolus EN.

Results: A total of 65 patients were included. Patients were 54% male, an average age of 61.7 ± 6.8 years, with a BMI of 26.4 ± 5.9 and required EN for an average of 8.7 ± 6.8 days. Half of patients had a long-term feeding tube. Only a quarter of patients ($n=17$) were fed via bolus administration. There were no significant differences in demographic variables between bolus and continuously fed patients. Bolus fed patients received significantly higher percent of goal calories compared to patients receiving continuous administration ($68 \pm 19\%$ vs $50 \pm 25\%$, $p=0.02$).

Conclusion/Significance: Preliminary data suggest hospitalized patients who receive EN via bolus administration receive more calories. However, only 25% of patients received bolus tube feeding. Further quality improvement projects are needed to determine how to improve calorie delivery for continuous tube fed patients and increase the use of bolus EN for hospitalized patients.

Abstract #: 42

Session: Poster

A preliminary look at the impact of grief and loss in the acceptance of life style changes among type II diabetics

Authors: Ingrid Forsberg, FNP,DNP Rush University College of Nursing

Introduction: To minimize the decline of health due to diabetes, patients are required to make changes in many aspects of their daily routine and life style. Providers discuss these changes with their patients but best practices that would support the patient in this period of transition have not been documented. Grief is an important part of a healthy resolution to loss. A few studies have begun to look at grief and loss in relationship to successful health outcomes in diabetics

Objective: To provide preliminary data from a convenience sample of thirty diabetic patients, without other major chronic illnesses and with a HA1c above 7 % from a community clinic. Each patient completed a semi-structured interview and Likert scale questionnaire on their perception of the manifestations of grief and loss since being diagnosed with diabetes

Methods: The study sample will be given written information on the sign and symptoms of grief and loss prior to the completion of the interview and questionnaire. This qualitative study will compare demographic data with HA1c values since diagnoses. Interview information and responses to the questionnaire will be analyzed for stages of grief and acceptance of loss. This will be compared to how the patient rated their success with life style changes and perception on the barriers they encountered.

Results: Patient profile data was compared with the results of the post-educational interview and questionnaire results on grief and loss. Patients who have successfully grieved the loss of their life style prior to diabetes had slightly lower HA1c then those diabetic who indicate they were in the depression or bargaining stage of grief.

Conclusion/Significance: The impact of grief and loss was identified and larger size studies would add significant information to better identify diabetics with unresolved grief and loss. The assessment tool used in this study was specific to the sample. A validated assessment tool needs to be developed. Grief support should be offered to diabetics who indicate prolonged grief and elevated HA1c due to inability to make life style changes

Abstract #: 43

Session: Poster

Understanding and Improving Patient Experience with Pain with Innovative Application of the Clinical Common Data Model

Authors: Francis Fullam, Health Systems Management, College of Health Sciences, Rush University

Introduction: CAPriCorn is the local collective effort by Chicago hospitals to share clinical data for innovative analysis as part of the national PCORI project. Several Rush projects are underway to demonstrate how the clinical common data model (CDM) can be expanded to include operational datasets and patient experience. This includes both the CMS mandated national HCAHPS and Press Ganey surveys. These demonstration projects will show the benefits of this new linkage and how it can be applied to a variety of issues (reducing readmission, improving the patient's spiritual experience, improved nurse communication, etc.) The analysis that is furthest along explores the factors that impact the patient pain experience.

Objective: The objective of the study is to look at the relationship between the number of needle sticks a patient receives and how this impacts the patient's experience with pain. The phlebotomist's interpersonal skills may be an intervening variable - their relation with patients might be able to mitigate the suffering from needle sticks.

Methods: This is a retrospective data analytic projects of adult inpatient discharged from Rush over the last few years. Several datasets were combined: Rush's clinical database count of the number of needle stick a patient received, the HCAHPS survey questions on patient experience with pain, the Press Ganey survey questions of patient experience with having their blood drawn, and the Vizient (UHC) calculation of a the patient's severity of illness.

Results: Initial results show that the number of needle sticks a patient receives has a negative impact on their patient experience with pain, regardless of their SOI. However, the interpersonal skills of the person drawing blood has a mitigating effect on this relation.

Conclusion/Significance: The practice of standing blood draws should be examined to avoid unnecessary blood draws. The selection and training of those drawing blood should be examined to understand those interpersonal skills that make the experience of the blood draw better for patients. Further analysis of the dataset is underway to understanding the differences between patient subgroups and their clinical conditions.

Abstract #: 44

Session: Poster

Assessment of Obstetric and Gynecologic Device Recalls and the FDA Approval Processes

Authors: Sheena Galhotra, MD (RUMC) Joseph Maurice, MD (RUMC)

Introduction: Medical device recalls is a common Food and Drug Administration (FDA) action. Obstetrics and Gynecology has its fair share of devices approved by the FDA. The FDA has two routes of approval for devices, the premarket approval (PMA) process and the expedited 510(k) process. The (PMA) process requires clinical trials to supports its efficacy and safety. The expedited 510(k) process does not. There has been increased attention to shortfalls in device approval in recent years in light of elevated numbers of device recalls. This study looks into FDA recall from devices used in Obstetrics and Gynecology.

Objective: To evaluate and compare the recall rates of Obstetric and Gynecologic devices approved via the Food and Drug Administration's 510(k) and PMA approval processes and to educate physicians on the different categorization of devices and the different approval processes

Methods: In this retrospective observational study, the FDA Medical Device Recalls online database was accessed to identify Obstetric and Gynecological device recalls from November 1, 2002 to July 31, 2017. The class of device, class of recall, date of recall, and original approval process were obtained for each device. These were compared against total number of approved devices during this time period in the PMA and 510(k) processes. Recall rates of each process were calculated and compared.

Results: A total of 685 devices were approved via the PMA process and 1,564 devices were approved via the 510(k) process in the observed time period. Of these, 1.17% of the PMA devices and 15.98% of the 510(k) devices were recalled ($p < 0.0001$). There was an overall increase in absolute device recall numbers over time in the 510(k) process, while the number of recalls in the PMA process did not change with time.

Conclusion/Significance: The recall event rate for the 510(k) approval process is 13.6 times the rate for PMA in the context of Obstetric and Gynecological devices. Analysis of the results suggests improper device risk classification, inappropriate assignment of approval process, and increased device malfunctions and recalls by the 510(k) process. This warrants a call for improvement and increased scrutiny in the 510(k) medical device approval process.

Abstract #: 45

Session: Poster

The Effects of Endoscopic Sinus Surgery on Voice Characteristics and Quality of Life in Patients with Chronic Rhinosinusitis

Authors: Ashwin Ganti, BA Danny B. Jandali, MD Inna A. Husain, MD Pete S. Batra, MD, FACS Bobby A. Tajudeen, MD Affiliation of all authors: Department of Otorhinolaryngology - Head and Neck Surgery Rush University Medical Center

Introduction: Functional endoscopic sinus surgery (FESS) is a standard treatment modality for patients with chronic rhinosinusitis (CRS) who have failed appropriate medical therapy. However, FESS entails modification of the upper airway tract that may alter phonatory resonance and produce voice changes.

Objective: The purpose of this study is to quantitatively assess the effects of FESS on postoperative voice characteristics and quality of life in patients with CRS.

Methods: A prospective cohort study was performed on patients with severe CRS who underwent FESS at a tertiary care referral center between May and October 2017. The Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) and the Voice Handicap Index (VHI) were utilized to quantitatively evaluate voice characteristics and quality of life, respectively. Pre and postoperative CAPE-V and VHI scores were compared to postoperative scores for each patient. Sino-Nasal Outcome Test (SNOT-22) scores were also obtained to assess self-reported changes in disease severity.

Results: 16 CRS patients undergoing FESS were evaluated. The average preoperative Lund-Mackay score was 13.9, indicating baseline severe CRS. Postoperative assessments demonstrated a significant decrease in CAPE-V scores (47.0 vs. 28.1, $P = 0.013$) and VHI scores (9.7 vs. 4.7, $P = 0.0014$). These correlated with a significant decrease in SNOT-22 scores (41.7 vs. 12.5, $P = 0.00023$).

Conclusion/Significance: Patients with CRS experience a significant improvement in voice characteristics and vocal quality of life following FESS. Further, this appears to correlate with a significant decrease in self-reported disease severity. These findings may augment the discussion of potential benefits of FESS to a new potential domain for voice quality.

Abstract #: 46

Session: Poster

Evaluating the Effect of Perioperative Music on Patient Anxiety, Pain and Satisfaction Level

Authors: Arlene Gliane-Todd, RN, CMSRN Katrina Blade, RN, MSN CPAN Mary Zonsius, PhD, RN

Introduction: A patient's request to listen to music before her ECT treatment to decrease her anxiety and orthopedic patients complaints of hearing noises in the OR despite receiving sedation prompt to improve care. Thus, two clinical nurses conducted a study to evaluate the use of music to decrease pain, anxiety and increase patient satisfaction.

Objective: The aim of this study is to establish feasibility so a music program can be offered to surgical patients and ECT patients in the outpatient setting.

Methods: A randomized design was used. Participants (N=37) aged 18 years or older who had a joint replacement were assigned to a music or non-music group. Participants in the music group listened to music before, during and after their procedure using an MP-3 player. An assessment of anxiety and pain, pre and post procedure were completed. Both groups were asked to rate their anxiety using the Verbal Anxiety Scale (Benotsch et al, 2000). Both groups were also asked to rate their pain using the Defense and Veterans Pain Rate Scale (Buckenmaier et al.,2013). Participants in the music group were asked to rate their satisfaction with the use of music via a post procedure phone call.

Results: The music group reported lower mean anxiety scores pre-operatively and upon awakening from surgery than the non music group. Both groups reported lower mean anxiety scores from pre-op to discharge from the PACU. The music group reported less pain pre-operatively and less pain at discharge the non-music group. During the pos-op phone call the music group reported a mean score for satisfaction ranging from 7.77 to 8.9(on 1-10 scale)

Conclusion/Significance: Despite the small sample size, results suggest that music is effective to decrease anxiety, decrease pain and increase satisfaction during the patient's surgical experience. The method established feasibility for expansion of the study to other populations, including patients receiving ECT in the outpatient setting.

Abstract #: 47

Session: Poster

Integration of Evidence-Based Practice at Rush University Medical Center

Authors: Lindsey Gradone (Rush University); Beth Staffileno (Rush University)

Introduction: A 20-item survey to determine evidence-based practice (EBP) needs was sent to 308 registered nurses (RNs) on 6 adult inpatient units at a large Midwestern academic medical center. Of the 106 responses, 57% reported a lack of knowledge of how to change practice. Lack of knowledge and perceived authority to change clinical practice are reported barriers to implement EBP changes. Care that is not evidence-based can be inconsistent, produce inadequate patient outcomes, and increase healthcare costs, whereas organizational resources can facilitate change.

Objective: The purpose of this project was to increase RNs knowledge of EBP processes and utilize internal and external resources available to support practice changes.

Methods: This project used a pre-post design. A 20-item survey was developed to assess RNs understanding of how EBP is operationalized, its use in daily practice, and their perceived ability to make practice changes. A flow chart was developed based on pre-survey results to guide RNs on EBP processes and available organizational resources. Ten-minute unit-based education sessions were conducted on the 6 surveyed units to provide: 1) pre-survey findings, 2) EBP concepts, and 3) an overview of the flow chart. Descriptive statistics were used to assess demographic characteristics and frequency of survey item responses. Ordinal data was dichotomized then Chi-square analysis was used to compare changes pre and post implementation.

Results: Twenty-four education sessions were conducted (4 per unit). A total of 48% of the 298 RNs on the units attended the sessions. Pre- and post-survey response rates were 34% (106 out of 308) and 32% (96 out of 298) respectively. Most respondents had a BSN or higher and a majority had less than 5 years of nursing experience. There was a statistically significant improvement in RNs' self-reported confidence to change clinical practice and, policies and procedures if they were not evidence-based ($p=0.000$, respectively).

Conclusion/Significance: Implementing short unit-based education sessions had a significant impact on RNs' self-reported confidence to make EBP changes. These data suggest that identifying organizational resources, such as education and flow charts, improves RNs knowledge and perceived authority to make practice changes.

Abstract #: 48

Session: Poster

Let's Talk Weight: Designing An Office Intervention to Facilitate Patient Weight Management

Authors: Kristin Hillgamy BA (RMC) Michael Hanak, MD Naomi Parrella, MD

Introduction: In a time-constrained office visit, many physicians feel unprepared or unmotivated to discuss weight loss with patients, especially after previous unsuccessful weight loss counseling efforts, lack of confidence in patients' ability to lose weight, or concerns for offending patients. Despite these hindrances, excess weight remains a powerful modifiable risk factor. An office intervention that allows physicians to initiate weight loss conversation at the patient's discretion in a non-judgmental manner holds potential to increase success in facilitating patient weight loss.

Objective: To design a brief office intervention that (1) increases patient-physician conversations initiated about weight loss and (2) increases follow-up visits or referrals related to weight loss counseling.

Methods: A worksheet was designed to be placed in exam rooms for patients to complete at their own discretion. If the patient's worksheet indicates a desire to discuss weight loss with their physician, the front desk staff either creates a follow up appointment for weight counseling within the office or offers referral information to another provider for the purpose of weight loss counseling. Motivational interviewing techniques and stages of change theory were applied in designing a worksheet and workflow that quickly gauges patient health goals, confidence, and motivation to lose weight. Family physicians working in various primary care office settings were consulted to inform workflow design.

Results: A weight loss discussion workflow for physicians and front desk staff was created. This provides a flexible model to implement a weight loss intervention in primary care offices.

Conclusion/Significance: Consideration of patients' readiness, physicians' frustrations, and the office workflow informed the development of a brief office intervention for weight loss. This intervention will be piloted in the summer of 2018 in three different family medicine offices. Results from the pilot will inform efforts to build an electronic tool that can be accessed to better manage overweight and obesity in the clinical setting.

Abstract #: 49

Session: Poster

A Multidisciplinary Team-Based Approach to Facilitate Surrogate Decision Making for Patients Requiring Prolonged Mechanical Ventilation- A Pilot Study

Authors: Jacqueline N. Horst, James Gerhart, Rebecca Hunter, Raj C. Shah, Jared A. Greenberg

Introduction: Surrogates of patients recovering from prolonged mechanical ventilation (≥ 21 consecutive days) often report that physicians did not provide the information necessary to make informed decisions.

Objective: We hypothesized that semi-structured education from a multidisciplinary team would increase surrogate understanding of critical illness recovery.

Methods: At a single academic center from July 2017 to October 2017, patients who were difficult-to-liberate from mechanical ventilation were prospectively screened. After the primary medical team asked a patient's surrogate(s) to consider a tracheostomy, the surrogate(s) were approached for informed consent by the study team. The intervention included clinicians from 8 disciplines: critical care medicine, respiratory, physical and occupational therapy, nutrition, palliative care and social services. Each clinician provided a 10-minute educational session on different aspects of critical illness recovery. Surrogates completed a survey created by the study team before and after the intervention to assess their understanding of the patients' medical condition and their level of comfort in making medical decisions. The content of the survey was developed by eliciting feedback from clinicians and surrogates of patients at a long-term acute care hospital. The survey consists of 24 items rated on a 5-point Likert scale, with higher numbers indicating greater medical comprehension or decisional certainty. The primary outcome was the change in the surrogate's pre- and post-intervention survey score; a p-value <0.05 by paired t-test indicates statistical significance.

Results: Of the 20 mechanically ventilated patients screened for enrollment, surrogates (n=18) from 9 of the patients (45%) received the intervention. The median time from the primary medical team approaching the surrogate(s) for tracheostomy consideration and the intervention was 2 days (mean 4, range 0-13). On a scale of 1-5, the average pre-intervention survey score was 3.52 (SD=0.33), indicating moderate to good understanding. The average increase in score post-intervention was 0.20 (SD=0.37; p<0.04). Surrogates also self-reported an improvement in understanding and comfort in medical decision making.

Conclusion/Significance: A multidisciplinary team-based approach to deliver information to surrogates at the time of tracheostomy placement improved surrogates understanding of the patient's condition.

Abstract #: 50

Session: Poster

Lab Cost-Saving Analysis in the General Medicine Unit (9 South Atrium) of Rush University Medical Center

Authors: Katrina Jose BA (RU) Yolanda Sanchez Garcia, MS, MLS(ASCP)CM SBB, Lab Manager, RML Core Laboratory Mark Jaros, MBA, MT(ASCP), Administrative Director of Rush Medical Laboratories at Rush University Medical Center

Introduction: In the United States alone, it is estimated that \$65 billion is spent on medical care, with approximately \$6.8 billion of this expense involved in unnecessary laboratory testing (1). The top three high volume laboratory tests at Rush University Medical Center (RUMC) are the following: Comprehensive Metabolic Panels (CMPs), Basic Metabolic Panels (BMPs) and Complete Blood Counts (CBCs). With laboratory tests being a critical component in patient health and diagnosis, an issue of concern is the indiscriminate use and overuse of lab tests (3). In essence, addressing laboratory utilization not only results in cost reduction for a given institution, but further improves patient care through reduction in unnecessary lab draws. Other comparable institutions have addressed and implemented utilization methods in hopes to improve the accuracy and efficiency of patient care. To the best of our knowledge, there are no efforts currently enforcing lab test utilization at RUMC.

Objective: The first objective of this study is to determine the presence of any unnecessary or overutilized CMPs, BMPs and CBCs inpatient test orders in the General Medicine Unit (9 South Atrium) between April 2017 to June 2017. It is the goal of this study to employ a CBC soft-stop in Epic, for which we anticipate statistical significant difference of test spending pre- and post-intervention of the stop. In the pre-intervention phase, we anticipate the presence of unnecessary or overutilized test ordering for each of the three high volume tests, resulting in high cost-spending. Post-intervention, we anticipate a decrease in unnecessary and overutilization of CBC test orders, as well as increased cost-savings within the General Medicine Unit.

Methods: Data collection consists of implementing specific patient criteria reflective of our patient population. This data will allow us to perform a cost-analysis for each of the three high volume tests via direct reagent costs. SPSS will be the guiding program for statistical analysis, and power analysis will be employed to ensure the proper number of samples are being collected to infer statistical significance.

Results: Currently, data analysis and conclusion is pending. Preliminary results will be completed prior to the end of February.

Conclusion/Significance: (See above)

Abstract #: 51

Session: Poster

Stroke thrombectomy patient selection: sex differences in collateral circulation

Authors: Kavantissa Keppetipola (Rush Medical College) Mark A Davison (Rush Medical College), Sumeet G Dua (Rush University Medical Center), Bichun Ouyang (Rush University Medical Center), Michael Chen (Rush University Medical Center)

Introduction: Large multicenter cohorts of thrombolysed stroke patients consistently report a sex disparity in functional outcome that is not age-dependent. Explanations for these sex-dependent outcomes differences are poorly understood. Patients with robust cerebral collaterals have been shown to have better outcomes after mechanical thrombectomy for acute middle cerebral artery occlusions. We hypothesize that differences in collateral circulation contribute to the observed sex disparity in stroke functional outcomes.

Objective: We aim to understand factors that will help us predict which patients will have better outcomes after undergoing mechanical thrombectomy for acute ischemic strokes. With what we know about sex differences, collaterals, and stroke outcomes, we hypothesize that women will have better collateral circulations than men, thus leading to their better outcomes.

Methods: Consecutive patients with middle cerebral artery occlusions undergoing mechanical thrombectomy at a tertiary care, urban, academic comprehensive stroke center were retrospectively evaluated. Brain CT angiography was graded by a neuroradiologist using a standardized grading scheme (0 = 0% collateral reconstitution of the affected ischemic area, 1 = < 50% collateral reconstitution, 2 = 50-100% collateral reconstitution, 3 = 100% collateral reconstitution). Other independent variables consisted of age, admission and discharge NIHSS, TICI 2b/3 recanalization, and IV-tPA use. The dependent variable was the modified Rankin score at 90 days.

Results: From June 2013 to November 2016, 42 males and 26 females met the inclusion criteria. Males had higher rates of poorer collaterals (0-1) than females (64.3% vs. 53.8%). Males also had lower rates of favorable collaterals (2-3) than females (35.7% vs. 46.2%). The odds ratio of collateral scores of 0-1 for males compared with females was 1.54 (95% CI = 0.57-4.18). Fisher's two-tailed t-test of the sample data showed a p-value of .45 ($p < 0.05$).

Conclusion/Significance: Though this pilot study did not prove a significant association between poor collateral scores (0-1) and patient sex, there was a trend towards poorer collaterals among men. Differences in collateral circulation would not appear to explain why women have poorer outcomes after post-mechanical thrombectomy. The sex disparity in stroke functional outcomes among thrombolysed patients remains unclear.

Abstract #: 52

Session: Podium Presentation - Student Award

Malnutrition Documentation: Accuracy and Areas for Improvement

Authors: Julia Kulik, BS (CHS) Sara Rosenblum, BS (RU) Sarah Peterson, PhD, RD, CNSC (RUMC) Stephanie Send, MS, RD, CNSC (RUMC) Katherine Weaver, BS (RU) Leslie Klemp, MS, RN, NE-BC (RUMC) Brian Stein, MD (RUMC) Diane Sowa, MBA, RD (RUMC)

Introduction: Malnutrition has long been associated with worsened outcomes in hospitalized patients, often leading to longer lengths of stay and increased hospital costs. Accurate documentation of malnutrition by medical providers allows for increased reimbursement to institutions for these patients. To improve documentation a best practice alert (BPA) was created to alert providers via the electronic medical record (EMR) whenever a patient was identified as malnourished by a registered dietitian (RD).

Objective: The objective of this quality improvement project was to examine provider adherence with the BPA and subsequent malnutrition documentation.

Methods: All patients who were identified as malnourished by the dietitian during October-December 2016 and 2017 were included. Malnutrition was identified using Subjective Global Assessment, which utilizes nutrition indicators of unintentional weight change, decreased calorie intake and muscle/fat wasting. Both nutrition indicator(s) and categories of malnutrition (underweight, mild protein calorie malnutrition, moderate protein calorie malnutrition, or unspecified severe protein calorie malnutrition) were recorded by the RD within the EMR. Subsequently, a BPA fired for any provider (physician, nurse practitioner, physician assistant) opening the chart; the BPA communicated with the provider the category of malnutrition and provided an option to add the appropriate category to the problem list. Additionally, the providers were reminded to document the corresponding nutrition indicators within a progress note.

Results: A total of 1184 patients were included (2016= 610 and 2017=574). There was no difference in categories of malnutrition between groups. Providers added the correct category of malnutrition the majority of time (2016: 88%, 2017: 89%). However, less than 15% of providers are documenting the supporting nutrition indicators within a note (2016: 13%, 2017: 11%).

Conclusion/Significance: Accurate documentation of malnutrition within the EMR requires adding the appropriate category of malnutrition to the problem list and describing the corresponding nutrition indicators within a progress note. Providers are effective at adding malnutrition to the problem list, likely because this action occurs by simply agreeing with the BPA. Providers are not consistently documenting the indicators of malnutrition. Additional training is required to improve documentation.

Abstract #: 53

Session: Poster

STAT Acuity Team: An Exercise in True Collaboration

Authors: Holly Losurdo (RUMC); Heather Cook (RUMC); Shonda Morrow (RUMC)

Introduction: The STAT Acuity Team (StAT) was developed to address patient throughput in an academic medical center. During this process, StAT established meaningful relationships with bedside nurses and physicians exposing a need for critical care outreach. Interdisciplinary collaboration served as a catalyst empowering StAT to evolve to consulting, advocating, and supporting the clinical needs of nurses by providing specialized care across 14 inpatient units and outpatient, procedural, and public areas.

Objective: To improve patient and nurse outcomes through critical care outreach and interdisciplinary collaboration.

Methods: Senior nursing leadership re-appropriated FTEs to ensure support of the STAT Acuity RN role. Metrics were identified to measure use and effectiveness of StAT. A dynamic environment requires the STAT Acuity Nurse to autonomously triage multiple requests during a shift. In an effort to identify patients at risk for decompensation, the STAT Acuity Nurse continually engages in proactive surveillance. Patients are monitored remotely utilizing handheld technology which provides access to the electronic medical record (EMR) and telemetry readings. STAT Acuity consultation is provided to patients identified via surveillance and by bedside nurse or physician request. Consultations may consist of targeted assessment, EMR review, immediate critical care intervention, plan of care revision, staff education, procedural assistance, or expedited transfer to higher level of care.

Results: Implementation and expansion of StAT have revealed a decrease in code blue calls, an increase in rapid response calls, and a decrease in emergency response time. In 2016 StAT responded to 6,616 nursing and 52 physician consultations respectively. A recent survey (n=237) indicated 94.5% of bedside nurses believed StAT had a positive impact on patient throughput, having expedited over 275 patient transfers. Bedside nurses reported improved job satisfaction (89.5%), improved patient safety (95%), and that StAT enhanced their skills and knowledge (86.5%).

Conclusion/Significance: The inception of STAT Acuity has fostered an environment conducive to improved patient and nurse outcomes while providing an opportunity for the certified critical care RN to practice to the full extent of his/her license. Continued evolution of the role has presented numerous opportunities for collaboration, education, process improvement, and dissemination of evidence-based practice.

Abstract #: 54

Session: Poster

Implementation of Evidence-Based Guidelines to Prevent Pediatric Extravasation Injuries

Authors: Authors: Kari Lucero, BSN, RN, CCRN, Staff Nurse (RMC); Molly Moran, MSN, RN, CCRN, Clinical Educator (RMC)

Introduction: Children are more susceptible to pediatric intravenous device (PIV) injuries due to developmental and physiologic factors. Complications, including edema, erythema and infiltration range up to 78%. Although many complications associated with PIVs are minor, others are far more serious, including infection, disfigurement, and prolonged hospitalization.

Objective: The purpose of this project was to create a systematic approach for preventing PIV extravasations, utilize a pediatric-friendly methodology for grading PIV extravasation, increase reporting, and reduce extravasation-associated complications. The framework created by the Cincinnati Children's Hospital was utilized for this project.

Methods: A quantitative research study was conducted and includes staff survey as well as chart review. IRB approval was not needed to conduct this study. All nurses, physicians and advanced practice nurses were encouraged to participate in a pre-and post-implementation survey which assessed knowledge of PIV assessment, extravasation of various medications, and documentation. Safety events from calendar year 2015-2016 related to extravasations in patients ≤ 18 years old were reviewed. Next, a comprehensive review of all medications administered intravenously in the children's hospital was created. Drugs were classified as 'red' or 'green' drugs based on physical and biological including extreme pH, osmolality, vasoactivity and cytotoxicity. Lastly, a PIV Extravasation Algorithm was created to ensure systematic assessment of the PIV site using the Touch-Look-Compare (TLC) method as well as a decision-making tree for notification of appropriate services. In-services were completed for staff, and a formal reporting process was implemented.

Results: Since implementation, we have seen an increase in the number of safety events related to PIV extravasations; from 46 in calendar years 2015 and 2016, to 35 in the first 6 months of calendar year 2017. The severity of extravasation classification has also decreased since implementation: 2.8% in calendar year 2017 classified as a grade 2, down from 6.4% in calendar years 2015-2016.

Conclusion/Significance: The increase in reporting and decrease in extravasation severity indicates that the PIV Extravasation Guideline is both sensitive and reliable at identifying PIVs at risk of causing harm to a patient. While further research is needed, these findings are of interest to healthcare providers caring for pediatric patients receiving intravenous therapies.

Abstract #: 55

Session: Poster

Impact of a Tailored Multicomponent Interdisciplinary Intervention on Family Caregiver Preparedness

Authors: Claribel R. Manalo DNP Student Cohort Dec. 2017

Introduction: Approximately 43.5 million Americans provided 37 billion hours of unpaid care to their loved ones. Despite their significant contributions, family caregivers often feel poorly prepared for their caregiving roles resulting in increased caregiver burden, which impacts their health and well-being. In an effort to enhance family caregivers' sense of preparedness, a tailored multicomponent interdisciplinary caregiver intervention was implemented in an inpatient rehabilitation unit of an urban community hospital in the Midwest.

Objective: The purpose of this project was to evaluate the impact the tailored multicomponent interdisciplinary intervention on family caregivers' sense of preparedness for caregiving prior to discharge home.

Methods: A one-group pretest-posttest design was used. Caregivers were eligible to participate if their family member was admitted to the unit for intensive rehabilitation. The tailored intervention involved four to eight face-to-face meetings, lasting 20 minutes to one hour, with an interdisciplinary team member. Intervention components included (a) information sharing (e.g. medication management, diet, physical activity) (b) skills building (e.g. transfers, ADL skills) and (c) self-care (e.g. coping, stress and time management). Caregiver preparedness was assessed on admission and before discharge home with the validated 8-item Preparedness for Caregiving Scale. The measure has 8 domains of readiness to provide care: physical, emotional, setting up of services, stress of caregiving, how to make caregiving a pleasant experience, how to obtain healthcare information, how to handle emergencies, and overall preparedness. Scale items range from 0 'not at all prepared' to 4 'very well prepared.'

Results: A total of 16 family caregivers enrolled in the program and completed baseline measurement from March through June 2017 (6 African American, 5 Caucasian, 4 Asians, 1 Hispanic). Of these caregivers, 12 completed the intervention and post measurement. Paired comparison t-tests revealed statistically significant improvements in caregivers' sense of preparedness in all domains of caregiving ($p < .001$ to $.001$). Following the intervention 75% of caregivers rated themselves as 'pretty well prepared' or 'very well prepared' in all domains of caregiving.

Conclusion/Significance: A tailored multicomponent interdisciplinary intervention may enhance preparedness for caregiving among family caregivers in the inpatient rehabilitation unit.

Abstract #: 56

Session: Poster

Influence of severity of illness and calorie delivery on muscle change among Intensive Care Unit patients

Authors: Elizabeth Mathews, B.S. Dietetics, Brigham Young University, 2016, Dr. Sarah Peterson PhD, RDN, CNSC, LDN (RUMC); Kristen Nowak MS, RD, CNSC, LDN, (RUMC); Diane Sowa MBA, RD, LDN (RUMC)

Introduction: Critically ill patients admitted to the intensive care unit (ICU) experience decreased protein synthesis and increased protein degradation which results in severe depletion of lean body mass. It is currently unclear how factors such as severity of illness (SOI) and calorie delivery influence these changes.

Objective: Examine how SOI and calorie delivery influence change in third lumbar (L3) abdominal cross-sectional muscle area.

Methods: ICU patients were included if they had two abdominal CT scans of the L3 region completed while requiring mechanical ventilation. Cross-sectional skeletal muscle area (cm²) was computed at the L3 region for the baseline and terminal CT scan. Total days were calculated between scans; percent total and change per day in cross-sectional skeletal muscle area was calculated. SOI was calculated using daily Sequential Organ Failure Assessment (SOFA) score and average SOFA for days between scans was recorded. Daily calorie and protein delivery was recorded and averaged for total scan days. Demographic and clinical variables were collected. Patients were categorized by the average daily SOFA score ($9.9 \hat{\pm} 1.7$) and calorie delivery ($13.7 \hat{\pm} 6.3$ calories/kg/day). Student's t-test was used to determine differences cross-sectional skeletal muscle area change by categories of SOI and calorie delivery.

Results: A total of 55 patients were included (56% male); average age was $55.4 \hat{\pm} 15.2$ with a BMI of $30.0 \hat{\pm} 7.2$. The average duration between scans was $13.6 \hat{\pm} 8.0$ days. Patients received an average of $998 \hat{\pm} 531$ calories/day ($13.7 \hat{\pm} 6.3$ calories/kg/day) and $49 \hat{\pm} 29$ grams of protein/day ($0.68 \hat{\pm} 0.36$ grams/kg/day). Patients experienced a $6.4 \hat{\pm} 10.8\%$ decrease in muscle ($-0.6 \hat{\pm} 1.1\%$ per day) between the two scans. Percent cross-sectional skeletal muscle area change per day was significantly different when comparing patients with high versus low SOI ($1.0 \hat{\pm} 1.0\%$ vs $0.3 \hat{\pm} 1.1\%$, $p=0.02$). Muscle change was not difference by categories of calorie delivery.

Conclusion/Significance: Muscle loss was higher for patients with increased SOI, but did not appear to be influenced by calorie delivery. More research is needed to determine if the interaction between SOI and calorie delivery influence muscle change.

Abstract #: 57

Session: Poster

ACT Implementation on a Mood Disorder Unit: A Quality Improvement Project

Authors: Clifton Moore, PhD, CADC (RUMC) James Hill, ORT, L (RUMC) Christine Feinstein, BSN, RN (RUMC) Carrie Pike, BSN, RN-BC (RUMC)

Introduction: In all areas of medicine, medical professionals' primary goal is to reduce human suffering. As a social worker, therapist, counselor, doctor or nurse, everyone works to help those who cannot help themselves. On 8north JRB, an inpatient psychiatric unit, an interdisciplinary group examined the current groups offered to patients and determined that additional groups appropriate to the population were needed. This current group structure was largely based on cognitive behavioral therapy principles and the group deemed that groups would appeal to more patients if based on a model that contained both cognitive and emotion-focused approaches, an approach consistent with Acceptance and Commitment Therapy.

Objective: The purpose of this project is to implement and evaluate Acceptance and Commitment Therapy or ACT as the framework for groups on 8 North. This project entails the evaluation of the implementation of ACT groups into the unit schedule-evidence-based group programming aimed at enhancing/augmenting the coping skills of patients hospitalized on 8 North and creating a group environment of positivity.

Methods: The planning team designed educational materials consistent with an ACT approach. Prior to implementation the planning team conducted educational/developmental sessions with all nursing and milieu staff. The ACT focused groups were systematically introduced into the patient schedule, one to two per day. The impact on patient care was monitored along several dimensions. Patient responses to the groups were monitored by the Acceptance and Action Questionnaire II (AAQ II) and the Evaluation of Group Experience. The Evaluation of Group Experience is an investigator designed measure that asks patients to rate a group along five dimensions on a four point scale. The questions focus on the group leaders as well as the relevance of the material. The ratings of the group experience was collected after each group and staff who conducted the group. All forms were administered by staff. Data was analyzed in aggregate for overall satisfaction with the ACT groups and changes in the AAQ II.

Results: Improved GRF scores show improvement at 95%. Diminished scores at 4% with no change at 1%.

Conclusion/Significance: It is possible to implement an intervention and create a positive impact during brief inpatient treatment.

Abstract #: 58

Session: Poster

Pediatric Acute Care Nurses' Knowledge, Attitudes, and Beliefs Related to Mother's Milk and Breastfeeding: An Integrative Review

Authors: Kathleen Piotrowski-Walters, MSN, RN, PCNS-BC, CCRN (Rush University) Janet Engstrom, PhD, APN, CNM, WHNP-BC, CNE (Rush University)

Introduction: Although mother's milk (MM) is the optimal source of nutrition for all infants, little is known about pediatric acute care (PAC) nurses' knowledge, attitudes, and beliefs (KAB) on mother's milk feeding (MMF; breastfeeding) in the PAC setting.

Objective: To synthesize the published research on PAC nurses' MMF KAB. Secondary objectives included: to examine the number and focus of breastfeeding-related papers in PAC professional journals and determine whether professional organizations representing PAC nurses have breastfeeding position statements and participate in breastfeeding policy organizations.

Methods: Electronic database searches were conducted for studies investigating MMF KAB, reporting results of PAC nurses separately, and published in English. Also, the indexes and table of contents of journals relevant to PAC nursing practice were searched for any breastfeeding-related papers. Finally, health policy and healthcare provider professional organization Internet sites were reviewed for policy and position statements related to breastfeeding and PAC nursing.

Results: Only two studies reported results specifically for PAC nurses. The studies were conducted in Australia (n=67) and England (n=122). Overall, the nurses knew the contribution of MMF to infant health, importance of latch, and need to seek maternal permission before offering non-MMF. The nurses were less knowledgeable about the differences between MM and commercial infant formula, recommended duration of breastfeeding sessions, milk expression intervals, otitis media risk, available milk expression locations, and breastfeeding resources for mothers. The nurses also thought hospital breastfeeding facilities and maternal support were poor. The search of three PAC nursing journals found 88 breastfeeding papers with a variety of topics. Only one article explored the MMF KAB of a combined sample of pediatric and neonatal nurses. Of the two professional organizations representing PAC nurses, one has a breastfeeding policy statement. Neither of the professional organization endorse the United Stated Breastfeeding Committee Core Competencies for All Health Care Providers.

Conclusion/Significance: The limited research on PAC nurses' MMF KAB suggests that PAC nurses know that MMF is important, but lack knowledge about many aspects of MMF in the PAC setting. PAC nurses' MMF KAB merit further investigation and initiatives designed to improve the KAB of PAC nurses are needed.

Abstract #: 59

Session: Poster

Calorie and Protein Delivery in Enteral Feeding PICU Patients Post-Feeding Protocol Implementation

Authors: Elisha Reichling BS (CHS); Natalie Ratz, MS, RD, CSP, CNSC; Christine Sharp, MS, RD, LDN, CNSC; Sarah Peterson, PhD, RD, CNSC (RUMC)

Introduction: A noteworthy proportion of patients admitted to Pediatric Intensive Care Units (PICU) require nutrition support during their stay to prevent the development or progression of malnutrition. However, inpatient enteral nutrition (EN) support, the preferred method of nutrition support, is commonly held for tests and procedures which can hinder overall calorie and protein delivery in this vulnerable population.

Objective: To improve calorie and protein delivery in EN patients, an EN feeding protocol has been adopted within the PICU at Rush University Medical Center (RUMC), providing weight-specific guidelines for EN starting and advancement rates. Thus, the objective of this quality improvement project was to assess adherence to the EN protocol and to describe calorie and protein delivery in PICU patients receiving EN at RUMC.

Methods: Data were collected daily for patients started on EN within the RUMC PICU between September-November 2017 (n=24). Protocol adherence was defined as starting and advancing by the recommended rate for the patient's weight category. Data were recorded from the intake/output flowsheet and registered dietitian (RD) notes in the electronic medical records. Deficits were created from nutrient delivery below the patient's daily nutrient requirements. Number of days feeds were held were recorded. Mann Whitney U tests were used to test differences in percent of average daily calorie and protein deficits and days feeds were held between patients.

Results: The sample was 8 months of age and spent 7 days in the PICU on average. Overall, 71% was fed according to protocol; for the remaining sample 17% did not follow the protocol and 13% never received EN despite RD recommendations. Patients fed according to protocol had lower average calorie (29% vs. 39%, $p=0.325$) and protein (19% vs. 33%, $p=0.654$) daily deficits and percentage of days where feeds were held (17% vs. 30%, $p=0.499$) compared to patients fed against protocol, although not statistically significant.

Conclusion/Significance: This preliminary data suggests the weight-specific EN protocol may improve calorie delivery; the lack of statistical significance observed was likely related to the small sample size. Further analysis will include calorie and protein delivery comparison to a PICU sample obtained prior to protocol implementation.

Abstract #: 60

Session: Poster

Surgical Management of Large Substernal Thyroid Masses with Tracheal Deviation

Authors: Aryan Shay (RUMC); Courtney Miller (RUMC); Danny Jandali (RUMC); Brian Kim (RUMC); Paolo Gattuso (RUMC); Samer Al-khudari (RUMC)

Introduction: Substernal thyroid mass (STM) resections represent 2% to 19% of all thyroidectomies and pose an increased risk in surgical complications, yet there is no consensus on best surgical management. Improvements in fine-needle aspiration (FNA), intraoperative nerve monitoring (IONM), and parathyroid hormone (PTH) testing and their relation to STMs have not been heavily investigated.

Objective: The primary objective is to analyze surgical outcomes and clinicopathological features of STMs with tracheal deviation or compression. The secondary objective is to review our experience with IONM, FNA, and intraoperative PTH testing.

Methods: IRB-approved retrospective chart review was performed of surgical cases over three years for STMs by the primary author. An STM was defined as a thyroid mass extending below the clavicles. Data collection included demographics, symptoms, intraoperative findings, final pathology, and postoperative course. Data was analyzed using descriptive statistics.

Results: 25 subjects were included (11 females and 14 males) with a mean age of 54 years (30-81). Most common presenting symptom was dysphagia (48%, n = 12) followed by shortness of breath (40%, n = 10). Average BMI was 34.8 (21.9-52). Twenty-three subjects (92%) had evidence of tracheal deviation with average deviation of 1.7 cm (0.52-3.6 cm). Thirteen subjects (56.5%) had evidence of tracheal compression with average transverse diameter of 8.7 mm (3.6-13 mm). FNA on 21 patients revealed 16 benign, 3 malignant, and 2 atypical findings. Final pathology reports revealed benign findings in 13 subjects and malignancy in 12 subjects. IONM was performed in 24 cases (40 nerves at risk) with one case of permanent recurrent laryngeal nerve paralysis and one case of vocal cord hypomobility with full recovery. Intraoperative rapid PTH testing was performed in 15 cases with one abnormal value resulting in permanent hypoparathyroidism. Average weight of the STMs was 144.5 grams (15-460).

Conclusion/Significance: STMs with tracheal involvement can be successfully managed with a low morbidity rate. The significant rate of malignancy in these patients should also be considered. Study limitations include small sample size, lack of a control group, and confounding variables. Recent advancements in thyroid surgery such as IONM and rapid PTH testing can successfully be used in this surgical cohort.

Abstract #: 61

Session: Poster

Supplement prescription and consumption in adult hospitalized patients at RUMC

Authors: Courtney Susterich BS (Rush), Danielle Hom BS (Rush); Sheridan Jonas BS (Rush); Alexis Virlee BS (Rush); Christine Hartney MS, RD (Rush); Sarah Peterson PhD, RD (Rush)

Introduction: Oral nutrition supplements are ready to drink formulas that provide additional calories, protein and vitamins/minerals. Oral nutrition supplements are used as a meal replacement or to supplement poor intake for hospitalized patients by increasing nutrient intake to lessen signs of malnutrition.

Objective: The objective of the current project was to describe oral supplement prescription by health care professionals and consumption by patients admitted to Rush University Medical Center.

Methods: Oral supplement prescription and consumption was recorded for 5 weeks (July 2017-August 2017) for all adults admitted to an inpatient unit (with the exception of psychiatry and obstetrics/gynecology). Oral supplement prescription was tracked via EPIC. The ordering provider, total number and flavor of supplements was recorded. Oral supplement consumption was tracked by visiting each patient and asking for a self-report of supplements consumed during the previous day. A chi-square analysis was conducted to determine difference in oral supplement prescription by health care professionals.

Results: A total of 556 patients received supplements over the 5-week period. These patients received 1,642 supplements during the time frame; providers order an average of 3 supplements per day (range 1-9) but patients only consumed an average of 0.9 supplements per day (range 0-6). The dietitian was the most frequent provider to order oral supplements, with 289 (52%) orders placed, followed by physicians, with 215 (38%) orders placed. Dietitians were more likely to order 1 or 2 supplements compared to physicians (60% vs 16%, $p<0.001$), while physicians more likely to order 3 or more supplements compared to dietitians (84% vs 40%, $p<0.001$). The supplement flavor that was most favored by patients was chocolate ($n=304$, 55%) and strawberry being least favored ($n=49$, 9%).

Conclusion/Significance: Overall, the results of this study indicated that supplementation of diet with oral nutrition supplements was excessive. This creates waste that may be avoided if the appropriate number of supplements is supplied. Appropriate supplementation may be facilitated via physician education and having a default order for one chocolate oral supplement daily.

Abstract #: 62

Session: Poster

Care Management Activities for a Primary Care Medicaid Population

Authors: Kathryn Swartwout (RUMC); Arlene Miller (RUMC); Matthew Vail (RUMC) & Regina McClenton (RUMC)

Introduction: Primary care transformation is urgently needed to improve health outcomes especially for populations facing health disparities. Recent research suggests that addressing social determinants of health may have a greater impact in improving health outcomes than addressing medical issues alone. But primary care resources are currently stretched to capacity and under tremendous daily pressure to address individual patient medical needs. Care management models have been quickly gaining attention for success in improving population outcomes. National efforts to identify activities necessary for staff providing care management in primary care settings health have not yet been fully incorporated into practice and educational settings.

Objective: Describe the care management activities and staff confidence in performing those activities in a model care management program for primary care Medicaid patients.

Methods: A descriptive approach was used to survey 22 care management team members including nurses (RN), social workers (LCSW) and patient navigators (PN) to identify activities performed and their confidence in performing those in their work providing robust care management to a Medicaid primary care population. The survey included 52-items listing typical care management activities, based on professional nursing and social work competencies, job descriptions, expert review and other studies found in the literature. A Likert scale rated performance frequency and confidence in performing the activity over the last 5 days. Frequencies identified the most often performed activities by staff role and their confidence levels in performing those tasks. Chi-square analyses compared activities and confidence by staff role.

Results: Across staff roles, the most common activities performed included use of an electronic medical record, phone skills, and team collaboration. Eleven activities differed significantly by staff role. Confidence also differed significantly by staff role.

Conclusion/Significance: This project provides necessary insights into the activities performed by care management team members and the distinct roles each team member plays. RNs perform more medical activities; LCSWs perform more mental health activities; PNs perform more clerical tasks. However, team members may not be maximizing their roles. For example, RNs are frequently making appointments and not asking frequently about mental health issues. Despite performing an activity frequently, respondents may lack confidence and benefit from additional training.

Abstract #: 63

Session: Poster

Medical Students who help Patients Quit Smoking may better retain Empathy, Mindfulness, and Compassion over time.

Authors: Ray Urban (Rush) Arthur Hoffman (Rush)

Introduction: Medical School in the United States are in an ironic crisis. Students become less empathetic during medical school; specifically, their empathy significantly decrease during the third year. This is when they enter the clinical phase of medical school where empathy is most important. The observed decline in empathy is shown to persist for the remaining 4th year. While this can be attributed to such factors such as high workload, increased distress, and less social support, it can be detrimental to the patient-doctor relationship that is the cornerstone of clinical practice. It has been shown that the cognitive process of empathy can be practiced and thus strengthened. Early clinical experience with a cognitive-behavioral based smoking cessation intervention program may provide optimal conditions to increase empathy through practice.

Objective: The objective of this study is to measure the effect of TCI on the empathy, compassion, and mindfulness of Rush Medical Students as measured incrementally during Medical School. This group will be compared to a control cohort of students that are voluntarily not involved in TCI.

Methods: Students in both cohorts voluntarily complete an online survey that contains the interpersonal reactivity index (IRI), the Five Factor Mindfulness Questionnaire, and the Compassionated Love Scale to measure empathy, mindfulness, and compassion respectively. Yearly administration will allow for scores to be tacked and compared between years in school and cohort. The data will then be analyzed in SPSS.

Results: Average scores for M1 students (mindfulness, compassion, empathy) in program (n=2) are 117, 88, and 109.5. Average scores for M2 in program (n=2) are 122.5, 93.5, and 100. Average scores for M4 students in program (n=1) are 156, 87, and 134. Average scores for M2 students out of program (n=5) are 122.6, 82.4, and 106.8.

Conclusion/Significance: In order to glean if there is evidence that involvement in the program is associated with medical students retaining their scores into the end of their medical school careers, more data must be collected. Longitudinal reassessment of participants as well as expanding participation is required to as the study continues.

Abstract #: 64

Session: Poster

Identifying Barriers to Care for Patients with Visual Impairments through Mock Tracer Surveys

Authors: Natalia Wright, MSN (RU); Dominique Anthony, MSN (RU); Katherine J. McArdle, RN MSN CNL (RU); Sarah H. Ailey PhD RN PHNA-BC (RU)

Introduction: The prevalence of people with visual impairments (PVIs) is increasing as a result of the aging population and shifting demographics. PVIs are at a higher risk of chronic health conditions, unintentional injuries, social withdrawal, depression, and mortality than people without a disability. PVIs also experience barriers when seeking health care services, such as poor communication, lack of physical access and access to information, and hampered autonomy. During hospital admissions, PVIs experience breakdowns in standards and processes of care leading to worse outcomes than for patients without visual impairments.

Objective: The purpose of this project was to use the Joint Commission style mock tracers to identify areas of breakdown in standards and processes of care for people with visual impairments.

Methods: A mock tracer survey consisting of eleven questions was designed to assess if specific needs of visually impaired patients were being met during their hospitalizations. To develop the tracer, interviews were conducted with individuals with visual impairments and staff nurses who care for PVIs across the spectrum of care. Themes were identified and used to develop the tracer questions. The mock tracers were then conducted on three units at a community hospital associated with a major medical center in the Midwest.

Results: Breakdowns are noted during discharge, at any points where consents are required and during transitions within the care setting.

Conclusion/Significance: Developing an interdisciplinary alert related to the presence of visual impairments is needed. Staff education and protocols for discharge planning and times of consent may be needed. Alternatives to written materials used during the time of discharge and consent may be needed. These strategies can improve the coordination of care and reduce breakdowns.

Abstract #: 65

Session: Abstract

The Relationships Between Severity of Illness, Nutrition Status, and Calorie Delivery with ICU Mortality in the Pediatric ICU at RUMC

Authors: Jean Ziegenhorn, BS (Rush); Sarah Peterson, PhD, RD, LDN (Rush), Kathy Keim, PhD, RD, LDN (Rush), Natalie Ratz, MS, RD, CNSC, CSP, LDN (Rush)

Introduction: Minimal information is available to describe the relationship between severity of illness, nutritional status, and calorie delivery with pediatric mortality in the intensive care unit.

Objective: To describe the association between calorie delivery and severity of illness for the first 7 days following intubation and malnutrition status at hospital admit with ICU mortality in pediatric ICU patients.

Methods: Patients were included if they were admitted to the PICU and required mechanical ventilation for at least 48 hours. Patient born prematurely and less than 37 weeks corrected gestational age were excluded. Calorie delivery and severity of illness were collected for the first 7 days following intubation. The Pediatric Sequential Organ Failure Assessment score (pSOFA) was collected daily: average pSOFA was recorded. Daily enteral and parenteral calorie and protein delivery was recorded and the average percentage of daily recommended intake (DRI) was reported for each subject. Age, sex and malnutrition status (defined as a weight-for-length and/or BMI-for-age z-score of <-1) were also documented.

Results: A total of 126 subjects were included (male: 52% and malnourished: 51%); 27% of subjects died. Of the sample, 79% were ages birth to 3 years, 10% ages 3 years to 9 years, and 12% were 9 years and older. Congenital heart disease (55%) and chronic respiratory failure (16%) were the primary admission diagnoses. The average pSOFA was 10.2 ± 3.2 . Mean calorie and protein delivery were $39 \pm 29\%$ and $92 \pm 60\%$ of the DRI. Patients who died had a higher pSOFA compared to those discharged alive (10.8 ± 2.7 vs 8.8 ± 3.1 , $p < 0.001$). Calorie and protein delivery were not different between groups. A trend toward higher prevalence of malnutrition was observed among patients who died compared to those discharged alive (62% vs 47%, $p = 0.13$). Only average pSOFA (OR 1.32 95% CI 1.12-1.55, $p = .001$) and malnutrition (OR 2.63 95% CI 1.09-6.33, $p = .03$) were significant predictors of mortality.

Conclusion/Significance: Increased severity of illness in the presence of malnutrition is associated with increased mortality. No association was observed between mortality and calorie delivery, however, the low overall calorie delivery may have impeded the ability to observe an association.

Abstract #: 66

Session: Poster

Health Education in Chicago Public Schools

Authors: Emily G. Adochio (RU); Sarah Burbank (RU); Jessica A. Chin (RU); Mallory Davis (RU); Steven K. Rothschild (RU); and Gina Kring (RU)

Introduction: Hispanic children have a higher rate of obesity compared to their non-Hispanic black and white peers. This disparity is especially exacerbated in Chicago. Despite this evident inequity, there is minimal research available that addresses the role of nutrition education in these urban, predominantly minority communities.

Objective: The intention of this study is to examine change in perception, attitude, and knowledge of fruits and vegetables in adolescent minorities through implementation of nutrition classes as well as tangible exercises.

Methods: A total of 23 students completed the curriculum, with 11 students in the Lecture Only (LO) group and 12 students in the Lecture + Activity (L+A) group. The LO group completed a set of six didactic lectures based on nutrition and advocacy. The L+A group completed the same didactic lectures followed by hands-on activities, such as a yoga class; they were also given the opportunity to participate in gardening. Each student was given pre- and post-tests which evaluated seven different areas. Paired students t-test, performed in Excel, were used to compare scores for both groups.

Results: Notably, the LO group saw increases in the perception and self-efficacy, exposure, and liking sections of the pre- and post-tests. The average amount of vegetables consumed in the past day increased in the LO group from 1.18 to 1.73. Students in the L+A group who also attended the garden saw an increase in the average number of vegetables consumed from 2.25 to 2.75. After analysis with a paired t-test, an overall significant increase in the number of fruits consumed in all groups combined was discovered ($p=0.013$).

Conclusion/Significance: Researchers found that the increase in fruit consumption was statistically significant in all study groups, indicating that a fruit and vegetable-based didactic component alone can improve the nutritional literacy of students. Additionally, students in the L+A group that attended the garden were the most favorable to make healthier dietary choices. Limitations of this study include a small study population and participants not being the primary food purchaser in their homes.

Abstract #: 67

Session: Poster

The Association between Condom Usage Patterns and Sexually Transmitted Infections Prevalence in Minority Women in Chicago, Illinois

Authors: Deborah Bang (Rush U)¹, Jessica M. Madrigal, MS², Lisa Henry-Reid, M.D.¹, Ashlesha Patel, M.D., MPH² ¹Department of Pediatrics, Adolescent Medicine at John H. Stroger Jr. Hospital of the Cook County Health & Hospital System, Chicago, Illinois ²Departme

Introduction: Adolescents in Cook County had the second highest rates of reported chlamydia (CT) and gonorrhea (GC) infections among all U.S. counties in 2014. Routine condom use can prevent the transmission of sexually transmitted infections (STIs); however, misinformation about condoms may be a barrier to consistent condom use especially in young women.

Objective: Our aim was to examine condom usage patterns and determine if they were associated with STIs prevalence among women at our clinic.

Methods: Women between 13 to 25 years old who presented for a first trimester termination at the Cook County Health and Hospital System (CCHHS) Reproductive Health Services clinic in 2015-2016 were approached for a brief encounter with a health educator about STIs. They were asked about condom usage, and information on age, race/ethnicity, education, health insurance, and CT/GC testing results were collected. Cochran-Mantel-Haenszel statistics and log-binomial regression modeling were used to estimate prevalence ratios and determine if condom usage was associated with positive STI status. This study was approved by the CCHHS institutional review board, and all participants consented to participate.

Results: 3,868 women participated in the health interview and received CT/GC testing during the study period. The average age was 21 (SD 2.3) years, and 90% were African American. Over 75% were enrolled in Medicaid. 12.6% (n=488), 1.5% (n=56), and 0.83% (n=32) were positive for CT, GC, or both at the time of their encounter. Only 4.7% (n=183) reported always using condoms. 21.6% (n=837) used condoms most of the time, 32.0% (n=1239) some of the time, and 41.6% (n=1609) rarely or never. Condom use was not associated with STI prevalence (p-values 0.52 to 0.95) in crude or multivariable models adjusted for age, race, insurance status, and history of STI testing.

Conclusion/Significance: Although patterns of condom usage varied among women with and without STI's at the time of the clinical encounter, always using condoms was not associated with lower STI prevalence. Furthermore, less consistent usage patterns were not associated with increased prevalence. This may indicate a need to strengthen health education resources on topics related to STI risk and prevention, in addition to condom use.

Abstract #: 68

Session: Poster

Evaluation of factors related to prolonged lengths of stay for patients with autism and/or intellectual disabilities

Authors: Andrea Cabrera (Rush); Sarah Ailey (Rush); Diane McNaughton (Rush); Tricia Johnson (Rush); Elizabeth Tadie (Rush); Louis Fogg (Rush)

Introduction: Patients with autism spectrum disorder (ASD) and/or intellectual disability (ID) face unique healthcare challenges. In addition to hospital experiences characterized by fear and insufficient staff training, these patients have significantly higher total charges, 1.5 times longer lengths of stay (LOS), and more diagnoses on admission than patients without ASD/ID; 3.6% have prolonged stays \geq 30 days, accounting for 25.1% of hospital days for this population. Prolonged stays are costly, and create stress for the patients, their supports, and hospital staff. Little research exists on factors related to prolonged LOS of patients with ASD/ID, hindering efforts to develop and implement evidence-based practices to improve care and reduce prolonged LOS.

Objective: Purpose: To explore factors related to prolonged LOS in acute care settings of patients with ASD/ID. Theoretical Framework: The Foundations for High-Performing Healthcare Organizations (HPHCOs) and the issue of evidence to drive change informs this project. HPHCOs evaluate performance, identify benchmarks, and negotiate realistic goals to meet the needs of varied and changing patient populations.

Methods: A retrospective review of electronic medical records was conducted of ten adult patients admitted to an urban academic medical center with secondary diagnoses of ASD/ID, with LOS \geq 30 days.

Results: All ten patients were discharged from adult inpatient psychiatry, a setting likely to exacerbate certain symptoms of the disorders of this population. The majority were male (n=8). The median LOS was 56 days, with a maximum of 203 days. Common themes included: a) the use of 1:1 or 2:1 observation (n=7); b) restraints and/or security holds (n=5); c) adverse events such as injury to self or staff (n=4); and d) significant discharge barriers in finding placements post-hospitalization (n=5).

Conclusion/Significance: Hospitals must evaluate performance with this patient population and identify evidence-based strategies to provide a safe environment for care, reduce lengths of stay, and lower costs. Promising strategies include partnering with patient-family advisors to identify areas of improvement, developing tool kits and algorithms for care, and improving staff education. Policy and payment changes are needed to improve availability of community placements. Developing realistic goals in these areas reflect characteristics of HPHCOs.

Abstract #: 69

Session: Poster

Unraveling the Mystery of the Gendered Paradox in PAH

Authors: Brandon Carman BS (GC) Shanshan Qin(RU) Sal Dibartolo(RU) Dan Predescu(RU) Sanda Predescu(RU)

Introduction: Idiopathic pulmonary arterial hypertension (PAH) is a deadly disease characterized by hyperproliferation of pulmonary endothelial cells (ECs) and medial hypertrophy due to dysregulation of pulmonary artery smooth muscle cells (PA-SMCs). This aberrant cellular behavior results in progressive obliterative remodeling of the small pulmonary arteries, increased vascular resistance, right ventricular hypertrophy, right heart failure and early death. Incidentally, females are at a higher risk of developing PAH, while, males tend to experience worse outcomes with a higher mortality rate.

Objective: Studies investigating this gendered paradox have identified the estrogens and androgens as being responsible for this phenomenon. Yet, patient outcome remains poor. As a result, a need to identify novel protein targets and signaling mechanisms influencing the gendered paradox of PAH remains.

Methods: In an effort to elucidate these proteins and mechanisms, we will explore the role of RXFP1 in PAH, as it is regulated by gender, localized to small PAs, and results in diverse signaling outcomes when activated. Therefore, we propose to take advantage of our recently developed mouse model of plexiform arteriopathy, the Eps15 homology domain transduced Intersectin-1short (ITSN) heterozygous mouse (EH-KOITSN+/-), a murine model that recapitulates many features of clinical PAH, including the required gendered differences to study RXFP1.

Results: EH-KOITSN+/- female mice develop a more severe phenotype in regard to PAH pathophysiology compared to EH-KOITSN+/- male mice. The progression of plexiform arteriopathy appears to be directly correlated to p38-MAPK activation, a protein which seems to be more activated when higher levels of RXFP1 are present.

Conclusion/Significance: These studies reveal a novel, RXFP1-dependent signaling pathway that likely regulates lung cell proliferation and obliterative remodeling of the small pulmonary arteries, as observed in PAH. As a result, this RXFP1-dependent signaling pathway may serve as a new therapeutic target and thereby improve patient outcome.

Abstract #: 70

Session: Poster

Lesbian/Gay/Bisexual Affiliation and Perceived Discrimination in Older Adults

Authors: Anthony Carrera (RADC), Raj C. Shah (RADC), Ana W. Capuano (RADC), Lisa L. Barnes (RADC)

Introduction: In sexually active older adults, the impact of identifying as lesbian/gay/bisexual (LGB) on health outcomes is not well understood. In younger adults, LGB status has been associated with worse health outcomes. Perceived discrimination has been one hypothesized mechanism by which LGB status could result in worse health outcomes.

Objective: We examined whether LGB affiliation in sexually-active, community-dwelling, older adults was associated with greater perceived discrimination.

Methods: Data from the Rush University Medical Center Institution Review Board approved Center of Excellence on Disparities in HIV and Aging (CEDHA) Research Core study was utilized. Participants included 203 black (78%) and white (22%) older persons with (36%) and without HIV (64%). At study baseline, everyday discrimination was assessed using the 9-item Detroit Area Study Everyday Discrimination Scale (scores from 0-9, higher scores representing more perceived discrimination). Participants who self-reported being sexually active were asked about sexual orientation (heterosexual, homosexual, or bisexual). LGB status was defined as answering the sexual orientation question and not reporting being heterosexual.

Results: Of the 203 CEDHA Research Core participants who reported being sexually active, 200 responded to the sexual orientation question with 44 (22%) reporting LGB affiliation. Persons reporting LGB affiliation were more frequently men (95%, Chi-square (df=1)= 5.85, p=0.016), Black (57%, Chi-square (df=1)= 14.74, p<0.001), with education greater than 12 years (93%, Chi-square (df=1)= 4.7786, p=0.028), and were HIV positive (73%, Chi-square (df=1)= 33.02, p<0.001). In a linear regression model adjusted for age, gender, race, and HIV status, there was no association of LGB status and perceived discrimination score (parameter estimate = - 0.291, SE = 0.49, p=0.6).

Conclusion/Significance: In a cross-sectional analysis, an association between LGB status and perceived discrimination score was not found which differs from findings in the current literature. Further work in larger cohorts of older adults of various sexual orientations is needed.

Abstract #: 71

Session: Poster

Relationship of Vascular Disease Burden and Global Cognitive Decline in Community-Dwelling Older Blacks.

Authors: Praneeth Chebrolu MBBS (Rush University Medical Center) Raj C Shah MD (Rush University Medical Center)

Introduction: Data on cardiovascular disease and cognitive decline in community-dwelling older Blacks is limited.

Objective: Our objectives are to investigate if vascular disease burden is related to the global cognitive decline in Blacks and to examine if the relationship is different as compared to Whites.

Methods: The analysis included 2273 community-dwelling Blacks and Whites aged 65 and older from a matched cohort of participants from two longitudinal studies of aging the Minority Aging Research Study (MARS) and the Rush Memory and Aging Project (MAP). Cognitive decline was assessed annually using a battery of 19 tests. Vascular disease burden at baseline defined as self-reporting of one or more of four conditions (heart conditions, stroke, claudication, and congestive heart failure) and score ranged from 0 to 4. Using mixed effects models adjusted for age, gender, and education level, the relation of baseline vascular disease burden with global and specific cognitive decline were determined for Blacks in the cohort. Next, models were repeated in the overall cohort to determine if race modified the relationship between vascular disease burden and global cognitive decline.

Results: In the overall cohort, 32.3% were Black with a mean age 73.5 year (SD=6.7) and 76.8 % women, and 67.7 % were Whites with a mean age 80.2 year (SD=7.2) and 73.8% women. During an average 6.5 years of follow up, in a mixed effects model controlled for age, gender, education and Apo ε4 genotype, vascular disease was not associated with the rate of global cognitive decline in Blacks (PE=0.01, SE=0.01, p=0.1). Vascular disease was significantly associated with slower rate of episodic memory decline (PE=0.02, SE=0.01, p=0.01). Global Cognition as a function of vascular disease burden is not modified by race in the entire cohort (PE=0.01, SE=0.01, p=0.5).

Conclusion/Significance: Vascular disease burden was not associated with a global cognitive decline in Blacks. Race did not modify global cognition as a function of vascular disease burden. More research is warranted on vascular disease burden and episodic memory in African-Americans

Abstract #: 72

Session: Poster

Dialysis access maintenance in the medicare population: An analysis of trends by provider and site of service over a decade

Authors: Osman Ahmed, MD Rush University Medical Center Chicago, IL Rana Rabei Rosalind Franklin Univ Med and Sci Chicago, IL Ketan Patel Rush University Medical Center Chicago, IL Mikin Patel University Of Chicago Medicine Chicago

Introduction: The prevalence of end-stage renal disease (ESRD) continues to rise in the United States, with over 650,000 people living with ESRD in 2014. As such, the numbers of dialysis maintenance procedures (percutaneous thrombectomy and hemodialysis access angiography) has increased dramatically with the growing population. Dialysis access maintenance was a territory that was once dominated by Radiologists, a profession that has showed immense growth over the past couple of decades, and Surgery. As time has passed, there has been a rise in the performance of these procedures by Nephrologists.

Objective: To evaluate the trends in percutaneous thrombectomy (de-clot) and hemodialysis access angiography (fistulogram) procedures amongst hemodialysis patients in the Medicare population by provider and setting.

Methods: Medicare Physician Supplier Procedure Summary Master Files from 2005 through 2015 were analyzed for procedure codes of hemodialysis access angiography and percutaneous thrombectomy. Using physician specialty codes, component procedure volume for endovascular services were extracted for Radiology, Medicine (Nephrology), and Surgery. Data entries were independently analyzed by provider type and place of service. Average submitted and allowed charges per each intervention were also queried.

Results: Between 2005-2015, the total Medicare fee-for-service beneficiary frequency of dialysis access angiography increased by a total of 47.39% (250,329 to 368,955). Specialty specific analysis demonstrated a volume increase of 220.78 % (31,520 to 101,109) for Surgery, 196.86 % (38,434 to 114,094) for Nephrology, and a decrease of 18.03% (170,032 to 139,367) for Radiology. By 2015, an increased trend from hospital to office-based procedures associated with significantly higher reimbursement rates (+17,038 office-based cases/year, \$26.17/year, $p=.001$) was also observed, with Medicine performing the highest volume of office-based fistulagrams. In this period, there was also a modest total overall increase of endovascular de-clotting procedures by 7.75% (61,485 to 66,250).

Conclusion/Significance: The frequency of endovascular hemodialysis access maintenance procedures has increased from 2005-2015 with the majority market share transitioning from Radiologists to non-Radiologists. Similarly, the majority of access maintenance procedures in this time period changed from hospital to office-based interventions.

Abstract #: 73

Session: Poster

Partnerships with purpose: expanding the Walk With A Doc model to provide education on stroke and stroke prevention

Authors: Rob DeStefano (Rush); Neelum Aggarwal, MD (Rush); Annabelle Volgman, MD (Rush)

Introduction: Stroke continues to be the leading cause of adult disability and the fourth leading cause of death in the United States. There are 9,000 strokes annually in Chicago with a predisposition towards minorities and underserved populations. Stroke prevention thus will require a coordinated community and health professional effort to address lifestyle modification and provide education about morbidity and mortality risk reduction.

Objective: The goal of Partnerships With Purpose was to expand the Walk With A Doc model to offer a physician supervised walking program (lifestyle modification) and stroke education to underserved populations in Chicago. As an extension of the CEERIAS study (Community Engagement for Early Recognition and Immediate Action in Stroke), we aimed to collect data on stroke awareness to evaluate if the CEERIAS intervention resulted in earlier recognition and action in stroke treatment.

Methods: We partnered with 3 organizations (A Safe Haven, The Village Chicago, Forward Chicago) to initiate walking programs. Walks at our existing partners' locations (Kroc Center and MetroSquash) were expanded to have regular monthly events and bolster participation. Stroke information was disseminated in the form of pamphlets, wallet cards, and physician driven discussion. Post walk surveys were administered across 10 cohorts from May through December 2017. Questions assessed an understanding of stroke presentation and when to seek medical attention. Patient demographics were collected to assess knowledge disparities.

Results: A total of 18 walks were added across 5 sites. Based on group discussions, the accessibility and involvement of a physician was a significant incentive to attend the walks. Additionally, the event structure provided a supportive community that some participants found favorable to individual walking. Across 7 months, the CEERIAS study received 363 completed surveys.

Conclusion/Significance: Our involvement indicates that walking programs are a beneficial and welcomed program in Chicago communities. Future goals will be to determine if continued involvement in walking programs has a positive impact on community or individual long-term health or depth of community/individual knowledge on stroke and stroke prevention. This partnership hopes to continue its assistance to the CEERIAS study and begin a collaboration with HabitNu, a diabetes prevention program, in the future.

Abstract #: 74

Session: Poster

Did the HCAHPS Survey Policies Exacerbate the Opioid Epidemic?

Authors: Blake Dobrich (Rush University) Shital Shah (Rush University) Francis Fullam (Rush University Medical Center) Mario Moric (Rush University Medical Center)

Introduction: The opioid epidemic is an increasingly dire situation in the United States. Some experts claim that physicians are contributing to the crisis through their unnecessary prescription of opioids since physician reimbursement is based partly on pain management. Realizing this, CMS removed the pain management questions on HCAHPS surveys at the beginning of 2018.

Objective: We examine the association between HCAHPS Top Box patient experience pain scores and opioid prescription rates at the state level controlling for intervening variables including: Race (% White, % Black), Median Income, and Education level (% High School Degrees, % Bachelor's Degrees).

Methods: This study is a retrospective, cross sectional study design that utilized 2013 data. Descriptive and bivariate (Pearson correlation and Anova) analysis was conducted to determine the association between HCAHPS Top Box patient experience pain scores, opioid prescription rates by state, and the intervening variables.

Results: Preliminary results from this study show states with higher opioid prescription rates tend to have better reports of pain management ($r=0.326$, $p<0.05$) Additionally, states with a higher median income tend to report lower pain management satisfaction ($r=-0.44$, $p<0.05$) and lower opioid prescription rates ($r=-0.422$, $p<0.05$). A positive correlation exists between states with a higher percentage of whites and HCAHPS pain satisfaction scores ($r=0.280$, $p<0.05$). Lastly, preliminary results show that states with a higher percentage of bachelor's degrees have lower HCAHPS pain satisfaction scores ($r=-0.497$, $p<0.01$) and lower opioid prescription rates ($r=-0.422$, $p<0.01$).

Conclusion/Significance: Preliminary analysis supports the contention that there may be an association at the state level between propensity to prescribe opioids and improved reports from patients of their pain management. Further analysis controlling for other state level variables will shed light on the degree to which this preliminary relationship is an artifact of an ecological correlation. The conclusions from this study will further the knowledge surrounding CMS's previous belief that the HCAHPS survey incentivized excessive opioid prescriptions. This study may not be able to directly show causation; however, the association found can point to further research in the pursuit of proof.

Abstract #: 75

Session: Poster

Health Education for Women in Washington Park

Authors: Josh Doppelt BS (RMC) Dr. Maria Brown

Introduction: As a steerer for the Chicago City Church RCSIP site in Washington Park, Josh developed a relationship with Pastor Moodie and his wife Kehinde. The Moodies identified health literacy, mental health, and coping strategies as priorities to address, in particular with women in their community. Alongside Kehinde, Josh developed a nine-week summer curriculum for their women's group to address areas of health most important to them.

Objective: The objectives of developing this curriculum were to teach women about common health diseases, positive lifestyles changes, and coping strategies to empower them to take control of their health. Additionally we sought to evaluate how interactive educational health sessions are comprehended and translated into personal health management.

Methods: After meeting with Kehinde to assess health issues facing their community, Josh designed an orientation for the women to gauge their knowledge about the topics identified, and to find if there were additional interests. Afterwards, Josh created a weekly nine-week curriculum and individual sessions.

Week Session: 1 Nutrition; 2 Hearth Heath; 3 Diabetes; 4 Nutrition II: Cooking; 5 Aging; 6 Exercise; 7 Mental Health II; 8 Mental Health II; 9 Recap and Celebration

To assess what was learned Josh created pre and post quizzes, as well as informally from games and asking questions during sessions. This latter style was how he assessed what was learned throughout the summer at the final recap.

To assess effectiveness and how to improve the curriculum and sessions, Josh utilized an anonymous suggestions box in addition to casual conversations.

Results: The women scored an average of 19.25% higher on post quizzes than pre-quizzes. Informal question and answer sessions showed improved understanding of topics. A difficulty arose with written content, as some of the women had lower literacy levels. The group began with hourly sessions, however the women asked to lengthen them to 1.5 hours to facilitate more videos and games.

Conclusion/Significance: This curriculum was effective in improving health knowledge and literacy as seen in quizzes and informal qualitative assessment. In future implementation, careful attention should be put into making sessions less dependent on written content to make information more accessible for all attendees.

Abstract #: 76

Session: Poster

Continued Development of a Student-Led Health Education Intervention for Women Detained in a Large, County Jail

Authors: Tam Dukich, PA-S I (Rush); Erin Paolini, BS, PA-S I (Rush); Sara Gottlieb, BA (Rush); Chloe J.E. Solomon, MS (Rush)

Introduction: Women in jail have lower educational attainment, lower socioeconomic status, higher rates of trauma, and higher rates of chronic and mental illness relative to the general U.S. population. Detained women also report barriers to accessing healthcare, negative interactions within the healthcare system, and avoidance of medical care due to stigmatization. Jails are thus an important interventional target for health promotion and disease prevention. The Correctional Health Initiative (CHI) allows health professions students to engage with this high-risk population by providing ongoing health education to women detained at Cook County Jail in Chicago, Illinois.

Objective: CHI aims to provide pertinent and actionable health information to program participants, while also fostering positive interactions between detainees and health professionals. Thus, our current goals are to refine our curriculum with input from participants and foster a deeper understanding of the criminal justice system amongst volunteers and health professionals.

Methods: Our interdisciplinary team of health professions students designed and lead a 10-week health education program for women detained at Cook County Jail, including topics such as family planning, substance use, nutrition, and common chronic diseases. A 40-page Women's Health Guide is distributed, containing relevant information and resources to accompany each session, along with program completion certificates, which can be used for court dates and job interviews. Given the protected status of our target population, IRB approval for formal statistical analysis is rigorous and time-intensive, a process we have not yet had the resources to achieve. Thus, informal feedback has been utilized for participants and post-program surveys for volunteers.

Results: To date, volunteers have led 140 sessions with an average of 32 participants/week, showing 6.67% annual participant growth. Informal participant feedback has been overwhelmingly positive while also providing insights into future considerations. Volunteers submit feedback via Google Forms, and results are used for quality improvement.

Conclusion/Significance: Health education interventions in correctional settings provide a valuable service and build positive relationships. Future directions include obtaining IRB approval to conduct participant focus groups, assessing the impact of participation on health professions students, and developing similar programming for detained youth.

Abstract #: 77

Session: Poster

Implementing Collaborative Care for Depression Treatment in Vulnerable, Urban Communities

Authors: Rebecca Feinstein (Rush)

Introduction: Approximately 17% of adults in Chicago are diagnosed with depression. Most seek treatment in primary care, which can often be understaffed and under-resourced, particularly in the area of mental health diagnosis and treatment. To improve access to depression treatment for adult Medicaid recipients, an accountable care organization of medical homes (primary care health centers and clinics) implemented an evidence-based collaborative care (CoCM) depression treatment program - based upon the principles of population-based care, measurement-based care, and stepped care.

Objective: This study evaluates the implementation fidelity and reports the outcomes of the CoCM program after one year.

Methods: A reflexive evaluation design was utilized over the course of 12 months. Patient screening, enrollment, and progress data were collected from program registries, health risk assessments, and claims data and measured with the Patient Health Questionnaire-9 (PHQ-9). Qualitative interviews were conducted with program and leadership staff after six and 12 months.

Results: CoCM initiated screening for depression in the entire adult patient population by including the PHQ-9 with the yearly health risk assessment. Of the 2065 enrolled, one-third of patients in the program for at least 12 weeks decreased their depression symptoms by 50%, as measured by the PHQ-9; 10% went into remission. The majority of medical homes adhered to the main program components (population-based screening, specified follow-up contact, regular measurement of PHQ-9 scores, and stepped-up care referral). Barriers to success are attributed to staff turnover, staff training, and poor collaboration with primary care providers regarding prescribing psychiatric medication.

Conclusion/Significance: CoCM was implemented by an accountable care organization consisting of 11 medical homes and over 90 clinics in Cook County, IL. This is the first time CoCM was implemented in a primarily low-income, ethnically diverse, urban population of Medicaid recipients. Despite the complexity of implementing CoCM in numerous sites, the program instigated a clinical practice change by integrating universal depression screening into the risk assessment process and increasing treatment capacity. Lessons learned from this program evaluation are valuable for other communities interested in implementing CoCM in a primarily low-income, ethnically diverse, urban population of Medicaid recipients who often have little or no access to mental health care.

Abstract #: 78

Session: Poster

Oh, the Places You Will Go: Dismantling Recreational Segregation in Chicago through Asset-Based Community-Engaged Marketing

Authors: Kaitlyn Fruin¹, David Ansell¹ ¹Rush Medical College

Introduction: Rush University Medical Center is the largest private employer on Chicago's West Side. Because compensating Rush's 10,643 employees accounts for more than half of Rush's operating expenses (\$845,659,668; 51%), creating opportunities that allow employees to reinvest their earnings in the West Side can maximize the local impact of Rush's largest annual investment. However, little is known about how Rush employees invest their time and financial resources within the West Side.

Objective: We described the impact of an asset-based, community-engaged marketing approach on aggregate West Side tourism patterns among Rush employees, students, and their family and friends.

Methods: We collaborated with community partners to promote the annual 5k walk/runs in Austin, Garfield Park, Little Village, Pilsen, and North Lawndale. We conducted a pre-intervention evaluation of Rush employees, students, and their family and friends (N=364) assessing which of the twelve communities in Rush's West Side service area they had visited during the prior six months. Pre-intervention data were compared to 5k walk/run registration data to evaluate impact on local tourism patterns.

Results: Pre-intervention, five communities (Humboldt Park, n=137; Little Village, n=142; Near West Side, n=153; Oak Park, n=166; West Town, n=131) had more than 130 visitors and seven communities (Austin, n=71; East Garfield Park, n=55; Forest Park, n=66; Lower West Side, n=66; North Lawndale, n=65; River Forest, n=59; West Garfield Park, n=63) had less than 75 visitors during the past six months. Sub-analyses of visitorship patterns by region of participants' residence reproduced the two-tier visitorship pattern. Post-intervention, visitorship increased by a factor of 3.02 in Pilsen, 1.8 in North Lawndale, 1.76 in East Garfield Park, 1.47 in Austin, and 1.22 in Little Village.

Conclusion/Significance: At baseline, participants demonstrated marked disparities in their tourism patterns across West Side communities. Internally marketing the annual West Side 5k walk/runs through an asset-based community-engaged approach increased visitorship to the five host communities among Rush University Medical Center employees, students, and their family and friends.

Abstract #: 79

Session: Poster

Using Vignette-based Methodology to Explore Barriers and Facilitators in the Recruitment of Older African American Adults: A Pilot Study

Authors: Charlene J. Gamboa, MPH, PhD Student (Rush University, College of Nursing) Wrenetha Julion, PhD, MPH, RN, FAAN2 (Rush University, College of Nursing) Dawn Bounds, PhD, PMHNP-BC1 (Rush University, College of Nursing)

Introduction: According to the CDC (2014), the greatest health burden of heart disease and stroke, hypertension, diabetes, kidney disease, HIV infection, and cancer mortality is shouldered by older African-American adults (OAAA; age 65 and above). OAAA represent a large and rapidly growing portion of the aging minority population. A growing opportunity for OAAA to access some forms of health-care is to participate in health-related research. Nevertheless, less than 5% of African-Americans enroll in health-related research. Although there is documented need for increased representation of OAAA in health-related research, scarce empirical data on the recruitment process from the perspective of OAAA persists with minimal information about the factors that influence the recruitment process. An innovative method to investigate enrollment influencers, facilitators or obstructers of OAAA into health-related research is with vignette-based survey methodology. Vignette-based survey methodology uses vignettes, or short stories about a hypothetical real-world situation or person to capture perspective on a given phenomenon and is traditionally used with research on sensitive topics or vulnerable populations.

Objective: This study will utilize written scenarios or vignettes of realistic recruitment situations in combination with a survey that examines recruiter's recruitment behavior to elicit OAAA perspectives on the likelihood of participating in health related research.

Methods: Swanson's Caring Professional Scale guided the development of vignettes that portrayed realistic recruitment experiences for OAAA. The use of vignette-based methodology was then used to investigate the attitudes, judgments, and decision-making processes of OAAA during the recruitment process.

Results: The majority of the participants responded that they are most likely to enroll into a health-related research study when the recruiter exhibited caring behaviors throughout the recruitment process. Non-caring or generic behavior tended to deter enrollment.

Conclusion/Significance: The vignette-based methodology guided by Swanson's Caring Professional Scale is a helpful method to ascertain the preferences of OAAA and subsequently guide their research enrollment decision-making. Future tailored recruitment plans should incorporate caring behavior strategies to facilitate enrolling of OAAA into health-related research.

Abstract #: 80

Session: Poster

An Assessment of Physicians' Opinions on Health Care Reform

Authors: Elizabeth Hall BA (RMC) Jim Curry MD (UIC), Katherine M. Tynus MD (NU), Peter Orris MD, MPH (UIC), and David Ansell MD, MPH (Rush)

Introduction: As the uncertainty regarding the direction of health care reform grows, the absence of physicians' perspectives in the health care debate becomes more conspicuous: no current, comprehensive survey of physicians regarding health care reform exists.

Objective: Data on physicians' opinions concerning health care policy could give valuable insight into the debate. Assessing Chicago physicians' perspectives and understanding of single payer health care, as well as analyzing the survey results based on demographics such as gender, age, medical specialty, and political party affiliation could better inform directions of health policy change.

Methods: To address this knowledge gap, we conducted a survey of Illinois doctors concerning health care policy. Using the Chicago Medical Society database, we asked doctors (and some doctors-in-training) to indicate their preferences and opinions regarding different health care insurance public repeal policies. 1,059 responded to the survey request, and roughly two thirds completed the survey entirely. Participants were from Cook County, which includes Chicago and the surrounding suburbs.

Results: A majority of respondents opposed the current proposal to repeal and replace the Affordable Care Act (ACA), a proposal known as the American Health Care Act (AHCA). A majority also expressed a generally favorable view of the ACA. An even greater majority indicated a preference for a single payer system. Nearly 90% of respondents agreed strongly or agreed somewhat that health care is a human right that should be made available to all.

Conclusion/Significance: Our survey is the first to demonstrate physician support for single payer health over the ACA and the AHCA. It is also the first to be conducted in Illinois, and is currently the most recent data. Opposition to the AHCA seems overwhelming, while the ACA and single payer appear to have widespread support among the physicians we surveyed.

Abstract #: 81

Session: Poster

National Survey Regarding Patient Perspective on Timing of Fertility Education Analyzed by Age

Authors: Karissa Hammer, Department of OBGYN, Rush University Medical Center, Chicago, IL, USA. Alyssa Kahan, Department of OBGYN, Rush University Medical Center, Chicago, IL, USA Louis Fogg, PhD Department of Nursing, Rush University Medical Center, Chicago, IL

Introduction: Oocyte cryopreservation is now an approved technology to aid women in delaying childbearing; however, studies have shown that our patients have little understanding of this technology and of the natural age-related decline in fertility. There are no published guidelines instructing physicians how or when to educate women about their fertility for physicians or schools to educate women on their fertility at young ages. When is the appropriate time to start this education, is it during OBGYN appointments or earlier during education during school years?

Objective: To investigate nulliparous women's opinions on timing of fertility education in order to discern whether fertility education is preferred at a general OBGYN appointment or earlier during school years.

Methods: A primary analysis of a cross-sectional electronic questionnaire was performed. A total of 1213 nulliparous patients from March 4- March 9, 2016 completed the survey. There were four questions addressing fertility education that were analyzed by age cohorts of younger than 35 years old and 35 years old or above. Contingency table analyses were performed.

Results: A total of 1213 women completed the online survey. Majority of participants either strongly agreed or somewhat agreed that women should be educated during OBGYN appointments and during school. When comparing age cohorts (age less than 35 years old and age 35 years old and above) we found that older women had an increased tendency to disagree with each question than younger women. Overall, majority of participants agreed with early education at OBGYN visits and sex education classes.

Conclusion/Significance: We demonstrate that overall women want more education on their own fertility. Our educational efforts need to improve as our patients need this information at younger ages in order to make educated reproductive choices. We approved the technology for cryopreservation in 2013, this survey took place three years later and our patients are still requesting more information. Perhaps fertility education should be a mandatory component of sex education in schools and a routine aspect for wellness exams.

Abstract #: 82

Session: Poster

Transforming Clinical Practice Initiative: Equity in CVD Risk Reduction

Authors: Michael Hanak, MD, Assistant Professor, Dept. Family Medicine (Rush) Nousheen Meherally, Performance Improvement Consultant (Rush) Christine O'Donnell, RN (Rush) Adrienne Blackmon, Patient Care Navigator (Rush)

Introduction: It has long been known that patient populations with fewer socioeconomic resources experience worse outcomes from cardiovascular disease. Despite efforts that seek to improve care gaps affecting cardiovascular health, the differences in cardiovascular disease severity and prevalence of comorbidities seen between white and non-white populations in the south and west sides of Chicago remains unchanged.

Objective: The purpose of this work is to establish workflows within primary care and cardiology practices that identify and engage high-risk and high-cost patients in comprehensive care that leads to improvement in modifiable ASCVD risk score components (lipid profile and smoking cessation) while achieving top-decile performance in the clinical management of diabetes and hypertension.

Methods: A cohort was selected among all adult patients with Medicare or Medicaid insurance who were empaneled to a Rush primary care physician and seen at least once in 2016. Each patient in the cohort had one or more cardiovascular conditions and fell into the 70th-90th percentile for cost based on Rush charges. Clinical and operational interventions were developed to address cardiovascular risk in this population while also completing a social determinants of health risk assessment and follow-up plan.

Results: The initial population assessment demonstrated greater prevalence and higher ASCVD scores among African-American patients. Older age and higher income were strongly linked to better diabetes control, as well as female gender. Finally, over half of patients were missing smoking status or cholesterol values, and nearly a third of patients with uncontrolled diabetes were lacking clinical information needed to calculate an ASCVD risk score. No patients have been screened for social determinants of health.

Conclusion/Significance: Initial data collection has shown disparate rates of disease control and cost of care when considering race, geographic location, and access to regular primary care (versus ED or hospitalization). Furthermore, highest cost patients reside in zip codes known to have fewer socioeconomic resources. Pre- and post-intervention data will demonstrate whether improved disease control, social determinant interventions, and a reduction in ED visits and hospitalizations results in lower cost and higher quality care among our most complex patient population.

Abstract #: 83

Session: Poster

Relationship of Loneliness to Level and Change in Cognitive Function in Older, Community-Dwelling African Americans

Authors: Mercy Joyce (UW-Seattle), Raj C Shah (RADC/RUSH), Ana Capuano (RADC/RUSH), Robert Wilson (RADC/RUSH), Duke Han (RADC/RUSH), David Bennett (RADC/RUSH), Lisa Barnes (RADC/RUSH)

Introduction: Loneliness, or emotional isolation, is perceived social isolation and feeling disconnected from others. In a predominantly White cohort of older, community-dwelling adults, higher reported loneliness is associated with more rapid global cognitive decline. Limited research on the relationship of social isolation and cognitive function in older African Americans.

Objective: We examined whether older African American adults who report greater accounts of loneliness at initial evaluation experience greater cognitive decline.

Methods: The Minority Aging Research Study (MARS) and the Memory and Aging Project (MAP) are two longitudinal studies of aging in older, community-dwelling persons without known clinical dementia at enrollment. Both have been approved by the Rush University Medical Center Institutional Review Board. Participants annually completed a neuropsychological battery of 19 cognitive function tests. Loneliness at study baseline was defined as the average score of five items from a modified version of the de Jong Gierveld Loneliness Scale and ranged from 1 to 5 (higher scores reflecting greater loneliness).

Results: Of 729 older African Americans followed for a mean of 6.3 years ($SD=3.8$), the baseline mean age was 73.4 years ($SD=6.6$), mean education level was 14.7 years ($SD=3.4$) and 75.7% were women. The mean baseline loneliness score was 2.1 ($SD=0.6$). In a mixed-effects model adjusted for age, education, and gender with global cognitive function as the outcome, each unit increase in baseline loneliness was associated with a 0.087 ($SE=0.027$, $p<0.001$) lower level of global cognitive function but not with a greater annual rate of change in global cognitive function (parameter estimate = -0.003, $SE=0.006$, $p=0.7$).

Conclusion/Significance: In older, community dwelling African Americans, greater report of loneliness was associated with lower level of global cognitive function but not with change in global cognitive function over time. This relationship differs from prior work done in predominantly older, community-dwelling Whites. Further work is needed to examine why cognitive change is less impacted by loneliness in older African Americans.

Abstract #: 84

Session: Poster

Developing, Initiating, and Evaluating a User-Informed Survey and Workflow Process for Collecting Lesbian, Gay, Bisexual, Transgender, and Queer Sexual Assault Data in the Community Health Setting

Authors: Alyssa Kava, BA, BSN, DNP-FNPc (CON) Bridget O'Brien, DNP, APN, FNP-BC, AOCNP, Paige Baker, PsyD Alyssa Kava, BA, BSN, DNP-FNPc (RU), Bridget O'Brien, DNP, APN, FNP-BC, AOCNP (RU) Paige Baker, PsyD (Howard Brown Health Center)

Introduction: Lesbian, gay, bisexual, transgender, and queer (LGBTQ) persons are at increased risk of sexual assault (SA). Available SA assessment tools are not stratified by gender identity or sexual orientation; therefore, little is known about the incidence or the needs of this population. A Chicago-based FQHC formed the nation's first LGBTQ-specific SA program in 2016 but lacked a method for collecting SA data central to developing evidence-based survivor services and securing funding.

Objective: To develop and initiate staff utilization of the Survivor Needs Assessment Survey (SNAS), train staff on SNAS completion and workflow, and perform a quality SNAS evaluation after 7 months of surveying.

Methods: A qualitative descriptive and quasi-experimental design was used. Four frameworks guided SNAS development. Convenience sampling was employed to invite 7 staff to participate in SNAS refinement, training, and completion following SA disclosures at 2 sites. A train-the-trainer approach guided training on completion and workflow. A post training Likert scale survey assessed staff knowledge, comfort, and skills to use the SNAS in practice. After 7 months of surveying, survey non-response bias was analyzed in the context of a quality evaluation. A second Likert scale survey assessed staff perceptions of program satisfaction and sustainability.

Results: Seven staff attended a 60-minute training and achieved > 80% on post training surveys. Staff completed SNAS' for 107/119 persons who disclosed SA during implementation. Seven SNAS sections met evaluative criteria. Low completion rates were attributed to lack of assessment for 5/7 sections prompting leadership to reeducate staff on conducting a needs assessment. Minor revisions were made to 4/7 sections to improve efficiency. A paper-to-electronic SNAS conversion is projected for February'18. Program evaluation survey results will be available in March '18.

Conclusion/Significance: This project addressed the need for an LGBTQ-specific SA assessment tool and collected SA data non-existent in the literature. Engaging staff in SNAS refinement enhanced participation. Training resulted in adequate staff knowledge, comfort, and skills to use SNAS in practice. The FQHC experienced a 6-fold increase in monthly disclosures compared to 2016 preliminary data and treats at least 9-10 x more SA survivors than most Illinois hospitals. Multiple factors impacted SNAS completion rates by section.

Abstract #: 85

Session: Poster

Factors Contributing to Missed Appointments in Pediatric Subspecialty Clinics

Authors: Kelly Lynch BSN, RN, DNP Student (Penn State Hershey Medical Center), Julianne Doucette DNP, APRN, CPNP-PC (Rush University), Louis F. Fogg, PhD (Rush University)

Introduction: The problem in the pediatric subspecialty clinics at Penn State Hersey Medical Center is an unacceptable rate of missed appointments, averaging 15% per month over a 12-month review period. The national average for pediatric subspecialties clinics is closer to 12.6%. The pediatric subspecialty clinics previously implemented a call reminder system which failed to decrease the rate of missed appointments. The purpose of this project is to identify reasons and risk factors for missed appointments, whether patients have unmet healthcare needs, and potential solutions.

Objective: The objectives of the inquiry were to identify the rate of missed appointments in the pediatric subspecialty clinics, contributing factors, most common reasons reported by parents, and specific solutions based on these findings.

Methods: Data collection methods include demographic information, development and administration of surveys to parents of patients scheduled during a one week study period, and observation of communication between provider and parents.

Results: The overall rate of missed appointments among all patients scheduled (n=666) in the pediatric subspecialty clinics was 16.9% (n=113). The most common reasons reported for missed appointments were the parent forgot the appointment 8.8% (n=10), had scheduling conflicts 8.8% (n=10), and did not know about the appointment 7.9% (n=9). Among patients who missed appointments (n=113), a greater proportion were more likely to live within 40 miles (75%, n=85), have appointment lead times greater than 180 days (21.2%, n=24), and have Medicaid insurance coverage (68.1%, n=77). Return patients were more likely to miss appointments (68.1%, n=77). Parents of patients who missed appointments were surveyed and 11.5% (n=13) reported they did not receive a reminder. Over 31% (n=36) reported that they had not been seen by another provider for their concern.

Conclusion/Significance: A multi-tiered strategy has been shown to be successful for reducing the rate of missed appointments; therefore, the proposed strategy will include adding capacity, implementing behavioral engagement strategies, reducing wait times and lead times, and developing enhanced reminder systems. Identifying these factors and potential solutions for missed appointments may improve the quality of care, decrease losses, increase provider productivity, and address unmet healthcare needs in the pediatric subspecialty clinics.

Abstract #: 86

Session: Poster

Depressive symptoms and self-management skills among Latinos and African Americans with type 2 diabetes

Authors: Crystal D. Maciel, BS (RUMC), Imke Janssen, PhD (RUMC), Elizabeth F. Avery, MS (RUMC) and Steven K. Rothschild (RUMC)

Introduction: African Americans and Latino adults with type 2 diabetes are more likely to suffer poorer health outcomes related to diabetes compared to White adults. Diabetic individuals are at higher risk for depression than the general population. Emotional distress can influence diabetes self-management skills, glycemic control and worsening health outcomes.

Objective: To examine the prevalence of depressive symptoms in Latinos and African Americans with diabetes and the relationship of depressive symptoms to self-management skills.

Methods: Using baseline data from the IRB approved Match2 Study, a randomized controlled trial of Latino and African American adult patients with type 2 diabetes. All 244 participants provided informed consent. We examined the cross-sectional relationships among self-management ratings using the HPSS survey (Health Problem-Solving Skills), medication adherence, diet, exercise, and HbA1c levels. Depressive symptoms were measured using PHQ-9 questionnaire. Pearson correlations were conducted, as well as linear regression models adjusted for age, Hispanic origin, marital status, poverty ratio, and years with diabetes.

Results: No differences were found between groups on HbA1c levels and PHQ9 scores. However, Latinos were significantly different to African Americans in other aspects; Latinos were younger, had lower SES and lower self-management skills. However, Latinos had higher average steps per day and a greater amount of time spent on moderate and/or vigorous activity compared to African Americans. PHQ9 scores were significantly negatively associated with medication adherence, HPSS skills, general diet and exercise. These associations remained significant after adjusting for age, marital status, Hispanic origin, and SES. When adjusting for years with diabetes, the only significant negative associations with PHQ9 scores, were with medication adherence, average steps per day and HPSS scores. There were no differences between ethnic groups and the associations between PHQ9 and any or all outcomes.

Conclusion/Significance: There was an association between higher depressive symptoms and poorer self-management skills, poorer diet and less exercise. Psychosocial attributes, such as depressive symptoms, may influence glycemic control should be taken into consideration when physicians consult with patients regarding diabetes self-management. There is a lack of research that examines minority populations with diabetes and depression.

Abstract #: 87

Session: Poster

Westside Walk to Wellness: Empowering Garfield Park Community and Encouraging Healthy Physical Activity

Authors: Kristen Obiakor, MS (RMC); David Ansell, MD (RMC); Sheila Dugan, MD (RMC)

Introduction: In Illinois alone, common chronic conditions, such as diabetes, heart disease, and stroke, affect more than 6.7 million residents and are among the leading causes of death in the state. Facing a number of health barriers in access and resources, Garfield Park is one of West Chicago's communities with greatest disparity. In the case of congestive heart failure, diabetes, and hypertension, respectively, Garfield Park has a 1.6, 3.83, and 11.55 higher percentage in estimated prevalence compared to the city of Chicago. It is clear that chronic disease and disparity are extensive within Garfield Park and strategies to reverse this trend are crucial.

Objective: We proposed a community-based health initiative that would not only increase physical activity, but would also 1) create partnerships within the community, 2) dismantle physician/patient barriers by fostering trusting relationships, 3) empower community members to manage their own health, 4) expose Garfield Park youth to health care professionals of color to inspire diversity in medicine, and 5) develop an understanding of community perspectives, including social determinants of health.

Methods: Held every Saturday morning from June 24 through August 12, 2017, Westside Walk to Wellness was an eight-week pilot program where Rush physicians would speak on health topics before all participants walked through the Garfield Park community. Police escorts joined in the walks and drove alongside the procession of walkers.

Results: Results from a focus group (n=13) and surveys (n=25) showed that 76.47% of participants increased their weekly physical activity or improved other health habits since participating in the events. 84.62% of West Side community residents stated having a positive perception change of Rush, while 81.25% of Rush-affiliated respondents indicated having a positive perception change of the Garfield Park community.

Conclusion/Significance: Geared towards improving vitality within Garfield Park, Westside Walk to Wellness went beyond specific aims. With over 100 participants, profound relationships between Rush physicians/staff/students, community members, police officers, faith leaders, and youth were fostered. In the words of a community resident, 'a movement began in Garfield Park.' It is hoped that future endeavors continue to strive for reduction in health disparity on the West Side through a community-based participatory approach.

Abstract #: 88

Session: Poster

Impaired Emotional Granularity Is Related to Worse Social Functioning in Clinical High Risk for Psychosis

Authors: Abhishek Saxena (Rush), Kristen M. Haut (Rush), Sarah H. Lincoln (Harvard), & Christine I. Hooker (Rush)

Introduction: Emotional Granularity is the ability to differentiate between different emotional states. Those who possess higher EG are able to identify distinct emotional states during a given moment rather than identify a situation as simply positive or negative. Research has shown that poor EG has been linked to a variety of psychiatric illnesses, including depression, borderline personality disorder, and substance use. Previous data from this lab has also shown that those at familial high risk for psychosis (FHR) have significantly worse EG than their healthy counterparts, which can contribute to increased risk of depression.

Objective: The following study aims to investigate the relationship between EG and functioning in those with clinical high-risk for psychosis (CHR).

Methods: To this end 18 participants with CHR and 15 healthy adults were recruited to complete a diary about the degree to which they felt emotional states and emotional events they may have experienced during the day. Participants were asked to complete these diaries online over seven days.

Results: We hypothesized that CHR participants, like their FHR counterparts, would have significantly worse overall EG and negative EG, but not worse positive EG than their healthy counterparts. These hypotheses were supported by our findings. Furthermore, we hypothesized that worse EG would relate to worse social functioning, but not role functioning. Our findings supported that worse overall EG and worse negative EG were related to both worse social and role functioning. However, when controlling for diagnosis, only worse negative EG was related to social, but not role, functioning in CHR.

Conclusion/Significance: These findings suggest that the ability to differentiate between emotional states may be valuable in everyday relationships and social situations. Furthermore, emotional granularity may be a possible intervention point for improving social functioning in those at clinical high risk for psychosis and other related disorders.

Abstract #: 89

Session: Poster

Illness Narratives: Exploring the Chronic Disease Experience in Caring for a Vulnerable Population

Authors: Lance Shaull, BS (RMC) Dr. Shanu Gupta, MD

Introduction: Personal narratives are powerful stories that have the ability to captivate, influence, and educate audiences^{1,2}. Large bodies of evidence describe hearing stories and developing 'illness scripts' is a key aspect in the development of clinical expertise in medicine.

Objective: Many healthcare students have misconceptions about homeless populations and healthcare needs and often rely on stories to question these ^{3,4}. Currently, the doctoring curriculum at Rush Medical College (RMC) includes workshops discussing the impact of social inequities on health and volunteer opportunities with underserved populations. Students who volunteer with the homeless through the Rush Community Service Initiatives Program (RCSIP) have found their experiences eye opening with first-hand access to patients and their stories.

Methods: This project aimed to disseminate the illness narratives at the Franciscan House of Mary and Joseph, a 257 bed emergency shelter with space for both men and women. We recruited residents with chronic asthma and diabetes mellitus for qualitative interviews based on the McGill Illness Narrative Interview (MINI).

Results: These narratives were used to develop educational modules on homeless health, and recorded as podcasts with the help of StoryCorps, a branch of National Public Radio (NPR). The modules continue to be shared using the network of NPR, the Franciscan Shelter, and the curriculum at RMC.

Conclusion/Significance: Telling the stories of those without a voice can provide insight into the role of homelessness in how disease is experienced, and be a powerful tool for education in empathy, understanding, and social context of disease.

Abstract #: 90

Session: Poster

LIFE Intervention: Qualitative Analysis

Authors: Shaina Shetty, Rush Medical College

Introduction: The Lifestyle Improvement through Food and Exercise (LIFE) study was a community-based randomized-controlled trial to measure the effectiveness of a lifestyle intervention to improve glycemic control among African-Americans with type 2 diabetes attending safety net clinics. The study enrolled African American adults with a diagnosis of type 2 diabetes and HbA1C > 7.0 who had attended specific safety net community clinics over the past year. The intervention was delivered in 28 group sessions in 3 phases over the course of 12 months. Each session included a facilitated group discussion or 'listening session', where participants were recorded discussing their progress and providing support to one another. They captured the successes and struggles of participants in this lifestyle intervention and provided the basis for this qualitative analysis.

Objective: The purpose of our analysis was to identify prominent themes discussed by participants during these sessions.

Methods: Recordings were transcribed and entered in NVivo, a qualitative analysis program transcript text was organized and coded into topics and themes in two stages, allowing for identification of themes across the most frequent discussion topics.

Results: Phase 1 was the intensive phase of the intervention. In this phase, 49 listening sessions were analyzed with 8-9 sessions per cohort represented. In the subsequent phases, 54 listening sessions ranging from 5-11 sessions per cohort were analyzed. Across cohorts and phases, themes fell into three major categories: Effects of LIFE Intervention, Social Norms, and Stressors. Themes related to Effects of LIFE Intervention discussed the impact of the intervention on health behaviors and indicators. Themes related to Social Norms focused on norms around healthy eating, food traditions, and resistance from family members and friends. Themes related to Stressors touched on financial and family stressors and how these stressors impacted diabetes management.

Conclusion/Significance: Limitations of this analysis include the small number of recordings and the specific context in which this study took place. However, this study is unique in that the recordings were collected during the intervention. This study lends to a larger question of how to design effective lifestyle interventions to support the needs of African American communities.

Abstract #: 91

Session: Poster

Minorities are more likely to be high-cost users of medical care regardless of the presence or absence of chronic conditions.

Authors: Dominique Sighoko¹, Chien-Ching Li¹, Tricia J. Johnson¹ ¹ Department of Health Systems Management, Rush University Medical Center

Introduction: High-cost user (HCU) status has been strongly associated with being older, or having multiple chronic conditions. Racial disparities exist in the prevalence of chronic conditions. It is therefore possible that some ethnic groups might more likely to be HCU than others.

Objective: Assess whether some ethnic groups are more likely than others to be HCU.

Methods: Using data from an academic center, patients were assigned to two groups; the cost category I representing the HCU and the cost category II representing low cost patients. Descriptive statistics and multivariate logistic regression model were used to characterize the HCU by ethnicity.

Results: Compared to NHW, NHB (OR=1.11 (95% CI, [1.05 - 1.17])), as well as Hispanics (OR=1.23 (95% CI, [1.15 - 1.32])) were more likely to be HCU. Compared to younger patients, older NHW patients had a higher odds to be in the high cost category (OR=1.12 (95% CI, [1.01 - 1.24])) while, no difference with regard to the age was found among NHB and Hispanics. While NHW with no particular chronic condition had a null median number of ED visit, NHB and Hispanics with similar patterns presented a median number of 1 ED visit. With the presence of MCC, NHB and Hispanics still had a higher median number of ED visit ranging from 1 to 2, while it was no more than 1 for NHW.

Conclusion/Significance: The overuse of ED visit reported among NHB and Hispanics could be a reflection of poorer disease control that result in a higher frequency of ED visits.

Abstract #: 92

Session: Poster

A Novel Stress Reduction Curriculum in Low-Resource Communities

Authors: Jacqueline Tanis (RMC)

Introduction: Within Chicago, individuals with lower levels of education have higher self-reported rates of poor mental health. Mindfulness-based stress reduction (MBSR) is a well-studied curriculum that demonstrates positive changes in physiological and psychological outcomes related to stress and has proven successful in low-income community centers. While low-resource areas may benefit most from stress reduction programs, many community centers lack the time and money for official MBSR programs. This project piloted a novel stress reduction curriculum with community members at a free clinic on the West Side and will continue the curriculum at a church in Washington Park.

Objective: a.) Develop a curriculum that integrates stress reduction with health education and is accessible to low-resource communities. b.) Assess whether the class empowers participants to manage stressors.

Methods: Before designing the curriculum, input was gathered from community partners, class participants, MBSR classes, and experts in the field. Three pilot lessons were taught at Community Health Clinic. Next, six one-hour lessons will be taught at Chicago City Church. Classes center around small group discussion and practicing techniques. Topics include Introduction to Stress, Effects of Stress on the Body/Body Scans, Breathing Exercises/Muscle Relaxation, Yoga/Movement, Mindful Eating, and Time Management/Communication. Participants are recruited freely, community partners help mediate the lessons, and healthy snacks are provided. Anonymous pre- and post- surveys are administered.

Results: Initial survey data indicates that participants were interested in the topics presented and felt they learned actionable techniques that could help manage their stress.

Conclusion/Significance: As part of the Dean's Summer Community Service Project, the main goal was to develop and implement the class. In future iterations, more robust survey data will be collected to measure the impact. The pilot program was for Spanish-speaking women and the main challenge encountered was consistent attendance. Participants struggled to come to class because they lacked transportation, had family obligations, and felt unsafe due to documentation status. These experiences inform future projects working with undocumented, Latina communities. To study the curriculum with a broader scope and encourage consistent participation, future classes will be open to all adults and taught at a location where transportation is provided.

Abstract #: 93

Session: Poster

When Neighborhoods Hurt- The Effects of Neighborhood Violence and Crime on Resident Resilience and Well-Being

Authors: Linzy Wagner, B.S., Frances Aranda, Ph.D., MPH, John Burns, Ph.D., Yanina Purim, M.D., & Stevan Hobfoll, Ph.D.

Introduction: Chicago is a racially segregated city where racial/ethnic minority populations live in neighborhoods plagued with poverty and violence. Studies have shown that individuals who live in stressful environments have higher rates of trauma exposure. Nonetheless, there are varied results in rates of posttraumatic stress disorder (PTSD) in Blacks compared to Whites, implicating socioeconomic characteristics rather than race as the driving factor behind the development of PTSD

Objective: This study will examine whether rates of environmental trauma are associated with PTSD symptom severity, depressive symptoms, and self-reported trauma histories in a sample of Chicago women.

Methods: As part of a larger longitudinal IRB-approved study of women (N=341), ages 18-41, interview data on trauma history, depressive symptoms, and PTSD symptoms were collected across a six-month period; informed consent was collected prior to the start of all interviews. Environmental trauma experienced by the women will be measured using ArcGIS to map crime density within their neighborhoods. Crime will be mapped from CPD records, and census blocks in which participants reside will be assigned a crime index value indicating the crime risk within the past year. Regression analyses will be conducted to determine whether the neighborhoods where the women reside impacts reports of PTSD, trauma exposure and depression.

Results: Preliminary findings indicate that trauma history and race (Black vs. non-Black) significantly predict depressive symptoms $F(2,335) = 4.48, p < .05$ and PTSD symptoms $F(2, 335) = 29.96, p < .0005$ at baseline. However, these models do not account for a large portion of the variance seen in symptom presentation. It is expected the addition of area of residence and rates of crime in the model will allow us to predict trauma exposure, PTSD and depressive symptoms more accurately.

Conclusion/Significance: The findings of this study will add to a greater dialogue surrounding the importance of addressing violence and investing in neighborhoods to improve the emotional well-being of the residents. The use of GIS will also allow us to disentangle differences that are often attributed solely to race by accounting for the impact of an individual's environment and socioeconomic status on their mental well-being.

Abstract #: 94

Session: Poster

A School-Based Physical Activity and Nutrition Education Program that Reaches from the School to the Home

Authors: Dr. Mallory Bejster (Rush) and Dr. Heide Cygan (Rush)

Introduction: Childhood obesity affects 17% of children in the United States. Schools and parents are important partners in fighting the childhood obesity epidemic. School-based nutrition and physical activity programs are one effective method for reaching entire communities with health behavior knowledge.

Objective: The purpose of this program was to implement an evidence-based physical activity and nutrition education program in an elementary school to:

Increase parent and teacher knowledge regarding physical activity and nutrition recommendations;
Increase teacher self-efficacy in sharing health behavior messages in their classrooms

Methods: The program consisted of parent and teacher education, school-based messaging, and student take-home activities. A pre-test (n=25)/post-test (n=24) design was used to measure changes in teacher knowledge before and after the teacher education session. A non-paired t-test was used to test for statistical significance. A post-test design was used to measure teacher self-efficacy. Parental awareness of the program and knowledge gain were measured on a post-program parent survey (n=30). IRB approval for the project was obtained through Rush University.

Results: 4% (n=1) of teachers correctly identified the recommendations for all 5 healthy childhood behaviors on the pre-test compared to 87.5% (n=21) on the post-test. The pre-test mean score of 1.52 out of 5 increased to 4.75 out of 5 on the post-test ($p = .000$). On the post-test, 95.8% (n=23) of teachers reported feeling confident to very-confident in sharing program messages in their classroom. On the post-program parent survey, 76.7% (n=23) of parents reported knowledge of the program. Of the parents who knew of the program, 100% (n=23) reported an increase in knowledge about at least one of the healthy childhood behaviors.

Conclusion/Significance: Program results support using a school-wide, evidence-based nutrition and physical activity education program to increase teacher knowledge and self-efficacy in sharing healthy behavior messages, and increase parental knowledge. Limitations include a small sample size and implementation at one school, preventing generalizability of results. Since children learn health-related behaviors from adults, increasing teacher and parent knowledge and teacher self-efficacy in sharing more healthy behavior messages at school are important first steps to help children develop healthy behaviors.

Abstract #: 95

Session: Podium Presentation - Student Award

Reading an Ice Cream Label: Medical Students Utilizing Health Literacy Tools to Facilitate Caregiver Education during Pediatric Clerkship

Authors: Alexandra Bery, BS (RUMC); Vivek Ashok, BA (RUMC); Gina Casini, BS (RUMC); Michelle March, BS, MPH (RUMC); Stephanie Schmitt, BA (RUMC); Elizabeth Van Opstal, MD (RUMC)

Introduction: The pediatric clerkship curriculum focuses communication skills on avoiding medical jargon, formulating education plans, and recognizing the importance of patient education. Curriculum on health literacy is essential for medical students to provide patient education effectively.¹⁻⁴ This pilot curriculum seeks to evaluate the effect of health literacy education on medical student led patient education.

Objective: (1) Provide pediatric clerkship students (MS3s) training and opportunities in assessment of health literacy and caregiver education. (2) Evaluate caregiver comfort of knowledge pre and post student education. (3) Provide students caregiver feedback on their education and communication skills.

Methods: Students received video and in-person teaching on health literacy, including Pfizer's 'Newest Vital Sign' (NVS) tool.⁵ They administered the tool to caregivers on inpatient wards. Cognizant of this score, students created individualized educational interventions for caregivers. Subsequently, caregivers completed numerical and open-ended surveys documenting efficacy of student teaching, topic understanding, and educational experience. Students shared experiences with self-reflective surveys and in small group sessions.

Results: Pilot data from 44 pre- and post-surveys were collected from caregivers. The average respondent NVS score prior to teaching was 3.9 out of 6 (higher scores suggest greater health literacy). Regardless of health literacy score, respondents' comfort level with presented topics increased from 3.64 to 4.68 out of 5 ($p < 0.001$). 93% of respondents indicated that students communicated clearly, and 67% indicated that students utilized helpful images/drawings. Student reflections revealed three common themes: (1) acknowledging the importance and challenges of patient education (2) avoiding assumptions irrespective of initial health literacy score (3) learning to teach using different methods and resources.

Conclusion/Significance: This curriculum gave students application of health literacy tools and experience in patient education. Regardless of NVS score, caregiver comfort level with the topics improved. Interestingly, caregivers gave few suggestions for improvement and nearly all gave 'perfect' scores to students teaching ability. The survey tool may have limited constructive student feedback from caregivers. We acknowledge possible reporter and selection biases as we interviewed a non-randomized convenience sample. Future applications of this model includes expanding to other clerkships and across longitudinal medical education.

Abstract #: 96

Session: Poster

Gender Comparison of Food Purchasing Patterns and Diet Quality of Purchases

Authors: Melissa M. Crane (RUMC), Christy C. Tangney (RUMC), Simone A. French (University of Minnesota), Yamin Wang (RUMC), Bradley M. Appelhans (RUMC)

Introduction: Food purchasing is an understudied precursor to eating behavior. To date, studies investigating food purchasing have primarily focused on women and it is unclear if women and men have similar purchasing behaviors. It is important to also study purchases made by other adults in the household in order to gain complete picture of household food environments and to identify additional points of intervention for healthy eating.

Objective: The purpose of this investigation was to compare food purchasing and the diet quality of foods purchased by men and women.

Methods: Data for this analysis come from the Study of Household Purchasing Patterns, Eating, and Recreation (SHoPPER; NCT02073643). This study used a rigorous, standardized protocol for collecting and validating food purchase receipts. The dietary composition of purchased foods was derived using the Nutrition Data System for Research (NDSR), and scored according to the Healthy Eating Index-2010 (HEI-2010). Participants were the primary food purchasers for their households (i.e., responsible for >75% of food purchases; N = 204; 17.2% men). The outcomes included the number of food items purchased, number of receipts collected, source of purchases, and the diet quality of all foods purchased (HEI-2010).

Results: There were no differences between men and women in number of items purchased or number of receipts collected. Men made fewer of their purchases at traditional grocery stores (51.7%) than women (70.2%; $p < 0.001$). There were no gender differences in the quality of foods purchased either overall (HEI- 2010 total score: Men 59.9 ± 16.1 vs. Women 59.5 ± 16.0 , $p = 0.98$) or when separated by source of purchase.

Conclusion/Significance: Although there were differences in where foods were purchased by gender, there were no differences in diet quality of the foods purchased, even when stratified by source. Future studies should examine whether these findings are similar when considering purchases made by individuals not primarily responsible for food purchases.

Abstract #: 97

Session: Poster

Pediatric Food Allergy Education: Development and Health Literacy Evaluation

Authors: Julianne Doucette DNP, APRN, CPNP-PC (Rush University), Alana Otto MD (Seattle Children's), Ruchi Gupta MD (Northwestern University)

Introduction: Pediatric food allergy is a potentially life-threatening condition affecting an estimated 8% of children in the United States. There is no widely-accepted cure for food allergy, and management involves strict avoidance, prompt recognition, and often emergency treatment. Caregivers report insufficient food allergy knowledge, fear regarding management, and often fail to use epinephrine for food-induced allergic reactions. A lack of understandable written information regarding management of food allergy for caregivers exists.

Objective: The objective of the study was to develop the original Food Allergy Tips for Caregivers written educational materials for caregivers of children with food allergy and conduct readability, health literacy, and caregiver evaluation to determine the clarity, usefulness, and understandability of the materials.

Methods: Develop the Food Allergy Tips for Caregivers using a multidisciplinary team of health professionals. Evaluate the readability of the materials using the Flesch-Kincaid Reading Ease and Grade Level tests. Evaluate the health literacy of the materials using the CDC Clear Communication Index and the Federal Plain Language Guidelines. Conduct key informant interviews to compare original and edited materials for clarity, usefulness, and understandability.

Results: The original materials had a Flesch-Kincaid Reading Ease readability score of 57.5 and a grade level of 9 while the edited materials had a score of 62 and a grade level of 8.6. The original materials had a CDC Clear Communications Index of 36/100 (non-passing) while the edited materials had a score of 93/100 (passing). 94% (n=16) of the caregivers preferred the edited materials. 82% (n=14) found the edited materials more useful, 76% (n=13) found the edited materials more understandable and 82% (n=14) found the edited materials clearer than the original.

Conclusion/Significance: Most pediatric food-induced allergic reactions occur in non-healthcare settings and often must be managed by parents or other caregivers. Caregivers need information that is clear and understandable to guide management of anaphylaxis. This pilot study concluded that the use of health literacy tools to evaluate educational materials can improve the overall clarity and understandability for caregivers which may lead to improved recognition of symptoms, management of reactions, and help alleviate fears of using epinephrine.

Abstract #: 98

Session: Poster

Agreement between Ultrasound and Computed Tomography for Assessment of Subcutaneous Adipose Tissue and its Subtypes

Authors: Gomez-Perez SL(1), Lopata E(2), Peterson S(3), and Sclamberg J(4). 1Rush University Medical Center, Clinical Nutrition, Chicago, IL 2Rush University Medical Center, Diagnostic Radiology, Chicago, IL 3 Rush University Medical Center, Clinical Nutrition,

Introduction: While abdominal ultrasound (US) has been used previously to assess abdominal fat distribution (AFD), the current gold standard remains computed tomography (CT) scans. But, CT scans are expensive, not portable, and require radiation exposure. No studies to our knowledge have used a portable, tablet-compatible ultrasound to assess AFD.

Objective: Here, we examine the agreement between an US method compared to CT images to assess subcutaneous (SAT), superficial (SSAT) and deep (DSAT) thickness at the bedside using a portable, tablet compatible ultrasound at the level of the umbilicus.

Methods: We conducted a pilot study to compare the agreement of SAT, SSAT and DSAT thickness (cm) measurements via US and CT on 14 subjects with a CT scan for medical reasons. Subjects were consented and measured at the umbilicus adhering to a previously published US technique at 5cm proximal of right and left side of umbilicus. Two thickness measurements for SAT and SSAT were taken and averaged. DSAT was calculated by subtracting SSAT from SAT. CT scans were performed on same day of US test. A blinded radiologist selected a single-cross sectional CT image at L4 from each subject and measured thickness 5cm lateral on either side of umbilicus according to US protocol.

Results: Mean age was 61.3 ± 15.6 years, 64% (9/14) were Non-Hispanic Whites and 57% (8/14) were male. SAT, SSAT, and DSAT for US vs. CT was 3.4 ± 1.9 vs. 3.6 ± 1.9 cm, 1.6 ± 1.0 vs. 1.8 ± 1.3 cm, and 1.9 ± 1.5 vs. 1.7 ± 1.2 cm, respectively. Agreement was strong based on Cohen's kappa criteria (strong agreement= 0.8-0.9) using Lin's concordance (LCC) >0.81 , intra-class correlation coefficient (ICC) >0.9 , and Spearman's rho (SR) >0.87 . ICC for SAT, SSAT and DSAT was 0.96 ($p<0.001$), 0.93($p<0.001$), 0.96 ($p<0.001$); LCC was 0.96 (95%CI 0.88-0.99), 0.86 (95%CI 0.69-0.94), 0.92 (95%CI 0.78-0.97); and SR was 0.96 ($p<0.001$), 0.91 ($p<0.001$), and 0.87 ($p<0.001$), respectively.

Conclusion/Significance: Our findings confirm that thickness measurements taken with a portable, tablet-compatible ultrasound at bedside was highly comparable to that obtained by CT. This portable US and thickness assessment of AFD has potential to enable clinicians and researchers to assess body composition in non-clinical and/or outpatient settings where CT is less acceptable for research use.

Abstract #: 99

Session: Poster

Nutritional Intake of Flavonols May Decrease the Rate of Alzheimer's Disease in an Elderly Population

Authors: Thomas M. Holland, MD, Yamin Wang, PhD, Puja Agarwal, PhD, Sarah Booth, PhD, David A. Bennett, MD, Martha Clare Morris, ScD

Introduction: Several studies have reported protective associations of dietary, flavonoids, bioactives with known antioxidant and anti-inflammatory properties, with risk of Alzheimer's dementia (AD) and cognitive decline. Little is known about the individual relations of specific subtypes of this broad class of bioactives.

Objective: In this study, we investigated the relations of total flavonol intake, a flavonoid subtype, and its subclasses (quercetin, myricetin, isorhamnetin, and kaempferol) to risk of incident Alzheimer's dementia.

Methods: The study was conducted in the Rush Memory and Aging Project, a community-based cohort of older persons dwelling in the Chicago area. A total of 934 participants (aged 60-100 years) completed neurological evaluations and dietary assessments annually over an average of 6.1 years. Baseline dietary intakes of flavonols were determined from semi-quantitative food frequency questionnaires. The diagnosis of AD was based on criteria of the joint working group of the National Institute of Neurological and Communicative Disorders and Stroke and the AD and Related Disorders Association. Cox proportional hazard models were used to estimate the hazard of developing AD by quintiles of energy-adjusted intakes of the flavonols.

Results: Total flavonol and all of the flavonol subclasses were inversely associated with incident AD. In models adjusted for age, sex, education, APOE-ε4, late life cognitive activity, and physical activity, the highest quintile of total flavonol intake versus the lowest intake quintile was significantly associated with a decreased rate of AD (Hazard Ratio = 0.52, 95% confidence interval (CI): 0.33, 0.84; p-value for trend, 0.01.) In similar models of the individual flavonols, hazard ratios for the top quintiles versus the lowest quintiles of intake were: kaempferol (HR = 0.49, 95% CI: 0.31, 0.77; p for trend, 0.002), myricetin HR = 0.62, 95% CI: 0.4, 0.97: p for trend, 0.02) and isorhamnetin (HR = 0.62, 95% CI: 0.39, 0.98; p for trend, 0.02.) Quercetin was marginally associated (HR = 0.69, 95% CI: 0.43, 1.09; p for trend, 0.06.)

Conclusion/Significance: Higher dietary intake of total flavonols and a number of its subclasses may reduce AD risk. The observed association between flavonols and AD risk deserves further study for their protective effects on the brain.

Abstract #: 100

Session: Poster

Rates of Maladaptive Eating Behaviors Following Bariatric Surgery

Authors: Megan Hood (Rush), Julia Olson (Rush)

Introduction: Bariatric surgery is a highly effective method for achieving significant long term weight loss for individuals with severe obesity. A significant minority of patients regain weight after surgery, jeopardizing the health benefits of their weight loss. Weight regain in bariatric surgery patients is typically related to changes in eating behaviors, including eating behaviors that are typically tied to low mood, though the timing of eating behavior changes after surgery is poorly understood, making it difficult to design effective interventions.

Objective: The aim of this study was to assess the prevalence of and associations among maladaptive eating behaviors and depressive symptoms in patients following bariatric surgery.

Methods: Fifty-two patients who had bariatric surgery at Rush completed online self-report questionnaires assessing their current eating behaviors. Patients were categorized by time since surgery, 0-5 months (n=11), 6-11 months (n=18), 12-17 months (n=17), 18+ months (n=6). Constructs that were measured included binge eating (Binge Eating Scale), emotional eating (Eating and Appraisal Due to Emotions and Stress- Emotional Eating subscale), loss of control eating (Loss of Control over Eating Scale), night eating (Night Eating Questionnaire), and depressive symptoms (Beck Depression Inventory 2).

Results: Emotional eating and depressive symptoms appeared similar across cohorts, while rates of binge eating, loss of control eating, and night eating appeared higher in participants who were greater than 1 year post-surgery. Group differences were clinically but not statistically significant. Binge eating, emotional eating, and loss of control eating were highly positively correlated with each other, but only had a trend to significance in correlations with depressive symptoms, while night eating was moderately correlated with the other eating-related measures as well as depressive symptoms.

Conclusion/Significance: Evidence is mixed regarding differences in eating behaviors at different time points following bariatric surgery, though these data preliminarily suggest that rates of binge eating, loss of control eating, and night eating could be elevated as patients get further from surgery. Further studies are needed to better understand maladaptive eating behaviors after bariatric surgery, particularly given that depressive symptoms and most eating behaviors were not as strongly associated as expected.

Abstract #: 101

Session: Poster

Feeding Inconsistency and Blood Glucose Variability as Predictors of ICU Mortality in Critically Ill, Enterally Fed Patients.

Authors: Sheridan Jonas BS (Rush), Sharon Foley, PhD, RD (Rush); Sarah Peterson, PhD, RD (Rush), Kristen Nowak, MS, RD, CNSC (Rush)

Introduction: Blood glucose variability (BGV) has been associated with mortality in critically ill patients. This response is often attributed to hormonal and metabolic changes induced during the stress response. Feeding inconsistency also commonly occurs in the ICU due to frequent interruption of calorie delivery and may also influence BGV and ultimately mortality.

Objective: To assess the influence of BGV and feeding inconsistency on ICU mortality.

Methods: A secondary data analysis was conducted of enterally fed, mechanically ventilated, adult (≥ 18 years) patients with acute respiratory distress syndrome admitted to the medical ICU at Rush University Medical Center (Chicago, IL) from 2009 to 2013 ($n=298$). Daily blood glucose values and calorie delivery were collected during mechanical ventilation, up to and including the 14th day of mechanical ventilation per patient. Blood glucose variability was represented as tertiles of calculated as the average of the absolute value of the daily change in morning BG values and reported in tertiles (Tertile 1: 0-50 mg/dL; Tertile 2: 51-100 mg/dL; Tertile 3: 101-greatest mg/dL). Feeding inconsistency was represented calculated as the number of days calorie delivery varied from the previous day by ± 250 calories. Severity of illness was described by recording the highest daily Sequential Organ Failure Assessment (SOFA) score was used to determine severity of illness during the study period during the 14 days. Demographic and clinical variables were collected to describe the population and bivariate tests were used to determine inclusion of variables in a hierarchical, binomial logistic regression model was performed to predict ICU mortality.

Results: The majority of subjects were female ($n=150$, 54%), mean (SD) age 59.8 (16.0) and BMI 28.7 (9.8). Tertile 3 of BGV (OR = 4.00, 95% CI, 1.292-12.382, $p=0.016$) and feeding inconsistency (OR = 1.139, 95% CI, 1.031-1.257, $p=0.010$) were both predictors of ICU-mortality after controlling for age, highest SOFA score, insulin delivery, and steroid administration.

Conclusion/Significance: Changes in daily morning BG averaging $\hat{\neq}$ 101 mg/dL may increase the risk for ICU-mortality. Variations in daily caloric delivery by $\hat{\pm}$ 250 calories also appears to increase this risk.

Abstract #: 102

Session: Poster

The effect of using pill boxes on medication adherence

Authors: Ashley Levitan (Rush); Dr. Kathryn D Swartwout (Rush) ; Sarah Abalos (Rush)

Introduction: Medication adherence proves to be difficult for patients. A patient's difficulty organizing and understanding medications can be a barrier to adherence. Using a pill box can increase medication adherence by giving patients a tool to organize their medications.

Objective: To improve patient medication adherence through the use of pill boxes and nurse support.

Methods: Pillboxes were distributed to 16 patients, ages 18-64, who stated they need help managing their medications. At time of pillbox distribution, patients took the ASK-12 medication adherence survey measuring the following categories: inconvenience/ forgetfulness, treatment beliefs, and behavior. Over a 12 week period, nurses called patients bi-weekly, asking them if they use their pill box and if they have skipped a dose of medication. Answers to these questions were documented and additional education and counseling was provided to the patient, if needed. At the end of the 12 week period, the ASK-12 medication adherence survey was administered telephonically. A paired T-test was performed pre survey to post survey.

Results: The paired sample T test did not reach significance for any of the three domains measured; however, the means for the inconvenienced/forgetfulness category and behavior category improved from pre to post test, as well as the total mean for the ASK-12 survey.

Conclusion/Significance: While no statistical significance was reported, clinical improvement was seen in the inconvenience/forgetfulness category, the behavior category, and for the ASK-12 survey as a whole. Therefore, pill boxes may be an effective tool to assist patients with medication adherence. Limitations to this project include the small sample size of n=16 and the fact that it's unknown whether the positive trend in medication adherence can be attributed to use of a pillbox or RN support. Further projects can be implemented with larger sample populations and that distinguish between use of a pillbox and RN support.

Abstract #: 103

Session: Poster

Associations between diet quality and body composition in older overweight and obese African American adults with self-reported osteoarthritis

Authors: Macy Mears (Rush University); Sandra Gomez-Perez (Rush University); Lisa Tussing-Humphreys (UIC); Christy Tangney (Rush University); Leah Cerwinske (Rush University)

Introduction: Osteoarthritis (OA) is a leading cause of immobility in the United States, and is associated with older age, inflammation, and obesity. Prudent dietary patterns have been associated with disease prevention. Little evidence exists describing diet quality (DQ) in older overweight and obese adults with OA, and how it relates to body composition.

Objective: The purpose of this study is to: 1) describe dietary patterns of older AA with OA using Healthy Eating Index (HEI), alternate Healthy Eating Index (aHEI), and alternate Mediterranean Score (aMED) indices and 2) examine the relationships between DQ, body fat percentage (BF%), and visceral adipose tissue (VAT).

Methods: A secondary data analysis using de-identified data was conducted for this study. Diet index scores were calculated using intake data from Block 2005 food frequency questionnaires. Descriptive statistics were used to describe DQ. Spearman correlational coefficients determined the relationships between DQ and body composition variables (HEI x VAT, aHEI x VAT, aMED x VAT, HEI x BF%, aHEI x BF%, aMED X BF%).

Results: The final sample includes 143 AA participants (12% male). Sample median age is 65.5 (60-87) years, and average body mass index (BMI) is 34.83 +/- 5.93 kg/m², with males having lower BMI (32 +/- 6 kg/m², p= 0.038). Males also had significantly lower BF% and higher VAT than females (both p-values= <0.001). Only aHEI scores showed significant difference between males and females (p-value 0.041). Spearman correlational coefficients displayed significant relationships between HEI x BF% and aHEI x BF% among females (rs= -0.179, p= 0.046, rs= -0.2, p= 0.025, respectively). No relationships were displayed between body composition and DQ in males.

Conclusion/Significance: Our results show that males compared to females had lower BF% but higher VAT, consistent with central adiposity. Overall, DQ scores were well-below acceptable levels for both males and females and implies more efforts focused on improving DQ in older adults with OA are needed. Further research is needed to explore the relationships of various DQ measures on BF%, particularly in females.

Abstract #: 104

Session: Poster

Monitoring Stress and Behavior Due to Construction in Giraffes Via Fecal Glucocorticoid Metabolites

Authors: Allison Wright (RUMC), Dr. Rachel Santymire (LPZ)

Introduction: Giraffes are currently listed as vulnerable by the International Union for Conservation of Nature (IUCN) due to a dramatic decline in population in the last ten years. Monitoring hormone metabolites have been seen to be useful in monitoring stress behavior, reproduction and health.

Objective: I aimed to determine if monitoring fecal glucocorticoid metabolites were useful for monitoring stress in giraffes caused by construction. If so, I also aimed to determine which glucocorticoid, cortisol or corticosterone, was most representative of these stress levels.

Methods: To do this, fecal hormone metabolites were extracted from 0.5 ± 0.002 grams of feces. The fecal hormones were extracted with ethanol and reconstituted in dilution buffer. The reconstituted sample was then diluted and run on goat anti-rabbit enzyme immunoassay.

Results: The results showed that corticosterone has a higher concentration in giraffe feces, however, cortisol has a significantly lower standard deviation compared to corticosterone. Higher stress levels were not seen during times of construction than the periods before or after, in the female giraffe Etana, but were seen in the female giraffe Sabrena.

Conclusion/Significance: These results indicate that corticosterone may be a better indicator of stress due to its high concentration, and that the stress of construction impacted each giraffe differently.

Abstract #: 105

Session: Poster

Overall distribution of rotations among Emergency Medicine residency programs

Authors: Kimbia Arno (RUMC); Matthew Kuhns (RUMC); Michael Gottlieb (RUMC)

Introduction: There are over 200 emergency medicine (EM) residency programs in the United States. While there are basic criteria defined by the Accreditation Council for Graduate Medical Education (ACGME), there can be significant variation between programs with regard to rotation distribution. However, there is currently no comprehensive analysis of the structure of EM programs. Such data would be useful for the creation of new programs and the assessment of current programs.

Objective: This study aimed to analyze the mean length of rotations among EM residency training programs in the United States.

Methods: A list of all current EM residency programs was obtained using the ACGME website. All program websites were reviewed and data was independently dual extracted by two investigators with any discrepancies resolved by consensus with a third investigator. Programs without curricular data available online were queried via email for the data. Programs were separated into three- versus four-year lengths. Mean and standard distribution was calculated for each rotation and percent agreement was determined for extraction.

Results: 200/202 programs (99%) had data available and the percent agreement was 99.9%. Among 3-year programs, the mean length of EM home rotations was 76.0 weeks, EM away 8.7 weeks, critical care 16.4 weeks, anesthesia 2.7 weeks, orthopedics 2.5 weeks, trauma/burn 6.8 weeks, ultrasound 2.4 weeks, obstetrics 3.1 weeks, pediatric EM 8.1 weeks, toxicology 1.6 weeks, emergency medical services (EMS) 1.8 weeks, administration 1.3 weeks, elective 6.4 weeks, and research 0.8 weeks. Among 4-year programs, the mean length of EM home rotations was 92.8 weeks, EM away 13.0 weeks, critical care 18.1 weeks, anesthesia 3.0 weeks, orthopedics 3.0 weeks, trauma/burn 6.7 weeks, ultrasound 2.7 weeks, obstetrics 3.1 weeks, pediatric EM 10.7 weeks, toxicology 2.8 weeks, EMS 2.3 weeks, administration 1.9 weeks, elective 12.2 weeks, and research 1.4 weeks.

Conclusion/Significance: This study provides summative data regarding the rotation distribution among EM programs in the United States. This will inform current and new EM residency programs when determining rotation selection.

Abstract #: 106

Session: Poster

Prevalence and Impact of Left-Handedness in Neurosurgery

Authors: Blake Beehler (Rush), Ryan Kochanski (Rush), Richard Byrne (Rush), Sepehr Sani (Rush)

Introduction: Although 10-13% of the world's population reports being left-handed (LH), lefties must adapt to many aspects of daily life designed for the right-handed (RH) majority. This extends into the hospitals and operating rooms that are training the next generation of neurosurgeons. Left-handedness is scarcely addressed in surgical training. This is the first study to look at left-handedness in the context of neurological surgery.

Objective: To assess the prevalence and impact of left-handedness on training and operative experience of neurosurgeons.

Methods: An email survey was designed and sent to 5,109 US neurosurgeons and neurosurgical trainees. The survey was completed by 1,482 responders (29.0% response rate). All statistical analyses were performed using the chi-squared test.

Results: Of the 1,482 respondents, 252 (17.0%) respondents reported being LH. LH neurosurgeons were more likely than RH neurosurgeons to report ambidexterity in the operating room (36.5% vs. 13.3%, $p < 0.001$). During neurosurgical training, 23.5% of RH trainers addressed LH specific issues compared to 44.7% of LH trainers. LH trainers were more likely to describe LH trainees as having greater technical ability (18.9%). Overall, most trainers reported equal comfort teaching LH and RH trainees. LH trainees reported difficulties with RH surgical tools (42.7%) and tendency to alter handedness for surgery (62.7%). The impact of these areas lessens in LH attending populations (27.8% and 39.9%, respectively). Most LH neurosurgeons denied specific training for left-handedness and access to LH specific tools, and 24.0% of LH trainees reported feeling disadvantaged due to their handedness.

Conclusion/Significance: Left-handers may be over-represented in neurosurgery, yet handedness is rarely addressed in neurosurgical training. Despite this, there is evidence of some degree of adaptation through training. There may be some benefit from recognizing differences in handedness in the operating room and attempting to give access for LH specific mentorship during training. This is the first study to explore handedness in neurological surgery. The results shed light on the perceptions of left-handedness in neurosurgical training as well as additional difficulties that LH surgeons must overcome.

Abstract #: 107

Session: Poster

Monitoring the Development of Clinical Reasoning Accuracy and Efficiency in Novice Medical Trainees

Authors: Ramin Chitsaz (Rush), Syed H. Shah (Rush), Jah-Won Koo (Northwestern), Adam B. Wilson (Rush)

Introduction: The competency of physicians is highly dependent on their ability to apply clinical reasoning (CR) skills to diagnose and implement treatment plans. Research in CR education remains limited in identifying optimal teaching methods for the development of each specific domain that constitutes the multifarious components of CR. With recent advancements in technology, virtual patient (VP) encounters have become an effective method for teaching CR; yet best practice evidence on this topic is scant.

Objective: This study investigates 1) the development of CR accuracy and efficiency over time, 2) how performance in certain CR domains co-varies with other domains, and 3) the number of VP cases needed to reliably monitor students' CR progress.

Methods: Data from 12 VP cases were collected from 123 first-year medical students over one academic year. Repeated measures ANOVA evaluated mean changes in CR accuracy and efficiency scores over time. Pearson correlations explored associations between the investigated CR domains. Generalizability analysis estimated the number of VP cases needed to make reliable judgments about students' CR performances.

Results: A large effect ($p < 0.001$, $\eta^2 \geq .841$) was observed in which accuracy, efficiency, and diagnosis scores among cases differed over time. Data gathering accuracy and diagnosis scores increased over time, while data gathering efficiency scores decreased. Data gathering accuracy scores were positively correlated with one another and with diagnosis accuracy. A negative association was observed between data gathering accuracy and efficiency scores. The D-study estimated that 11 cases are necessary to reach adequate reliability.

Conclusion/Significance: The unique data tracking features of VPs makes it feasible to monitor students' CR progress at more refined levels. However, work remains to fully validate the measurement properties of VP data and more has yet to be learned about the developmental trajectory of CR efficiency in medical trainees.

Abstract #: 108

Session: Poster

Implementation of Faculty Clinical Research Mentorship to Improve Academic Clinical Partnerships and Nurse Led Projects

Authors: Mary Heitschmidt PhD, RN (RU) Beth A. Staffileno, PhD, RN (RU) Ruth M. Kleinpell, PhD, RN, PhD, FAAN, FAANP (RU)

Introduction: The American Association of Colleges of Nursing supports partnership opportunities between academic nursing and academic health centers yet information to operationalize a systematic approach connecting bedside clinical nurses interested in conducting evidence based practice projects and research, to nursing faculty, is sparsely found in the literature. Health care systems are expected to have clinical nurses participate and lead research and evidence-based practice (EBP) projects in order to achieve and maintain Magnet® status, the highest recognition for nursing excellence.

Objective: The purpose is to describe a unique academic nursing faculty mentoring project which provides faculty with the resource tools needed to work with clinical nursing staff and multidisciplinary project teams who want to engage in clinical evidence based practice and research projects.

Methods: Guidelines established by the members of the CCRS are provided to nursing faculty who are interested scholarship opportunities that include working with clinical nurses on EBP and research work. Projects that connect faculty to clinical nurses address a variety of patient and clinical care topics. Faculty can identify their areas of interest to be matched to a clinical project.

Results: Referrals from health care system clinical nurses or nursing leaders requesting faculty project involvement are matched with CON faculty who have expertise and are interest in the work. The CON faculty mentor may also provide consultation and assistance to the project team with project development, IRB submission, oversight of project implementation and with dissemination (abstract development; poster presentation; manuscript preparation) of the project. Participating as a faculty mentor enables the CON faculty member to have active involvement in scholarship as well as authorship on projects related presentations and publications.

Conclusion/Significance: This distinctive partnership between CON faculty and clinical nurses is an example of how to systematically elevate clinical scholarship in an academic medical center with the intent of providing improved patient care outcomes from the results of EBP or research projects, opportunities for faculty to participate in scholarship as clinical mentors, and positive leadership experiences for both clinical nurses and CON faculty.

Abstract #: 109

Session: Podium Presentation - IMSD

Nurturing the STEMs of the Future: Increasing Diversity in STEM Fields

Authors: Ruqayyah Malik (RMC)

Introduction: There is a nationwide need to increase the number of college graduates in the Science, Technology, Engineering and Mathematics (STEM) disciplines. The ever-increasing diversity of the United States population makes the under-representation of students of color in these fields even more glaring. One obstacle that underrepresented minority students (URM) students in particular face is succeeding in a rigid classroom environment characterized by faculty driven transmission of information and minimal student participation.

Objective: There is a growing body of evidence that suggests that varied and culturally inclusive teaching is one pathway to increasing the diversity of the STEM workforce. I ran the Junior Doctors Summer Pipeline Camp (JDSPC) at the Union League Boys and Girls Club in Pilsen, IL. JDSPC included 4th-8th graders from Pilsen as well as surrounding neighborhoods. The goal of JDSPC was to introduce science in a fun, low-stakes, and interactive environment in order to stimulate interest and potentially foster a life-long passion for science.

Methods: Over the course of the 4 weeks, JDSPC covered the subjects of hypertension, diabetes and cancer. I utilized the principles of active learning pedagogy and coupled didactic sessions with a reinforcing interactive activity. Another important component of JDSPC was the flipped classroom activities in which the students got to become the instructor and demonstrate what they learned in a new way (e.g. skits, experiments and presentations). The goal of this was to help build their self-confidence and self-image as successful STEM students and potential workforce members.

Results: Short surveys were administered throughout the course of JDSPC to track the students' attitudes towards the STEM field and collect their feedback on each of the lessons. The elementary school level group demonstrated the greatest gains in positive STEM attitudes and STEM self-efficacy with a delta of +3.51. The middle school level group demonstrated a more modest positive gain of +0.32 but had a higher average survey score compared to the elementary school level group.

Conclusion/Significance: My data indicates that JDSPC was most effective at increasing positive STEM attitudes and self-efficacy for the elementary level group. This supports the implementation of more pipeline programs geared towards elementary school students.

Abstract #: 110

Session: Poster

EMComm: A Longitudinal Case-based Communication Curriculum for Emergency Medicine Residents

Authors: Kathryn Sulkowski BS (RMC) Sara Hock, MD (Rush)

Introduction: The ability to effectively communicate in difficult situations is an important skill in Emergency Medicine (EM). However, the high stakes communication challenges that residents face in real-life scenarios are often not amenable to formative feedback and are usually not observed for the purposes of evaluation. Improved communication skills have been shown to be related to increased patient compliance, decreased malpractice rates, and an improved patient experience. A simulated communication curriculum offers an opportunity for immediate feedback as well as assessment of the EM milestone of 'Patient Centered Communication.'

Objective: The objectives of this curriculum are to reinforce effective approaches to diverse communication challenges, to provide a safe learning environment for critical communication skill development, and to improve the patient experience through clear and empathic communication

Methods: This case series is designed to allow junior and senior resident learners to practice a broad range of communication skills including obtaining consent, delivering bad news, difficult discussions, and clinical uncertainty. These eight cases (four each for junior and senior resident groups) could be divided over time or administered on the same day(s) for more intense practice. The simulations are designed to include one standardized patient per scenario following the provided instructional scripts. Standardized door charts for each patient help to orient resident learners to the objectives of the encounter. Following each scenario, a debriefing session with reflection and feedback is provided by both the simulated patient and a faculty instructor.

Results: Preliminary survey results show that most residents reported a 'very positive' experience and 'frequently' employed skills reviewed in this curriculum in the post-curriculum period.

Conclusion/Significance: This curricular design is generalizable to other GME specialties and can be tailored to specific needs with variations in cases that are more realistic for other specialties.

Abstract #: 111

Session: Poster

Inhibition of bacterial plasminogen activation prevents colonic anastomotic leak in mice

Authors: Richard Jacobson MD (RUMC) John Alverdy (U of C)

Introduction: Anastomotic leak (AL) remains a significant source of morbidity and mortality following colon surgery for benign and malignant conditions, occurring after 5-20% of the roughly 300,000 resections performed in America every year. Our lab has previously shown that *Enterococcus faecalis* can cause AL in rodents through pathologic degradation of colonic submucosal collagen. The ubiquitous protease plasminogen (PLG) has a central role in tissue repair in multiple organ systems, and is readily activated by pathogenic bacteria. Its contribution to surgical anastomotic healing is incompletely understood.

Objective: Determine the role of PLG in pathogen-induced AL and target this pathway with existing pharmaceuticals

Methods: Fluorogenic PLG activity and collagenase assays were performed in the presence of collagenolytic *E. faecalis* (E44), in the presence or absence of PLG and the PLG inhibitor tranexamic acid (TXA). C57BL/6 mice underwent our validated model of E44-induced AL and were treated with 0.75mg/kg TXA or vehicle control via rectal enema.

Results: E44 alone activated PLG in a concentration-dependent fashion (reaction velocity increased by 0.32 RFU/s per E44 colony forming unit, $R^2 = 0.99$). When macrophages were plated with live E44, a direct correlation was observed between PLG activity and multiplicity of infection (MOI) (no E44 36.9 ± 2.9 AU; MOI2 40.6 ± 3.5 ; MOI10 80.9 ± 3.6 , $p < 0.01$). Subsequently, collagenolytic activity was increased in a MOI-dependent fashion (no E44 28.8 ± 1.2 AU; MOI 10 35.8 ± 1.4 $p < .01$). Each process was inhibited by TXA in a concentration-dependent fashion. In our model of E44-induced AL, 3/4 mice receiving TXA survived to the planned date of sacrifice, postoperative day 8, while mice receiving vehicle control had 100% AL-associated mortality (4/4) by postoperative day 4.

Conclusion/Significance: *E. faecalis* utilize host PLG to degrade collagen directly, and induce host macrophages to do the same. TXA competitively inhibits this process in vitro and rescues pathogen-mediated AL in vivo. Our data suggest that the pathogenesis of anastomotic leak involves microbial activation of PLG and drives collagenolytic activity to supraphysiologic levels. That this process can be suppressed by TXA offers a novel therapeutic role to apply this FDA approved agent to high risk anastomotic surgery.

Abstract #: 112

Session: Poster

Resistance associated-substitution testing does not delay in management of Hepatitis C

Authors: Fahad Khemani MD, Sara Javidiparsijani MD, Mary Hayden MD, Nikunj Shah MD, Sheila Eswaran MD, Costica Aloman, MD, Justin Mitchell DO, Sujit Janardhan MD, Donald Jensen MD, Nancy Reau MD

Introduction: Baseline testing for resistance-associated substitution (RAS) is recommended for some patients chronically infected with HCV prior to treatment initiation. AASLD/IDSA guidelines highlight treatment naïve (TN) or treatment experienced (TE) G1A patients considered for elbasvir/grazoprevir (EBV/GZR), TE G1A patients considered for ledipasvir/sofosbuvir and G3 TE and TN patients considered for sofosbuvir/velpatasvir as the population to be tested for RAS testing. Mathematical simulation models have shown that RAS testing prior to EBR/GZR is cost effective.

Objective: We aim to evaluate whether RAS testing in a real world single center population follows guideline recommendations of AASLD/IDSA and to measure the impact of insurance on RAS testing.

Methods: We identified patients in hepatology clinic with genotype testing and then did a retrospective chart review with RAS testing between May 2016 and May 2017. We collected demographic data, hepatitis C genotype testing and RAS testing baseline disease.

Results: We identified a total of 183 patients with HCV genotype testing during this time. Of the 183 patients, 60% were males and 48% fell between the age groups of 61-85 years. Additionally, 47% of the subjects were 1A genotype and 26% were identified as genotype 1B. All RAS testing was performed in G1A patients being considered for EBV/GZR and was supported with AASLD/IDSA guidelines. We identified two subjects who had RAS testing ordered outside of the recommended guidelines. These individuals were G2b TN and G1B TN treated with ledipasvir/sofosbuvir.

Conclusion/Significance: The current utilization of RAS testing is consistent with guideline recommendations in our healthcare practice and likely minimizes additional health care cost. Majority of the individuals had Medicaid insurance in our cohort. Insurance coverage was highly associated with RAS testing, likely related to the preference of EBV/GZR by several insurers.

Abstract #: 113

Session: Poster

H. pylori Eradication Rate and Factors Affecting Eradication Success in an Urban Academic Medical Center in the USA

Authors: Christina Lin (RMC), Marcus Juan Esteban MD (RUMC), Prachi Chakradeo MS (RUMC), Sean Xiang Liu (RMC), Mohamad Hemu MD (RUMC), Salina Lee MD (RUMC)

Introduction: H. pylori, classified a class I carcinogen, is a significant cause of GI morbidity. Various treatment regimens are available, but their overall eradication successes have not been well studied.

Objective: We aimed to determine eradication success rate at an urban academic medical center and determine factors that may affect successful eradication.

Methods: Data was analyzed for 1,109 H. pylori positive patients who were treated with triple, quadruple, concomitant, sequential or hybrid therapy at Rush University Medical Center from 2008 to 2017. Infection and eradication were tested with stool antigen testing, urea breath testing, or EGD with biopsy. The associations between eradication success and demographic and modifiable factors were analyzed by chi-square analysis using SPSS software.

Results: The overall eradication rate was 83.9%. No difference was seen between patients <60 and >60 years old (84.6% vs 83.0%, $p=0.269$). Males had a higher rate than females (88.5% vs 81.3%, $p=0.001$). No difference was seen in the rates between African Americans, Caucasians, Hispanics, Asians and others (81.8% vs. 90.8% vs. 83.4% vs. 82.9% vs. 83.3%, $p=0.80$). However, Caucasians had a higher rate compared to non-Whites (90.8% vs 82.5%, $p=0.002$). There was no difference in between the rate seen in African Americans and other races (81.8% vs 85.6%, $p=0.051$). No difference was seen between non-diabetics and diabetics (84.8% vs 80.5%, $p=0.068$). Non-smokers have a higher rate compared to smokers (85.6% vs 81.6%, $p=0.042$). No difference was seen between alcohol and non-alcohol consumers (84.2% vs 83.6%, $p=0.420$). Patients with no drug use history have significant higher rates than patients with drug use history (85.0% vs 68.8%, $p<0.001$).

Conclusion/Significance: The eradication rates in our study are consistent with other North American studies on H. pylori eradication. A Korean study also showed that males have higher rates compared to females. While studies have shown Caucasians having lower prevalence of H. pylori infection, our results showed Caucasians having higher eradication rates. Looking at modifiable factors, patients with no smoking or drug history had higher eradication rates, suggesting educating patients about avoiding these risk factors may optimize eradication rates. Further studies of the interactions amongst these factors with H. pylori eradication is warranted.

Abstract #: 114

Session: Poster

Production of Short Chain Fatty Acids in HIV+ Individuals and Immune Cell Activation

Authors: Rebecca J. Patterson (RMC), Dr. Alan Landay (Rush), Dr. Ali Keshavarzian (Rush), and Dr. Brett Williams (Rush)

Introduction: Published studies have linked sustained inflammation in HIV+ patients on highly active antiretroviral therapy (ART) to findings of compromised intestinal barrier function. This relationship may be explained by findings that HIV+ patients have decreased levels of butyrate-producing bacteria in the gastrointestinal tract and lower levels of butyrate, which has been implicated in the improvement of barrier function. However, there exist gaps in our knowledge on the role of the gut microbiome in HIV+ patients, both in the bacterial production of short chain fatty acids (SCFAs) and in the impact of SCFAs on the inflammatory response.

Objective: To determine the relationship between dietary fibers and their ability to modify the production of SCFAs by the microbiome of HIV+ patients. Based on previous studies, we proposed to determine if SCFAs would alter immune cell activation levels.

Methods: Fecal samples from two HIV patients pre-ART, at 24 weeks post-therapy, and a matched healthy donor were fermented with dietary fibers (guar gum, potato starch, and mixture) and a control. Supernatants were collected from each fermentation sample and assays were performed to quantify SCFA concentrations (acetate, propionate, butyrate). Fresh peripheral blood mononuclear cells (PBMCs) from an HIV negative donor were incubated for 22 hours with filtered and diluted supernatant from each of the fermentation reactions obtained from HIV+ and HIV- donors. We then evaluated PBMC immune marker expression with flow cytometry.

Results: Preliminary results demonstrated that fermentation of stool samples with all three dietary fibers result in an increase in all SCFA levels with acetate increases and quantity being the greatest. All samples with fibers showed decreased CD25-/CD69- and increased CD25-/CD69+ for both CD4 and CD8 T Cells in comparison to media and no fiber samples, suggesting increased activation of those subsets with the increased levels of SCFAs.

Conclusion/Significance: Our results show a relationship between SCFAs present and increased CD25-/CD69+ T cell expression. Future studies will be aimed at determining the correlation between specific SCFA concentrations and both T-cell activation and PBMC metabolic profiles. These studies highlight the importance of investigating the impact of SCFAs on immune activation associated with the persistent systemic inflammation in HIV+ patients.

Abstract #: 115

Session: Poster

Effects of Human Milk vs. Formula Feeding on Clinical Outcomes in Gastroschisis Patients

Authors: Andrew P. Storm (RMC); Rakhee M. Bowker (RUMC); Samuel Klonoski (RUMC); Stephanie Iantorno (RMC); Jonathan Bell (RMC); Srikumar Pillai (RUMC); Ami Shah (RUMC); Aloka L. Patel (RUMC)

Introduction: Gastroschisis is a congenital condition in which abdominal contents herniate through the anterior abdominal wall, requiring surgical repair and a postoperative NICU stay. Its incidence is increasing, giving cause to identify variables associated with improved clinical outcomes. Limited literature reports positive outcomes for patients fed with human milk (HM, from the infant's mother, not donor milk) compared to formula.

Objective: We aimed to determine the impact of dose of HM on: a) time to full enteral nutrition and days of total parenteral nutrition (TPN), b) length of stay (LOS), and c) growth rate from birth to discharge. We hypothesized that higher doses of HM would correlate with: a) reduced time to full enteral nutrition and reduced duration of TPN, b) a reduced LOS, and c) a higher growth rate.

Methods: This was a retrospective study of 44 gastroschisis patients at RUMC born between 2005 and 2016. The following data were recorded from patient charts: gestational age at birth, sex, type of gastroschisis, each recorded weight, length, and head circumference, age at first enteral feeding, age at full feed (defined as 140 mL/kg/d), days TPN was received, daily volume of formula, pedialyte, HM, and donor milk, and type of formula. Dose of HM was defined as the percentage of human milk by volume compared to the overall volume of enteral nutrition during the hospitalization. Data were analyzed using Pearson correlation and multivariate linear regression.

Results: HM dose was significantly negatively correlated with TPN days ($r=-.43$, $p=.003$), and LOS ($r=-.30$, $p=.046$). In the multivariate linear regression analysis (covariates simple vs. complex gastroschisis, sex, and gestational age), HM dose was significantly associated with TPN days with every 10% increase in BM dose associated with a decrease of 3.2 TPN days ($\beta -3.2$, 95% CI [-5.3, -1.1], $p = .003$).

Conclusion/Significance: Dose of HM was associated with fewer TPN days but did not affect LOS or growth. These preliminary findings are provocative and suggest that further study of the role for donor human milk when HM is unavailable in the post-operative feeding regimen for infants with gastroschisis may be indicated.

Abstract #: 116

Session: Poster

Change in objective but not subjective measures of empathy following social cognitive training

Authors: Kristen M. Haut (RUMC, Psychiatry) Erin Guty, (Pennsylvania State Univ, Psychology Department) David Dodell-Feder, (Rochester Univ, Psychology) Christine I Hooker, (RUMC, Psychiatry and Radiology)

Introduction: Empathy, the ability to understand and share in others subjective emotional states is critical for healthy social functioning and maintenance of interpersonal relationships. Individual differences in empathic skills suggests that developing targeted interventions may aid in improving social functioning, however, it is unclear how malleable the skills are that contribute to an individual's empathic functioning.

Objective: This study assesses whether an objective measure of empathy, namely empathic accuracy, or an individual's self-reported empathy levels change following a social cognition targeted training paradigm.

Methods: 45 healthy individuals without a history of significant psychopathology completed a randomized controlled trial of a computerized cognitive training program that includes empathy-related skills such as emotion recognition and perspective taking. Pre- and post-training, subjects completed an empathic accuracy task in which they make inferences about the naturalistically occurring emotions of individuals recounting autobiographical events and these inferences are scored for accuracy against the stimulus persons' self-reported feelings. Subjective trait empathy was also assessed using the Interpersonal Reactivity Index questionnaire (IRI), which measures self-reported dispositional empathy. A repeated measures ANOVA was conducted to assess for group differences in empathic accuracy performance change following training as well as within-group paired t-tests to determine the pattern of significant results.

Results: Repeated measures ANOVA show that there is a significant condition by timepoint interaction ($F=4.254, p=.045$) on the empathic accuracy task, where the active treatment group show a significant increase in overall empathic accuracy score following training ($t=2.58, p=.017$) while the control group did not ($t=-.559, p=.582$). There was no effect of emotional valence on the change revealed by the group by timepoint interaction ($F=.140, p=.710$) and there were no condition by timepoint interactions ($F=.041, p=.841$) for the IRI score overall or on any of the four IRI subscales ($F=.124, p=.946$).

Conclusion/Significance: Individuals who received social cognition training demonstrated improved performance on an objective task of empathic accuracy while individuals in a control computer games condition did not. These improvements in objective empathic ability, rather than changes in subjective reports of empathy, suggest that cognitive training may be a useful tool for increasing empathic skills and improving social functioning.

Abstract #: 117

Session: Poster

Racial Differences in Objective and Subjective Sleep Parameters: A Sample of Inner-City Women

Authors: Alexandra Fischer (RUMC); Frances Aranda (RUMC); Teresa Lillis (RUMC); Helen Burgess (RUMC); John Burns (RUMC); Yanina Purim-Shem-Tov (RUMC); and Stevan Hobfoll (RUMC)

Introduction: African Americans (AA) are increasingly recognized as a population with significant sleep inequities.

Objective: This study examined racial differences in objective and subjective sleep parameters from a diverse sample of inner-city women who presented to an urban Emergency Department (ED) with an acute pain complaint.

Methods: As part of an ongoing, longitudinal study examining the relationship between pain and traumatic stress, seven days of wrist actigraphy, and sleep diaries were collected from 44 women. The mean age of the women was 29.41 years (SD = 6.00); race/ethnicity was 41% AA, 39% Latina, 11% White, and 9% Other. Total sleep time (TST), wake after sleep onset (WASO), sleep efficiency (SE) and fragmentation (FRAG) were estimated with actigraphy; sleep quality (SQ) ratings, and number of perceived awakenings were collected via self-report from the Consensus Sleep Diary. The study was approved by RUMC's Institutional Review Board and informed consent was obtained from all participants.

Results: The sample was divided between AA race (n = 18) and Non-AA race (n = 26) following preliminary analysis that found no significant differences in primary study variables (e. g. TST, SQ) among Latina, White, or Other race/ethnicity. A series of one-way ANOVAs based on AA race relative to Non-AA race revealed significant differences in most objective variables including significantly lower values for TST (F = 6.57), and SE (F = 4.12), higher values for FRAG (F = 7.17), but no significant differences were found based on subjective measures (all p's < .05). These differences were not accounted for in pain intensity/interference, PTSD symptoms, education, or employment status. However, AA women were more likely to have lower incomes than non-AA women.

Conclusion/Significance: The results indicate that AA women appear to have shorter, more fragmented sleep compared to Non-AA women yet no difference in subjective sleep quality ratings. Additionally, AAs have significantly lower incomes which could indicate a social determinant of sleep with varying influence on objective and subjective sleep parameters. As the present study continues data collection, a follow-up will be presented to provide additional information on race/ethnicity differences in objective and subjective sleep parameters.

Abstract #: 118

Session: Poster

Optimism and resource loss in a female minority population: Are they associations with depression and physical pain

Authors: Morgan Mulcahy (Rush), Frances Aranda (Rush), John Burns (Rush), Yanina Purim-Shem-Tov (Rush), & Steven Hobfoll (Rush)

Introduction: Researchers have found links between depression and pain (i.e., intensity, interference, and catastrophizing). Common contributors included resource loss and optimism. Literature has reported 35-50% of individuals with chronic pain are comorbid for depression (Romano and Turner 1985, Miller and Cano 2009). Understanding the associations involving optimism and resource loss could lead to increased prevention and better treatment of conditions involving pain.

Objective: This study examined the associations of optimism and resource loss in relation to depression and pain. We used mediation of optimism and resource loss on depression and pain in a sample of women (N=301) reporting to an urban Emergency Department with acute pain.

Methods: Data were collected via a structured interview. Study measures included Pain Catastrophizing Scale (PCS), Pain Interference (PROMIS), self-reported pain intensity, Structured Clinical Interview for DSM-IV (SCID) for depression, Life Orientation Test (LOT-R) for optimism, and 11 items for resource loss. Multiple regression results were reported at $p < .05$. The study was approved by RUMC's Institutional Review Board and informed consent was obtained.

Results: Optimism and resource loss were associated with the relationship between depression and pain interference and catastrophizing which partially supported the hypothesis. Optimism mediated the relationship between depression and pain catastrophizing ($b = -.2$, $t(301) = -3.53$, $p < .05$), and resource loss mediated the relationship between depression and pain interference ($b = .141$, $t(301) = 2.17$, $p < .05$). However, resource loss and optimism did not mediate the relationship between depression and pain intensity which differed from previous studies.

Conclusion/Significance: The lack of mediation on pain intensity may be due to age and/or general health of the participants. Previous studies included senior or adolescent participants, who presented with health problems; whereas this study included women (age 18-41) and excluded chronic conditions involving pain (e.g., sickle cell).

Abstract #: 119

Session: Poster

Going beyond Race: Examining the relationship between socioeconomic status and minority women's willingness to participate in health research

Authors: Benino Navarro (RUMC) Linzy Wagner (RUMC) Frances Aranda PhD, MPH, MS (RUMC) John W. Burns, PhD (RUMC) Yanina A. Purim-Shem-Tov, MD, MS (RUMC) Stevan E. Hobfoll, PhD (RUMC)

Introduction: Ethnic/racial minorities are generally underrepresented in health research, cited reasons included mistrust, competing demands, and limited research opportunities. However, the Trauma and Pain (TAP) Study at Rush University Medical Center, included a higher percentage of minority women (79.1%) than White women. This goes against what is expected based on previous literature. This study examined differences between women who declined participation and those enrolled in TAP to inform future efforts of including minority women in research.

Objective: To examine what factors beyond race influence a minority woman's decision to participate in health research.

Methods: Demographic data were collected during baseline interviews (N=313). Women who refused (N=99) completed a brief refusal survey; 9 declined survey (excluded from analysis). The groups were examined for demographic differences using Chi-square analysis.

Results: Chi-square analysis found significant relationships between study participation with race, $\chi^2(1)=7.72, p<.01$, and income, $\chi^2(4)=15.90, p<.01$; White women and those with incomes greater than \$80k were more likely to refuse participation. Women who live with more people ($M=3.66, SD=2.06$) were significantly more likely to enroll ($M=2.93, SD=1.317$), $t(408)=3.81, p<.001$. Women with children under the age of 18 ($M=1.17, SD=1.344$) were significantly more likely to enroll ($M=0.83, SD=1.021$), $t(410)=2.30, p<.05$. Similar analyses were conducted by race comparing those who refused to those enrolled, no significant differences were found.

Conclusion/Significance: These results indicate that factors related to socioeconomic status, such as income, crowding and number of dependents, might have a bigger impact on a woman's decision to participate than race alone. Results may be attributed to TAP not being a clinical trial study that can invoke mistrust or that TAP offers compensation for participation.

Abstract #: 120

Session: Poster

Inertial sensor based normative balance parameters in typically developing children and young adults

Authors: Palmer, A, Tracy, R, Voss, S, Fefferman, M, Parulekar, M, Purcell, N, O'Keefe, JA All Authors
Rush University Affiliated

Introduction: MobilityLab (APDM™) is a widely used inertial sensor system increasingly used in the analysis of balance and gait due to their relatively low cost, transportability and ease of use. However, normative data using this system has not yet been established in children and young adults throughout the developmental spectrum.

Objective: The objective of this study is to establish a normative database of postural control parameters which is essential for comparison to children and young adults with neurological and other disorders causing balance deficits.

Methods: Balance data was collected from typically developing children and healthy young adults ages 5-30 (n=134) using an instrumented postural sway (i-SWAY) test consisting of three stance patterns (firm surface, foam surface, tandem stance) each completed with eyes open and eyes closed. Data was stratified into the following age groups 5-6 (n=15), 7-8 (n=19), 9-10 (n=11), 11-13 (n=30), 14-21 (n=22), and 22-30 (n=37) years.

Results: There were no differences between male and female metrics; therefore data was combined for statistical analysis (one way ANOVA with Tukey's post hoc comparisons or Kruskal-Wallis tests for normal or non-normal distributions, respectively). Total sway area (m^2/sec^4) decreased significantly as age increased in all stance patterns with children 5-6 years of age having the largest sway area ($p < 0.0001$). All groups had an increase in total sway area when eyes were closed compared to eyes open in all stance patterns. Eyes closed in tandem stance yielded the largest total sway area throughout the age groups. Children 5-6 years of age also demonstrated significantly greater total jerk (m^2/s^5) reflecting less smoothness of the sway path compared to older age groups. Total jerk was also observed to decrease as age increased in all stance patterns ($p < 0.0001$).

Conclusion/Significance: Normative data from this study may be useful to clinicians and researchers using the MobilityLab system to analyze postural control in children and young adults with balance deficits. This system is also feasible to determine efficacy of treatment interventions including use in clinical trials research in neurological populations. Further validation of this system with gold standard methods is needed in children.

Abstract #: 121

Session: Poster

Social Support as a Mediator of Socioeconomic Status and Health

Authors: Katie Rim (RUMC); Frances Aranda (RUMC); John Burns (RUMC); Yanina Purim (RUMC); and Stevan Hobfoll (RUMC)

Introduction: Previous research established the relationship between socioeconomic status (SES) and both physical and mental health. However, the pathway of how SES impacts health is less clear.

Objective: This study examined social support as a mediator between SES and physical and mental health in a sample of inner-city women (N=332).

Methods: The study was approved by RUMC's IRB and informed consent was obtained. A subjective measure of Perceived Income Needs Met (PINM) was used ('Do you consider your total household income to be not enough to meet your basic needs, enough to meet your basic needs, or more than enough to meet your basic needs?'). Social support was measured using the Provisions of Social Relationships Scale. Physical health was measured as perceived health ('Thinking about your physical health, how would you rate it?'). Mental health was assessed using PTSD Checklist (PCL) for post-traumatic stress disorder over the past month. Mediation analyses examining physical health controlled for household income and the number of persons in the household, while mediation analyses examining PTSD additionally controlled for PTSD over the lifetime (PCL over the whole life) and the total number of traumatic events ever experienced (Trauma History Questionnaire).

Results: Social support fully mediated PINM and physical and mental health. In the first analysis, PINM predicted social support ($b=2.17$, $se=.37$, $p=.001$) and social support predicted physical health ($b= -.05$, $se=.01$, $p=.001$). PINM was no longer a significant predictor of physical health after controlling for social support ($b= -.12$, $se=.09$, $p=.2$), consistent with full mediation. Similarly, in the second analysis, PINM predicted social support ($b=1.88$, $se=.34$, $p=.001$) and social support predicted PTSD symptoms ($b= -.64$, $se=.14$, $p=.001$). PINM was no longer a significant predictor of PTSD after controlling for social support ($b= -1.48$, $se=.91$, $p=.11$).

Conclusion/Significance: These results suggest that social support fully mediates subjective SES and physical and mental health. These findings contribute to our understanding of the association between SES and health and provide important clinical implications for treatment of women's health.

Abstract #: 122

Session: Poster

Normative database of spatiotemporal gait parameters using inertial sensors in typically developing children and young adults

Authors: Stephanie Voss (RUMC); Rachel Tracy (RUMC); Sasha Palmer (RUMC); Marie Fefferman (RUMC), Medha Parulekar (RUMC), Nicolette Purcelle (RUMC) Joan A. O'Keefe (RUMC)

Introduction: Inertial sensors are used increasingly in the analysis of gait parameters due to their low cost, transportability and ease of use. MobilityLab (APDM TM) is a widely used system, however normative data has not yet been established in children/young adults throughout the developmental spectrum.

Objective: This study aims to establish a normative database of spatiotemporal gait parameters essential for comparison to clinical populations.

Methods: Gait and turning data was collected from typically developing children and young adults ages 5-30 (n=139) using an instrumented 2-minute walk test (i-WALK), at a self-selected and fast pace, and a Timed Up and Go test (i-TUG). Data was stratified into the following age groups 5-6 (n=15), 7-8 (n=19), 9-10 (n=13), 11-13 (n=30), 14-21 (n=24), and 22-30 (n=38) years.

Results: There was no significant difference between male and female gait parameters; therefore data were combined for analyses. Stride length increased with age where 7-8 years were shorter than all older age groups except 9-10. At a self-selected pace, children 5-8 years were slower than all older children; cadence decreased and gait cycle time and turn durations increased in young adults 22-30 years. At a fast pace, 22-30 years were faster than all younger groups; cadence decreased and gait cycle time increased after 9+ years, and turn durations were faster in children ≥ 14 compared to 7-8 years. Children 11-13 years had shorter stance times and longer swing times than older groups. Double support times varied in children ≥ 11 , where 11-13 years had shorter times at a self-selected pace, and 14-21 years had longer times at a fast pace. Sit-to-stand durations were longest in children 14-21 years, differing significantly from children 9-10 years. Turn-to-sit duration, number of steps to turn, and right toe out angles did not vary between groups.

Conclusion/Significance: Normative data from this study may be useful to clinicians and researchers using the MobilityLab system to analyze spatiotemporal gait parameters in children and young adults. Further validation of this system with gold standard methods is needed in children.

Abstract #: 123

Session: Poster

SIV infection leads to Increased Frequencies of Colon Innate Lymphoid Cells and Natural Killer Cells that Constitutively produce Interferon-gamma and IL-22

Authors: Andrew Cogswell (Rush), Stephanie Dillon (University of Colorado Boulder), Natasha Ferguson (Rush), Moriah Castleman (University of Colorado Boulder), Cara Wilson (University of Colorado Boulder), Edward Barker (Rush)

Introduction: During early HIV infection CD4+ T-cells drastically wiped out both in number and function of these cells in the GI tract. However, innate lymphocytes appear to remain intact in number and function. Innate lymphoid cells (ILC) group 3 (which consists of ILC3s) and ILC group 1 (which consists of ILC1s and NK cells) are major innate counterparts to the CD4+ T-cells in function.

Objective: We wanted to determine the frequency and type of cytokines secreted by ILC3, ILC1s and NK cells from the colon during SIV infection.

Methods: Utilizing digested fresh colons from necropsies of uninfected and SIV-infected rhesus macaques, we examined both the frequency and function of ILC1, 3 and NK cells in the lamina propria using flow cytometry.

Results: There is a higher frequency of ILC3s, ILC1s and NK cells that constitutively express IL-22 and IFN- γ but not IL-17 in the colon of SIV-infected rhesus macaques relative to uninfected monkeys. Moreover, we demonstrate that myeloid dendritic cells are a major source of IL-12. A novel cell NK-B cells, which appear in the GI tract during SIV infection are a major source of IL-18, which together with IL-12 likely drive increased IFN- γ production by ILCs and NK cells in the SIV infected colon.

Conclusion/Significance: These findings indicate that IL-22 production by innate lymphocytes in the colon are not lost during chronic SIV infection, but rather increased production of IFN- γ and IL-22 by ILCs and NK cells likely contributes to chronic colonic inflammation and leaky GI tract of SIV-infected rhesus macaques.

Abstract #: 124

Session: Poster

Pseudomonas aeruginosa ExoS Induces Intrinsic Apoptosis in Target Host Cells in a Manner That is Dependent on its GAP Domain Activity.

Authors: Kajal H. Gupta PhD (RUMC) , Amber Kaminski, Josef W. Goldufsky, Ha Won Lee, Vineet Gupta and Sasha H. Shafikhani

Introduction: *Pseudomonas aeruginosa* is a Gram-negative opportunistic pathogen that causes chronic and acute infections in immunocompromised individuals and cystic fibrosis patients. The Type III Secretion System (T3SS) is a major virulence structure in *P. aeruginosa*, which has been linked to severe disease progression and poor clinical outcomes in human studies. These effector virulence factors mediate tissue damage, inhibit wound healing and establish chronic infection. ExoS and ExoT are two highly homologous bifunctional T3SS effector virulence factors which induce apoptosis in target host epithelial cells. They possess a GTPase Activating Protein (GAP) domain at their N-termini which share 76% homology and an ADP-ribosyltransferase (ADPRT) domain at their C-termini which target non-overlapping substrates. While both domains of ExoT contribute to ExoT-induced apoptosis in target host cells, ExoS-induced apoptosis has been attributed to its ADPRT domain activity and the role of the GAP domain in ExoS-induced apoptosis has not been.

Objective: The main objective of this research is to demonstrate that the GAP domain of ExoS is both necessary and sufficient to induce mitochondrial (intrinsic) apoptosis, thus revealing a previously unappreciated role for the GAP domain of ExoS.

Methods: We have used Immunofluorescent (IF), time-lapse videomicroscopy, confocal microscopy and different molecular biology techniques.

Results: We show that intoxication with ExoS/GAP results in activation of (i) JNK, (ii) upregulation and enrichment of Bax and Bim in mitochondria outer-membrane, (iii) disruption of mitochondrial membrane and release of cytochrome and (iv) caspase-9 and caspase-3 activation, which ultimately drive the cell toward apoptotic demise. Our data reveal a previously unappreciated virulence function for the GAP domain of ExoS as an inducer of apoptosis.

Conclusion/Significance: We provide compelling evidence that ExoS-induced mitochondrial outer-membrane disruption and cytochrome c release into the cytosol is primarily due to ExoS/GAP domain activity and not the ADPRT domain activity.

Abstract #: 125

Session: Poster

Immune and Metabolic Markers of Mast Cell Activation Syndrome

Authors: Kathryn Hughes, Susan Fox, Mahboobeh Mahdavinia, Mary Tobin (all: Division of Allergy/Immunology, Department of Internal Medicine, Rush University Medical Center)

Introduction: Mast Cell Activation Syndrome (MCAS) is a multi-systemic disorder involving hyper-responsive mast cells (MC) without MC proliferation. Patients experience episodes of unpredictable, sudden-onset symptoms, including abdominal pain, diarrhea, flushing, itching, neurologic abnormalities, and wheezing known as MC flares. However, as MCAS is a newly-recognized condition, definitive biomarkers, associated medical conditions, and diagnostic criteria are currently being investigated.

Objective: This on-going study explores the phenotypic profiles and clinical characteristics of a series of MCAS patients.

Methods: We recruited patients (2-84 years old) presenting to the Rush Allergy Clinic with MCAS. Demographic information, comorbidities, and systemic MC biomarkers (serum tryptase, 24hr urine N-methyl-histamine, and 24 hr urine prostaglandins D2 & F2) were recorded for each patient. Participants completed a questionnaire describing the symptoms, triggers, and frequency of MC flares, in addition to quality of life and healthcare utilization related to their MCAS.

Results: Twenty-five patients were enrolled so far; 4 males (16%) and 21 females (84%). All cases identified as non-Hispanic Caucasians. Their ages ranged from 2 to 54 years with mean±SD of 31.2±19.35 years. Comorbid allergic rhinitis, asthma and food allergy was seen in 84%, 36% and 36% of the cases. The mean±SD of 24 hr urine prostaglandin D2 was elevated at 533.6±813 ng/24hrs (rr 100-280ng). Serum tryptase, 24hr urine methyl-histamine, and 24hr urine prostaglandin F2 were within normal ranges, with mean±SD of 7.33±5.86 ng/mL (reference range(rr): <11ng/mL), 173.1±99.8 mcg/gCr (rr 30-200mcg/gCr), and 3095.5±2484 pg/mgCr (rr: <5205pg/mgCr), respectively. Common triggers of MC flares included food, medications, hot weather, illness, stress, and odors. Most common symptoms experienced daily were abdominal pain (64%), nausea (50%), and difficulty concentrating (43%). Most common symptoms exclusively during MC flares were swollen throat (57%), lightheadedness (n=8), and numbness & tingling (50%). Fifty-seven percent of patients experienced over 4 flares per month, and 64% of patients saw >10 physicians before receiving the MCAS diagnosis.

Conclusion/Significance: Common triggers of MC flares in our series included food, medications, weather, and stress. During MC flares, MCAS patients most often experience swollen throat, lightheadedness, and numbness/tingling. Further research is warranted to establish baseline characteristics, immunologic mechanisms, and treatment options for MCAS patients.

Abstract #: 126

Session: Podium Presentation - IMSD

Zika virus, in a strain specific manner, induces human fetal astrocyte cell death through β -catenin inhibition

Authors: Oscar A. Jimenez MS (Rush), Srinivas D. Narasipura PhD (Rush), and Lena Al-Harhi PhD (Rush)
OAJ is supported by Rush IMSD (R25 109421)

Introduction: Zika virus (ZIKV) has been known to infect humans for 70 years in Africa with relatively few clinical implications. However, within the past ten years there have been several large outbreaks of Zika infection in the Pacific islands, Latin America, and subsequently the United States. These outbreaks are linked to severe complications in immunocompromised adults, fetuses within pregnant mothers, and infants. In newborns, the congenital Zika virus syndrome, is associated with significant neurologic abnormalities including microcephaly (small brain). We initiated an investigation to address differences in CNS pathogenicity between Asian lineages (recent epidemic) vs. African lineage ZIKV strains on human fetal astrocytes (HFAs).

Objective: To determine the impact of ZIKV lineage-specific strains on the viability of HFAs and if the pro survival β -catenin pathway can rescue viral mediated cell death.

Methods: We infected HFAs with four strains of ZIKV virus at an MOI of 0.3 and measured cell viability by MTS assay over the course of 7 days. Protein expression of total β -catenin and downstream target Axin 2 was determined by standard western blot protocol. qRT-PCR was used for relative transcript determination.

Results: We found infection with ZIKV Asian strains (PRVABC59 and FLR) reduced cell viability significantly more than ZIKV African strain (IBH 30656). Asian strains induced 50% cell death by three days post infection (d.p.i), whereas African lineage mediated only 10% cell death at the same time point. Western blot showed a significant inhibition of β -catenin by three d.p.i as well as reduced protein expression of downstream effector Axin2. Similarly, mRNA expression of β -catenin and Axin2 is reduced by in HFAs by Asian lineage ZIKV infection. In contrast, African lineage ZIKV had no impact on β -catenin signaling on HFAs. Overexpression of β -catenin in the form of a plasmid containing constitutively active β -catenin (pABC) protected astrocytes from ZIKV mediated cell death. These results were reproducible in both human fetal primary astrocytes (HFAs) and human adult astroglomas (U138MG).

Conclusion/Significance: Our data suggest that Asian lineage ZIKV is able to inhibit β -catenin in fetal human astrocytes leading, in part, to heightened pathogenesis.

Abstract #: 127

Session: Poster

Atopic dermatitis phenotypes in African American and Black South African children

Authors: Kylie Jungles, Michael Levin , Maresa Botha, Betty Andy-Nweye, Sukruthi Jois, Claudia Gray, Carol Hlela, Avumile Mankahla, Ben Gaunt, Carl le Roux, Nonhlanhla Lunjani, Mary Tobin, Mahboobeh Mahdavinia

Introduction: Atopic conditions are currently on the rise, especially in the United States. Atopic conditions, such as food allergies, asthma, and atopic dermatitis often present as comorbidities in patients, which can have significant negative impacts on their quality of life. While atopic conditions are on the rise in all races and ethnicities, studies have shown that African American children are at an increased risk for developing atopic conditions, specifically atopic dermatitis and food allergies.

Objective: Atopic dermatitis (AD) is commonly seen in African American (AA) children. AAs experience more severe AD compared to individuals of other races. However, it is unclear whether genetic or environmental factors are responsible for the severity of AD in these children.

Methods: We investigated a cohort of AA children (≤ 3 yrs.) with AD living in an urban environment in the United States. All parents completed a standardized questionnaire consisting of a history of atopic conditions, and a SCORAD questionnaire. We compared these variables to a cohort of Black South African (SA) children (≤ 3 yrs.) with AD living in urban and rural environments in South Africa.

Results: The AA and SA cohorts consisted of 68 and 63 children with AD respectively. The two cohorts had similar age and gender distribution. The SA cohort had significantly higher SCORAD scores in comparison to the AA (mean \pm SD of 29.55 ± 25 vs. 513.37 ± 12.7). While the prevalence of allergic rhinitis was comparable among the two cohorts (22.1% vs. 22.2%), the AA cohort had significantly more children with asthma (1.6% vs. 20.6%) and SA children had more food allergy (14.7% vs. 30.2%). Of the SA cohort, 34 children were from rural and 29 from urban areas. Adjusting the data based on rural vs. urban location did not yield any changes.

Conclusion/Significance: The differences between two cohorts of Black children from different countries with higher severity of AD among SA children could be due to lower access to health care, genetic differences between AA and SA, or environmental factors, which could result in increased disruption of the skin barrier and the rate of atopic comorbidities.

Abstract #: 128

Session: Poster

Relative abundance of nasal microbiota in chronic rhinosinusitis by structured histopathology

Authors: Hannah N. Kuhar (RU), Bobby A. Tajudeen, MD (RUMC), Mahboobeh Mahdavinia, MD, PhD (RUMC), Ashley Heilingoetter, BA, MPH (RU), Paolo Gattuso, MD (RUMC), Ritu Ghai, MD (RUMC), Pete S. Batra, MD, FACS (RUMC)

Introduction: Chronic rhinosinusitis (CRS) is an infectious and inflammatory disease process with different phenotypes. Recent data has shown that CRS phenotypes maintain distinct nasal microbiota that may predict surgical outcomes. Nasal microbiota and structured histopathologic reporting have the potential to further differentiate subtypes and provide added insight into CRS pathophysiology.

Objective: The objectives of this study are two-fold, first to better understand the relationship between nasal microbiota and structured histopathology in CRS, and second to better understand the pathophysiologic mechanisms of CRS subtypes and implications for disease management.

Methods: Sinus swabs for nasal microbiome assay were performed in the office and studied by polymerase chain reaction analysis of 16S ribosomal RNA. A structured histopathology report of 11 variables was utilized to analyze sinus tissue removed during functional endoscopic sinus surgery (FESS). Histopathology variables and relative abundance of nasal microbiota were compared among CRS patients.

Results: 51 CRS patients who underwent FESS were included. Relative abundance of Firmicutes phylum in nasal microbiota of CRS patients was associated with presence of neutrophilic infiltrate (27.47 ± 44.75 vs. 9.21 ± 11.84 , $p < 0.029$), presence of mucosal ulceration (47.67 ± 45.52 vs. 13.27 ± 26.48 , $p < 0.041$), presence of squamous metaplasia (5562.70 ± 2715.66 vs. 3563.73 ± 2580.84 , $p < 0.035$), and absence of Charcot Leyden crystals (5423.00 ± 3320.57 vs. 679.94 ± 1653.66 , $p < 0.001$). Relative abundance of Bacteroidetes phylum in nasal microbiota of CRS patients was associated with increased severity of inflammatory degree ($p < 0.004$) and presence of mucosal ulceration ($p < 0.004$).

Conclusion/Significance: Distinct histopathologic features of CRS are associated with relative abundance of nasal microbiota phyla, specifically Firmicutes and Bacteroidetes. These findings contribute to the literature on microbiota in sinonasal disease and may have important implications for understanding pathophysiologic mechanisms of CRS subtypes and disease management.

Abstract #: 129

Session: Poster

ANTIMICROBIAL SUSCEPTIBILITY TESTING OF POTENTIAL UROPATHOGENS ISOLATED VIA ENHANCED QUANTITATIVE URINE CULTURE

Authors: Robert Mendoza (RUMC) Dr. Amanda Harrington, PI (LUMC)

Introduction: Urinary tract infections in women have recently been linked to certain fastidious and emerging uropathogens that are rarely reported and have limited data available. In this study, we will look at the susceptibility patterns of these isolated uropathogens and provide insight on how to interpret these results.

Objective: We ask what is the susceptibility of these uropathogens are by determining which methods will provide data on susceptibility testing. We hypothesize that the isolated clinically relevant fastidious and emerging uropathogens will demonstrate similar susceptibility patterns across the methods utilized. The secondary objective of this study is to provide insight on how to interpret these susceptibility values where none is provided in literature.

Methods: Kirby-Bauer disc diffusion method will be performed for the isolates to determine the zones of inhibition. The minimum inhibitory concentration (MIC) will be performed via MicroScan broth dilutions. Testing will be performed in triplicate with mean and standard deviation of isolate results being assessed. Comparative analysis between MIC values and zones of inhibition will be assessed via scattergram to determine breakpoints in accordance to CLSI guidelines for fastidious organisms.

Results: Three organisms (*Alloscardovia omnicolens*, *Actinotignum schaalii*, and *Oligella urethralis*) were tested for KB zones of inhibition using Muller-Hinton agar. *O. urethralis* was the only one that grew. The utilization of Muller-Hinton agar with blood aided the growth of *A. omnicolens* and *A. schaalii*. All three species require 48-hours to grow under 35°C and 5% CO₂ incubator. MIC testing is currently being assessed, preliminary reports have failed to generate growth.

Conclusion/Significance: Data analysis of the KB testing has no CLSI guidelines and is not part of standardized testing. Assessing breakpoints has been compared to phylogenetic tree of similar bacterial species to which CLSI does include data. Literature is highly limited as few case reports are available for these isolates and susceptibility results have been scarcely reported but rarely assessed.

Abstract #: 130

Session: Poster

Whole-exome sequencing of the patient with pyoderma gangrenosum

Authors: Andrew Nesterovitch (RUMC) Helen Piontkivska (KSU) , Mark Hoffman (RMC), Heather Mercer (UMU), Tibor Glant (RMC), Michael Tharp (RMC) KSU - Kent State University; UMU - University of Mount Union

Introduction: Pyoderma gangrenosum (PG) is a neutrophilic dermatosis with chronic painful skin ulcers of unknown etiology. The diagnosis of PG continues to be one of exclusion. There are no specific laboratory tests or absolute diagnostic histopathologic features for PG.

Objective: PG is a heterogeneous and relatively rare skin disease. However, several amino acid changing (missense) mutations in the PSTPIP1 gene were identified in patients with syndromic PG, characterized by pyogenic sterile arthritis with PG and acne (PAPA syndrome).

Methods: Whole-exome sequencing (Illumina Platform PE150, Q30 \geq 80%)

Results: In this study, we performed whole-exome sequencing of the genomic DNA from 47 year old Hispanic female with postoperative PG. No missense mutation in the coding sequence of the PSTPIP1 gene was detected, which indicates the role of different genes in pathogenesis of PG. We identified over a hundred novel mutations/polymorphisms which change amino acid sequence of different proteins involved in immune/inflammation processes and/or are within candidate genes identified in prior SNP array genotyping studies.

Conclusion/Significance: This is the first study of PG using whole-exome sequencing. This pilot study is limited to a single exome analysis, but it will form a base for comparison and identification of candidate genes, which might play role in pathogenesis of PG.

Abstract #: 131

Session: Poster

β -catenin negatively regulates neuroinflammatory cytokine and chemokine expression in human astrocytes

Authors: KaReisha Robinson MS (GC), Srinivas D. Narasipura and Lena Al-Harathi Department of Microbial Pathogens and Immunity, Rush University Medical College, Chicago, IL. USA.

Introduction: HIV invades the brain during acute infection, setting the stage for persistent neuroinflammation despite combined antiretroviral therapy (cART). These events lead to HIV-Associated Neurocognitive Disorders (HAND), which occurs in ~50% of HIV-infected individuals. The cellular and molecular mechanisms driving this neuroinflammation/HAND are not entirely clear. The Wnt/ β -catenin signaling pathway is integral to cell survival and proliferation. We have shown that both HIV and inflammatory signals downregulate Wnt/ β -catenin signaling in astrocytes leading to neuronal injury.

Objective: Our lab has been focused on understanding the role of Wnt/ β -catenin signaling in HAND.

Methods: siRNA technology was used to knockdown β -catenin in astrocytes. Pharmacological agents 6-bromoindirubin-3'-oxime (BIO) and lithium chloride(LiCl) were used to overexpress β -catenin in astrocytes. Real-time PCR was used to evaluate the mRNA levels of the cytokine IL-6 and chemokine IL-8 expression in astrocytes with β -catenin knocked down or overexpressed. Western Blot was used to evaluate the protein levels of β -catenin knocked down or overexpressed. Enzyme-linked immunosorbent assay (ELISA) was used to evaluate the IL-6 and IL-8 expression in astrocytes with β -catenin knocked down or overexpressed. To assess the direct impact of β -catenin on transcriptional activity of IL-6 and IL-8, we conducted a bioinformatics analysis of their respective promoters to test for presence of putative TCF/LEF binding sites. Student T-test was used for statistical analyses.

Results: We demonstrate that knockdown of β -catenin in normal human astrocytes (NHAs) significantly induced IL-6 and IL-8 at the transcription and protein levels and conversely, induction of β -catenin significantly downregulated these two molecules. In addition, we found a proximal TCF/LEF site located between the -91 and -86 region sandwiched between C/EBP and NF- κ B and a distal TCF/LEF site located between the -948 and -943 region on the IL-6 promoter. We also found one TCF/LEF site located between the -175 and -169 region on the IL-8 promoter.

Conclusion/Significance: These findings suggest that β -catenin regulates inflammation in astrocytes and may do so through direct regulation of IL-6 and IL-8 at the transcriptional level.

Abstract #: 132

Session: Poster

Impact of Pneumocystis prophylaxis on incidence of treated urinary tract infections following kidney transplantation

Authors: Sabrina Sanchez (RUMC), Marissa Brokhof (RUMC), Nicole Kenyon (RUMC), Christy Varughese (RUMC), Nicole Alvey (RUMC)

Introduction: Urinary tract infection (UTI) is the most common infectious complication after kidney transplantation resulting in increased morbidity and mortality. Sulfamethoxazole-trimethoprim (SMX-TMP) is commonly used as *Pneumocystis jirovecii* pneumonia (PJP) prophylaxis following kidney transplant and covers common urologic pathogens.

Objective: The objective of this study was to evaluate the impact of PJP prophylaxis on the incidence of treated UTI's within the first year of kidney transplant at RUMC.

Methods: This was a single-center retrospective cohort study that excluded previous transplant and multiple-organ recipients. Patients who remained on prophylaxis with SMX-TMP for at least 30 days after transplant were compared to patients who were switched to alternative PJP prophylaxis with dapsone or atovaquone within 30 days of transplant.

Results: One hundred and fifty-five patients who received a kidney transplant between January 1, 2015 and October 31, 2016 were included. One hundred and thirteen patients received PJP prophylaxis with SMX-TMP for at least 30 days following transplant (group 1). Forty two patients were switched to alternative prophylaxis within 30 days of transplant (group 2). Five patients did not receive SMX-TMP due to pre-existing sulfa allergies, and 30 patients were switched to alternative agents due to increased serum creatinine, including 10 patients with delayed graft function. Less common reasons for SMX-TMP discontinuation included hyperkalemia, leukopenia, increased transaminases, and GI upset. Seventy eight total treated UTI's were reported in group 1 and 30 treated UTI's were reported in group 2 ($p=0.9317$). Thirty seven patients in group 1 and 13 patients in group 2 were treated for at least one UTI event (32.7% vs 30.9%, $p= 0.8334$). Six urosepsis events were recorded within the first year of transplant in group 1, vs 3 urosepsis events in group 2 (5.3% vs 7.1%, $p= 0.6987$). No death censored graft loss was found in either group. No cases of PJP were reported within the one year prophylaxis period in either group.

Conclusion/Significance: No difference in the number of treated UTI's was found between patients who remained on SMX-TMP prophylaxis for at least 30 days after transplantation vs those who were switched to alternative PJP prophylaxis within 30 days of transplant.

Abstract #: 133

Session: Poster

The Role of Hyperglycemia in T Cell Survival and Differentiation

Authors: Catherine Steib BS (CHS), Nadine Lerret, PhD (Rush University)

Introduction: Recent research suggests that type 2 diabetes is an inflammatory disease. Most studies have focused on the role of macrophages in diabetes, but there is a lack of information on how T cells contribute to the disease.

Objective: This study focuses on T cells and the role hyperglycemia plays in their priming and survival. We sought to determine whether or not a decrease in the total number of T cells in hyperglycemic conditions is due to apoptosis and if the cells undergo a change in surface markers under varying glucose concentrations.

Methods: T cells were cultured in two sets of conditions where they were either co-cultured with dendritic cells or cultured alone. In each set, the cells were cultured in various concentrations of glucose, 0 mmol/L, 5.5 mmol/L (physiological), 15 mmol/L (pre-diabetic), and 30 mmol/L (diabetic). Flow cytometry was used to evaluate the degree of activation (CD11a) and apoptosis (Caspase-3) after culture.

Results: CD11a, a surface marker involved in cell mobility, was shown to be up-regulated as concentrations of glucose increased. Within the T cells that were cultured alone, the percent of cells positive for Caspase-3 was highest among cells that were cultured with 30 mmol/L of glucose and lowest among cells cultured with 5.5 mmol/L of glucose. Among the T cells that were co-cultured with dendritic cells, the percent of T cells positive for Caspase-3 was lowest in the cells cultured with 30 mmol/L of glucose.

Conclusion/Significance: This study implies that T cell survival and activation is impacted by glucose concentration, as there are trends in CD11a and Caspase-3 between the different concentrations of glucose. The difference between the percent of Caspase-3 positive cells in T cells cultured alone and those co-cultured with dendritic cells indicates that the presence of dendritic cells influences the impact of glucose on T cells. This study implies hyperglycemia may impact the activation and survival of T cells in diabetic patients.

Abstract #: 134

Session: Poster

A novel approach in rheumatoid arthritis therapeutics

Authors: Daniel M. Toth (RUMC), Timea Ocsko (RUMC), Adrienn Markovics (RUMC), Katalin Mikecz (RUMC), Tibor T. Glant (RUMC) and Tibor A. Rauch (RUMC)

Introduction: Aberrant DNA methylation patterns of the genome are known to be presented in cancer cells including global hypomethylation and site-specific hypermethylation. A similar phenomenon can be observed in autoimmune diseases, such as rheumatoid arthritis (RA), where the dysregulation of B cell epigenome can result in emergence of pathogenic autoantibodies.

Objective: Based on the importance of methylome changes in both cancer and RA we hypothesized that effective DNA methylation modifiers in cancer therapy might also have beneficial effects in RA treatment wherein no such type of drug has been tried so far.

Methods: Mice with proteoglycan-induced arthritis (PGIA) were treated with low dose DNA methyltransferase inhibitor 5'-Azacytidine (AzaC) and its effects were followed by visual arthritis score, histochemistry, ELISA as well as flow cytometry and RT-qPCR of B cells. DNA methylation profile changes were explored in B cells by MIRA. To explore the molecular background of AzaC treatment RT-qPCR, Western blot and CHIP methods were applied in A20 cell culture.

Results: AzaC treatment halted the progression of PGIA in mice and abolished inflammatory reactions in synovial joints. Lower level IgG1 and reduced germinal center (GC) formation were detected in AzaC-treated arthritic mice compared to untreated ones. The expression of Activation-induced cytidine deaminase (Aicda), which is the master regulator of immunoglobulins' maturation and plays a significant role in GC formation, was strongly reduced in B cells of AzaC-treated mice. Finally, we explored that this diminished Aicda expression is the consequence of increased expression of aryl hydrocarbon receptor (AhR) transcription factor, promoter of which is demethylated after AzaC treatment resulting in its elevation, translocation into the nuclei and binding to Aicda regulatory region.

Conclusion/Significance: Low-dose AzaC treatment regimen inhibited the development of experimental autoimmune arthritis and suppressed its progression. A key factor in this process is AhR transcription factor which can regulate Aicda and thus antibody maturation and GC formation, therefore its epigenetic inactivation by DNA methylation significantly contributes to RA pathogenesis. DNA methylation inhibitors have a great potential in RA therapeutics.

Abstract #: 135

Session: Poster

Expression of CD32, a marker of HIV latency, is enriched on CD4dimCD8bright T cells

Authors: Amber Viridi (Rush University), Jennilee Wallace (Rush University), Melanie Seaton (Rush University), Maureen Richards (Rush University), Lena Al-Harhi (Rush University)

Introduction: CD32 is a low affinity IgG Fc fragment receptor commonly expressed on cells such as neutrophils, dendritic cells, monocytes, and B cells. Recently CD32a, a subtype of CD32 receptor, was reported as a marker of HIV latency expressed on ~50% of the latent CD4+ T cell reservoir in the peripheral blood of HIV+ patients. Our lab has identified a unique population of CD4dimCD8bright (DP) T cells, infectable by HIV, that constitutes greater than 55% of CD8+ T cell anti-HIV response and migrates into the CNS.

Objective: Here we assessed the frequency of CD32 expression on DP T cells in the peripheral blood of HIV+ patients (n=11) and HIV- controls (n=4).

Methods: Flow cytometry was used to determine all T cell populations and their expression of CD32.

Results: We report that CD32 is enriched on DP T cells compared to single positive CD4 T cells among HIV- and HIV+ individuals. In HIV- individuals, mean CD32 percent expression was 73.05% on DP T cells and 22.83% on CD4+ T cells ($p<0.001$). In HIV+ patients, mean CD32 percent expression was 54.40% on DP T cells and 12.79% on CD4+ T cells ($p<0.001$). CD32 expression on both T cell populations was determined in HIV+ patients of varying clinical status (elite controllers (n=4), viremic (n=3), and cART suppressed (n=4)). Viremic and cART suppressed individuals showed significant enrichment of CD32 on DP T cells compared to CD4+ T cells (both $p<0.001$). Elite controllers, while not significant, showed a trend of CD32 enrichment on DP T cells. Difference in CD32 expression on DP T cells was not statistically significant between HIV+ cohorts and HIV-individuals. CD4 count and viral load among HIV+ patients did not correlate with CD32 expression on DP T cells.

Conclusion/Significance: These data suggest DP T cells are enriched for CD32 independent of HIV status. Ongoing studies include increasing sample size and assessing the relationship between CD32+ DP T cells and HIV RNA/DNA content.

Abstract #: 136

Session: Poster

Canonical Wnt signaling mediates CD8+ T cell non-cytotoxic antiviral factor activity

Authors: Jennillee Wallace 1, Srinivasa Narasipura 1, Beverly Sha 2, 3 and Lena Al-Harhi 1 1
Department of Microbial Pathogens and Immunity, 2 Division of Infectious Diseases, and 3 Mark Weiss Memorial Clinic for Infectious Diseases (RUMC)

Introduction: HIV+ long-term non-progressors (LTNPs) and elite controllers (ECs) control HIV load without antiretroviral therapy. While the mechanisms(s) attributed to this natural immunity is not clear, a secreted soluble factor coined the CD8+ T-cell antiviral factor (CAF) is associated with potent HIV control. The identity of CAF has remained elusive for over 30 years. CAF is a heat-stable, small secreted factor (>500aa) that inhibits HIV transcription.

Objective: As several biologic and functional characteristics of CAF are reminiscent of our published data of Wnts effects on HIV, we assessed here if CAF activity is mediated by Wnt signaling and whether it is associated with LTNP and EC status.

Methods: qRT-PCR, siRNA knockdown, ELISA

Results: We show that CD8+ T cells express all Wnt ligands, albeit with donor variability. CD8+ T-cell conditioned media induced the transcription of β^2 -catenin downstream targets CyclinD1 and Axin2, indicating that CD8+ T-cell conditioned media express functional Wnts capable of inducing canonical Wnt signaling. Pre-treatment of HIV+ CD8 depleted PBMCs with the canonical Wnt signaling inhibitor Dkkopf-1 (DKK-1), reversed CAF activity by 2.5 fold in comparison to control cultures. Further, addition of a prototypical canonical Wnt inducer (human recombinant Wnt1) inhibited HIV transcription and not reverse transcription or integration, and induced CyclinD1 and Axin2 expression in recipient cells. We found that DKK-1 concentration was significantly higher in HIV+ patients with lower than 500 CD4 count/ul and higher viral loads. Wnts 2B, 3A and 9B expression negatively correlated with viral load, and Wnts2B and 9B expression were significantly higher in ECs and LTNPs compared to viremic patients.

Conclusion/Significance: Collectively, this data demonstrates that canonical Wnt signaling is responsible for CAF activity. Ongoing studies are using siRNA to knockdown and thus identify specific Wnts responsible for CAF activity.

Abstract #: 137

Session: Podium Presentation - Deans' Award

Physical Activity and Cognitive Health in HIV-Infected African American Older Adults

Authors: Nadia Winston (Rush) Barbara Swanson (Rush) Joellen Wilbur (Rush) Ana Capuano (Rush) Lisa Barnes (Rush)

Introduction: HIV-associated neurocognitive disorders (HAND) affect approximately 50% of HIV-infected persons and can impact quality of life, everyday functioning, and self-care abilities needed to effectively manage HIV infection. It is associated with deficits in attention, problem-solving, and reasoning skills, and slower speed in performing activities of daily living; these deficits are exacerbated in HIV-infected older adults. Physical activity (PA) is a modifiable behavior that is associated with improved cognitive function in uninfected older adults. While there are a few published studies suggesting that PA is associated with improved cognitive function among HIV-infected older adults, African Americans have been underrepresented in these studies. This is significant given that 46% of HIV diagnoses in the United States are among African American older adults.

Objective: The purpose of this study is to compare the association between self-reported PA (minutes/week of moderate/vigorous PA) and cognitive function, as measured by performance on a neuropsychological test battery, in HIV-infected African American older adults and a matched uninfected control group.

Methods: Secondary analysis of data collected from HIV-infected and uninfected African American older adults (> 50 years) participating in a longitudinal cohort study designed to reduce health disparities (n= 255). Statistical analyses will include operationalizing PA and cognitive functioning by calculating composite scores and using T-tests and a linear mixed effects model to examine the association between PA and cognitive performance.

Results: Data are currently being analyzed.

Conclusion/Significance: The findings may inform the development of interventions to improve cognitive health and reduce disparities in HIV-infected African-American older adults.

Abstract #: 138

Session: Poster

Asthma related ED visits are associated with distinct nasal microbiome composition in chronic rhinosinusitis patients

Authors: Hyo Yang, MS (RMC), Pete S. Batra, MD, FACS., Philip A. Engen, BSc, Philip S. LoSavio, MD., Arpita Mehta, MD., Raj Kota, MD., Bobby A. Tajudeen, MD, Ali Keshavarzian, MD, Mahboobeh Mahdavinia, MD., PhD (RUMC)

Introduction: Chronic rhinosinusitis (CRS) is a chronic inflammatory disease involving the mucosal tissue of upper airways. It has adverse impacts on asthma severity and may potentially contribute to emergency department (ED) visits or even hospitalizations. Fundamental questions regarding the mechanism of chronic mucosal inflammation in CRS, or how it affects the lower airways remain an enigma. CRS patients have also been shown to possess distinct nasal microbiomes compared to healthy counterparts.

Objective: This study investigated whether nasal microbiome composition is associated with asthma management and asthma exacerbations requiring ED visits.

Methods: Endoscopic guided nasal swab samples were collected from the middle meatus in a prospective cohort of CRS patients. These patients with concurrent asthma were followed 1-year post sampling and also screened for asthma related events 2-years prior to sampling. Microbiome composition of samples were analyzed at phyla and genera taxonomic levels using 16S-ribosomal-RNA sequencing.

Results: Among 111 CRS cases, 46 (41.4%) had concurrent asthma. Asthmatic CRS had significantly higher relative abundance of Streptococcus genus compared to non-asthmatic CRS with mean of 1037.2 vs. 318.7, respectively ($p < 0.05$). Asthmatics also had a trend towards decreased Anaerococcus and increased Burkholderia genera abundance. Overall, 17% of asthmatics had at least one ED visit from asthma exacerbation. Relative abundance of Proteobacteria and Burkholderia genera was significantly higher in asthmatic cases with ED visit vs. controlled asthmatics (mean \pm SD of 4287.1 \pm 3047.4 vs. 1835.1 \pm 2170.8 and 685.8 \pm 894.4 vs. 319.3 \pm 324.2, respectively).

Conclusion/Significance: Present study found that CRS patients with history of asthma had significantly increased nasal Streptococcus. Further, Burkholderia genus, which is known for its significant effect on lower airway inflammation, was linked to asthma, decreased FEV1 and asthma-associated ER visits. Additional studies are necessary to determine mechanisms of how these bacterial populations contribute to the pathogenesis of asthma.

Abstract #: 139

Session: Poster

The Timing of Intraarticular Injections Prior to Rotator Cuff Repair Impacts the Risk of Surgical Site Infection

Authors: Avinesh Agarwalla (RUMC), Richard Puzziello (RUMC), Randy Mascarenhas (McGovern Medical School, UTHSC), Shelby Sumner (RUMC), Anthony Romeo (RUMC) Bryan Forsythe (RUMC)

Introduction: Corticosteroid joint injections are a common clinical procedure; however, the development of a surgical site infection is a concern amongst surgeons, as they often delay elective surgical intervention following an intraarticular injection.

Objective: The purpose of this investigation is to determine if an association exists between pre-operative intra-articular corticosteroid injections and the rate of post-operative surgical site infection in patients who are undergoing rotator cuff repair.

Methods: The PearlDiver Patient Records Database was reviewed for Humana patients undergoing rotator cuff repair following ipsilateral shoulder injection. Two cohorts were created: rotator cuff repair within one year of injection (n=12,060), rotator cuff repair without prior injection (n=48,763). Surgical site infection within six months post-operatively were assessed. Patients receiving pre-operative injections were further stratified by the duration (in months) prior to surgery that the injection was performed.

Results: Patients receiving an intraarticular injection 1 month prior to operative management had a significantly higher rate of surgical site infection (OR=1.3, P=0.04). However, there was no significant difference in the total number of surgical site infections in patients receiving an intraarticular injection, compared to the control cohort, when all preoperative injection time points were combined (OR=0.9, P=0.2). Male gender, obesity, diabetes, and smoking status were also independent risk factors for the risk of developing a surgical site infection regardless if the patient received a pre-operative injection or not.

Conclusion/Significance: The risk of infection following rotator cuff repair occurred at twice the rate when preoperative intraarticular shoulder injections were administered within 1 month of operation, but surgical delay by 1 month reduced the risk of infection. If patients receive an injection for symptomatic rotator cuff tears, physicians must allow ample time prior to proceeding with operative management in order to reduce complications.

Abstract #: 140

Session: Poster

Age-Dependent Cortical Bone Compositional Properties in CD26 Deficient Mice Utilizing Fourier Transform Infrared Imaging (FTIRI)

Authors: Kyle D. Anderson (Rush), Meghan M. Moran (Rush), Ryan D. Ross (Rush), Matthew J. Meagher (Rush), Songyun Liu (Rush), Margaret A. McNulty (IUSM), Kent W. Christopherson II (Rush), D. R. Sumner (Rush)

Introduction: CD26 (dipeptidyl peptidase IV [DPPIV or DPP-4]) is a membrane bound cell surface glycoprotein that cleaves circulating chemokines containing N-terminal proline and alanine motifs in amino acid position 2. CD26 could alter bone composition through cleavage of circulating GLP-1 which has known effects on bone mesenchymal precursor cells such as osteoclasts and osteoblasts. CD26 is also of interest as a therapeutic role in rheumatoid arthritis as well as generalized inflammation. Study of CD26 could then direct therapeutic interventions to increase bone health, decrease inflammatory processes, as well as indicate potential risk for fracture. Indeed in previous work of a CD 26 KO, our group found age-dependent differences for cortical bone geometry (~10% reduction in cortical thickness and area at 6 months and 8% larger medullary area at all ages in the KO mice), material properties (~25% increase in modulus of toughness at 6 months in KO mice), whole bone mechanical properties (~40% increase in yield moment at 3 months in KO mice) and trabecular architecture (~30% decrease in connectivity density at 6 months in KO mice).

Objective: In this study, we sought to determine if naïve CD26 KO and wild-type (WT) mice differ in cortical bone matrix composition.

Methods: To do this we utilized Fourier Transform Infrared Imaging (FTIRI) on left femurs of male KO and WT mice that were 1, 3 and 6 months of age (n=3 for each time point) to measure cortical bone mineral-to-matrix ratio, collagen cross-linking, crystallinity and carbonate substitution as material property end points.

Results: These data were found to be insignificant via one-way ANOVA (p value <0.05)

Conclusion/Significance: Although insignificant, we have established FTIRI capabilities at Rush University Medical Center that has allowed for additional data collection that will increase the power of this study as well as permit future studies using these techniques.

Abstract #: 141

Session: Poster

Does Acromioplasty Decrease the Critical Shoulder Angle and Risk of Retear after Arthroscopic Rotator Cuff Repair?

Authors: Brandon C. Cabarcas, BS (RUMC), Brian R. Waterman, MD (RUMC), Jon Newgren, MA (RUMC), Anirudh K. Gowd, BS (RUMC), Drew Lansdown, MD (RUMC), Bernard R. Bach, MD (RUMC), Brian J Cole, MD (RUMC), Anthony A Romeo, MD (RUMC), Nikhil N Verma, MD (RUMC)

Introduction: Critical shoulder angle (CSI) and Acromial Index (AI) are radiographic parameters that have been shown to be significant predictors of rotator cuff pathology. Although the incidence of arthroscopic acromioplasty is increasing, limited evidence exists to demonstrate it can reliably reduce CSI or AI, or secondary impingement after concomitant rotator cuff repair.

Objective: To evaluate whether adjunctive acromioplasty decreases acromial overcoverage and secondary impingement during rotator cuff repair.

Methods: As a part of a previous randomized prospective trial, all prospectively-enrolled patients with arthroscopic repair for full-thickness rotator cuff tears were identified. Routine preoperative radiographs, including anteroposterior (AP) and scapular Y images, were obtained to classify lateral acromial angulation and acromial morphology as described by Bigliani et al. After controlling for demographic variables and acromial morphology, patients underwent arthroscopic rotator cuff repair with or without acromioplasty using a traditional cutting block technique. Patients with standardized pre- and post-operative AP radiographs were included, and CSA and AI were calculated. Differences in CSA and AI within and between groups were calculated, and t tests were performed to evaluate for statistically significant differences.

Results: After exclusion of 24 patients due to lack of postoperative radiographs, 71 patients (74.7%) were available for analysis. Baseline demographics, acromial type, and lateral acromial angle demonstrated no statistically significant differences among patients in the acromioplasty and non-acromioplasty cohorts. When compared to preoperative measures, acromioplasty resulted in no significant reductions in mean CSA (35.6° vs. 34.7°; $p=0.059$) or AI (0.68 vs. 0.66; $p=0.076$). Furthermore, postoperative CSA (34.7° vs. 35.8°, $p=0.30$) and AI (0.66 vs. 0.66, $p=0.92$) demonstrated no statistically significant differences between patients with and without acromioplasty. CSA and AI were not significantly associated with any postoperative patient reported outcome measures or increased risk of retear ($p>0.05$) at mean 92.4 month follow-up.

Conclusion/Significance: Traditional cutting block technique for acromioplasty did not significantly reduce radiographic measures of acromial overcoverage. Increased CSA was not associated with a heightened risk of retear after arthroscopic rotator cuff repair with or without acromioplasty.

Abstract #: 142

Session: Poster

Impact of Depression, Anxiety, and/or Mania on Functional Outcomes After Simple Meniscectomy

Authors: David R. Christian, B.S. (RUMC); Kevin C. Wang, B.S. (Northwestern University Feinberg School of Medicine); Avinesh Agarwalla, B.S. (RUMC); Michael L. Redondo, M.A., B.S. (RUMC); Adam J. Beer, B.S. (RUMC); Brian Forsythe, M.D.; Nikhil N. Verma, M.D. (RUMC)

Introduction: Psychiatric factors have been shown to affect outcomes after arthroplasty and athletes' ability to return to play after ACL reconstruction. The impact of mental illness on short-term outcomes after arthroscopic knee surgery is unknown. Intrinsic psychiatric illnesses may affect outcomes in those receiving pain-relieving procedures, such as arthroscopic meniscectomy.

Objective: To investigate if underlying depression, anxiety, or mania affects outcomes after arthroscopic meniscectomy.

Methods: Adult patients scheduled to undergo a simple meniscectomy at a single institution are identified and prospectively enrolled. Pre-operatively, patients complete a predictive test for psychiatric illnesses (Computerized Adaptive Testing - Mental Health; CAT-MH) in addition to the patient reported outcomes surveys Knee injury and Osteoarthritis Outcomes Score (KOOS), International Knee Documentation Committee (IKDC), Veterans Rand (VR-12) and Short Form Health Survey (SF-12). Six months post-operatively, patients complete KOOS, IKDC, VR/SF-12 and questions about returning to their pre-operative level of functioning.

Results: Pre-operative and 6-month post-operative data is available for 86 patients. Psychiatric findings are present in 14 patients (4 depression, 6 depression and anxiety, 1 anxiety, 3 mania/hypomania). There is no significant difference in age between the non-psychiatric group (n=72) and psychiatry group (n=14) (52.6±10.0 vs. 48.8±12.9 years, p=.214). Pre-operative mean IKDC (45.3±13.7 vs. 32.1±13.8, p=.001), KOOS-daily living (65.6±16.1 vs. 51.1±17.7, p=.004), KOOS-pain (57.1±13.5 vs. 45.0±16.1, p=.004), KOOS-QOL (31.1±16.8 vs. 13.5±21.6, p=.001), KOOS-sports (36.5±19.5 vs 19.6±19.3, p=.005), KOOS-symptoms (58.1±16.38 vs. 46.0±14.6, p=.012), SF-12 mental (56.2±8.4 vs. 39.1±9.2, p<.001), and VR-12 mental (58.5±8.1 vs. 41.3±10.3, p<.001) are significantly lower in the psychiatric group. Post-operative mean IKDC (74.4±21.3 vs. 50.5±24.1, p<.001), KOOS-daily living (86.1±18.1 vs. 72.1±21.5, p=.011), KOOS-pain (82.7±17.3 vs. 64.7±23.5, p=.012), KOOS-QOL (68.9±24.1 vs. 37.9±28.4, p<.001), KOOS-sports (66.5±28.4 vs 43.2±32.4, p=.008), KOOS-Sx (81.1±16.2 vs. 63.5±21.5, p<.001), SF-12 mental (56.5±6.1 vs. 42.4±11.2, p<.001), and VR-12 mental (60.4±6.3 vs. 46.1±12.1, p<.001) are significantly lower in the psychiatric group at 6-month follow-up. IKDC, KOOS, and VR/SF-12 scores improved post-operatively in both groups.

Conclusion/Significance: Patients with underlying depression, anxiety, or mania may report worse pain, function, and quality of life following arthroscopic meniscectomy. It is important to consider these factors when discussing surgical intervention with patients.

Abstract #: 143

Session: Poster

The Influence of Physeal Status on Cartilage Survivorship after Screw Fixation for Osteochondritis Dissecans of the Knee

Authors: Robert Dean BS1; Brian R. Waterman, MD2; Kevin C. Wang BS2; Blaine T. Manning BS2; Michael L. Redondo BS2; David R. Christian BS2; Adam B. Yanke, MD, MS2; Brian J. Cole, MD, MBA2 1. University of Illinois at Chicago College of Medicine, Chicago, IL, US

Introduction: Arthroscopic-assisted fixation has emerged as an effective treatment option for osteochondritis dissecans (OCD) lesions in appropriately-selected patients.

Objective: The purpose of this study was to evaluate for the effect of skeletal maturity on structural failure and reoperation after OCD fixation.

Methods: All patients undergoing internal fixation of a symptomatic OCD (ICRS Grade II-IV) by a single surgeon were identified between 2005-2014. Demographic data including age, sex, radiographic physeal status, lesion size, fixation construct, and intraoperative findings were extracted from medical record. Prospective follow-up confirmed the ability to return to sport, requirements for further surgery, and patient satisfaction. Differences between groups were evaluated using Fisher's exact test and independent samples t-test.

Results: Of 45 patients, 34 patients (mature, n=20; immature, n=14) were available at mean 5.2 ± 2.8 -year follow-up, with 10 patients (29.4%) reporting structural failure and 3 (8.8%) additional patients reporting dissatisfaction with postoperative outcome. Kaplan-Meier analysis demonstrated 85.3% and 73.9% survival from failure or re-operation at 2- and 5-year follow-up, respectively, with no significant difference based on physeal status ($p > 0.05$). Skeletal maturity was significantly associated with greater likelihood of an unstable lesions ($p = 0.027$), and skeletally immature patients were significantly younger (15.1 ± 2.2 years vs. 18.2 ± 2.6 , $p < 0.001$), had smaller lesions (269 ± 139 -mm² vs 391 ± 145 -mm², $p = 0.046$), and had a shorter length of follow-up (4.5 ± 2.3 years vs 6.4 ± 2.7 , $p = 0.040$). However, physeal status was not significantly associated with structural ($p = 0.99$) or poor patient satisfaction (open/closing, 0%; closed, 27%; $p = 0.13$).

Conclusion/Significance: The current series demonstrates no significant differences in rates of structural failure between skeletally mature and immature patients undergoing fixation for symptomatic OCD lesions of the knee. Approximately 75% of lesions demonstrated stable healing at 5-year follow-up, although nearly a third of patients requiring unplanned reoperation for residual symptoms.

Abstract #: 144

Session: Poster

Analysis of Publication Trends for the 2011 - 2015 American Orthopaedic Society for Sports Medicine Annual Meeting Abstracts

Authors: Anirudh K. Gowd, BS, Joseph N. Liu, MD, Brandon C. Cabarcas, BS, Gregory L. Cvetanovich, MD, Grant H. Garcia, MD, Nikhil N. Verma, MD

Introduction: Academic conferences are sources of novel research that can influence clinical decision-making. Orthopedic surgery maintains a relatively high rate of publication relative to other surgical subspecialties and sports medicine conferences hold an even higher rate within the subspecialty. The American Orthopedic Society for Sports Medicine (AOSSM) has been shown to have among the highest rate of publication for accepted abstracts. Contemporary trends over time and variables that affect publication have not been previously researched.

Objective: To determine differences between two-year publication rates of poster and podium abstracts accepted into the AOSSM conference and identify factors associated with publication.

Methods: The AOSSM Archives were queried for all accepted poster and podium presentations for annual meetings from 2011 - 2015. Google scholar and MEDLINE databases were used to determine which abstracts transitioned into journal articles. Publication rates were compared based on publication two years following their presentation. A logistical regression of the above variables was performed to demonstrate which were most correlated to successful publication. Data on publication impact factor and number of citations were collected on the InCites database.

Results: Of 646 abstracts accepted during this period, 265 were poster presentations and 363 were podium presentations. Overall, 44.7% of abstracts presented at AOSSM 2011 - 2015 were accepted into peer-reviewed journals within two years of presentation. There was no statistical difference between posters and podium presentations for journal publication ($p = 0.328$). Poster presentations had statistically lower impact factor ($p=0.005$) and number of citations ($p<0.001$) than podium presentations. Logistical regression analysis of publication outcome as a function of multiple variables demonstrate that only number of authors was correlated to publication ($p=0.023$).

Conclusion/Significance: Podium and poster presentations accepted into AOSSM conferences have equal rates of publication in two years. The relative impact of podium presentations appears to be greater, which suggests the AOSSM selects abstracts for podiums that will have greater clinical impact. Increasing number of co-authors was the only factor found to be correlated with publication.

Abstract #: 145

Session: Poster

Surface Micro-Topography Changes Contact Mechanics in Total Hip Modular Taper Junctions: A Finite Element Analysis Study

Authors: Jonathan A. Gustafson (Rush); Steven P. Mell (Rush); Robin Pourzal (Rush); Hannah J. Lundberg (Rush)

Introduction: Total hip arthroplasty (THA) modular junctions are commonly used in modern hip replacement procedures and have been implicated as a source of failure that can occur when there is micromotion and fretting corrosion at the contact surface. Within the modular junction, it is currently unclear as to the role of the micro-grooves of the stem and head-taper topography on the contact mechanics.

Objective: The objective of this study was to employ a novel, micro-grooved finite element (FE) model to determine whether varying modular junction surface topography influences contact mechanics.

Methods: A two-dimensional, axisymmetric FE model of a CoCrMo femoral head taper and Ti6Al4V stem taper was created using median geometrical measurements taken from hip implant retrievals. The contacting surface topography of the stem-taper was modified using a sinusoidal function with the following parameters: 2 μm , 6 μm , 11 μm , and 14 μm micro-groove height (amplitude) and 30 μm , 100 μm , 200 μm , and 234 μm micro-groove spacing (period). Sixteen simulations (4 height x 4 spacing parameters) were performed in Abaqus v2017/Standard. Outcome variables included contact area, pressure, residual stress, and plastic deformation.

Results: The lowest spacing parameter (30 μm) led to the lowest total contact area, yet greatest pressures, residual stresses, and plastic deformation. The greatest contact area (35 mm^2) was found in the model with a micro-groove height of 2 μm and spacing of 200 μm . A micro-groove height of 14 μm and spacing of 30 μm generated the lowest contact area (9 mm^2), yet led to the highest residual stress (1.5 GPa). Increases in micro-groove height, regardless of the spacing, led to increases in contact pressure.

Conclusion/Significance: This novel, micro-grooved FE hip joint study suggests that varying surface micro-topography height and spacing has a significant impact on contact mechanics in THA modular junctions. Increased micro-groove spacing and lower micro-groove height led to a 'smoother' fit, while decreased micro-groove spacing and increased micro-groove height led to 'sharper' contact regions and plastic deformation. Identifying ideal head and stem-taper topographies will aid in minimizing micromotion in modular junctions and reduce the risk of failure in THA.

Abstract #: 146

Session: Poster

Pressure-based auditory feedback to reduce knee moments in subjects with medial knee osteoarthritis

Authors: Jade He, Christopher Ferrigno, Najia Shakoor, and Markus A Wimmer (Rush University)

Introduction: As part of a longitudinal 6-week clinical trial, this study tested the immediate knee loading effects of using pressure-based auditory feedback (PBF) in subjects with mild to moderate medial knee osteoarthritis (OA).

Objective: We tested the hypothesis that pressure-based feedback will reduce peak KAM (pKAM), a measure of knee load distribution, in subjects during their baseline visit. We also compared the first peak of KAM (KAM1) and the second peak of KAM (KAM2) before and after PBF, and investigated potential adverse effect of PBF on knee flexion moment (KFM).

Methods: Thirteen subjects wore a fully integrated pressure-detecting shoe insole that communicates with a smartphone, which generates PBF in the form of auditory cues. After conducting a baseline 3D gait analysis of subjects walking normally, subjects were trained to walk with PBF. Retraining pressure thresholds were calculated from baseline plantar pressure on two lateral sensors that correspond to the time-occurrence of KAM1 and KAM2. A second 3D gait analysis was performed while performing their newly-learned gait skills. Knee moments after retraining were compared with those at baseline.

Results: After training with insole-based PBF, 10 out of 13 subjects reduced pKAM ($p=.046$). These 10 subjects reduced pKAM by 11.8%, whereas the remaining three subjects increased pKAM by 7.9%. The entire cohort reduced KAM1 by 9.4% ($p=.008$) and maintained similar KAM2 ($p=.612$). The change in mean KFM was not significant ($p=.616$).

Conclusion/Significance: The results suggest that most participants with knee OA can process auditory cues from PBF to reduce their pKAM. Ten of 13 subjects succeeded in this venture during the single visit, which is promising and is an initial indicator that most of those with knee OA can kinetically respond to the PBF. Additionally, the retraining of gait did not appear to negatively influence KFM, suggesting an overall reduction of compressive load at the medial knee. Participants of this clinical trial will continue to practice three times daily (5-minute periods) in their natural environment for the next three weeks before return to follow-up which should further enhance the loading conditions at the knee.

Abstract #: 147

Session: Poster

Hip arthroscopy for femoroacetabular impingement syndrome improves sleep quality postoperatively

Authors: Kyle N. Kunze, BS (Rush); Natalie L. Leong, MD (Rush); William H. Neal, BS (Rush); Charles A. Bush-Joseph, MD (Rush); Shane J. Nho, MD, MS (Rush)

Introduction: Sleep disruption is a common complaint among patients undergoing hip arthroscopy for femoroacetabular impingement syndrome (FAIS), yet it is rarely addressed.

Objective: To describe the incidence of abnormal sleep quality in patients with FAIS and to determine whether hip arthroscopy can improve sleep quality postoperatively.

Methods: A total of 55 patients undergoing primary hip arthroscopy were prospectively enrolled. All patients were administered the Pittsburgh Sleep Quality Index (PSQI) preoperatively and at 3, 6, 12, and 24 weeks postoperatively. A PSQI score >5 is indicative of poor sleep quality. The Hip Outcome Score (HOS) - Activities of Daily Living (ADL), HOS-Sports Specific Subscale (SSS), modified Harris hip score (mHHS), visual analog scale (VAS) pain score, and international hip outcome tool-12 (IHOT-12) were used to assess functional outcomes. A repeated measures ANOVA with post-hoc Greenhouse-Geisser and Bonferroni corrections was conducted to determine statistically significant changes in sleep patterns. The level of significance was set at $p < 0.05$.

Results: A total of 52 patients (94.55%) were included for analysis out of a total cohort of 55 prospectively recruited patients. The mean patient age was $37.8(\pm)13.9$ years and BMI was $27.6(\pm)5.3$ kg/m². At 24 weeks postoperatively, 6 (11.5%) patients were lost to follow-up. Preoperatively, 49 (94.2%) of patients experienced poor sleep quality with a mean PSQI score of $9.8(\pm)4.4$. At 24 weeks postoperatively, 10 (21.7%) of patients experienced poor sleep quality with a mean PSQI score of $2.2(\pm)1.6$. All patients had significant improvements in all hip outcome instruments at 24 weeks postoperatively ($p < 0.001$). No correlation was found with the VAS Pain score at any time point ($p > 0.5$).

Conclusion/Significance: Preoperatively, FAIS patients have a 3- to 6-fold greater prevalence of abnormal sleep quality than the general public. Hip arthroscopy for FAIS results in marked improvements in sleep quality early in the postoperative period. Surgeons who encounter patients with symptomatic FAIS should address the concerns of patients with abnormal preoperative sleep quality using this information to guide prognosis.

Abstract #: 148

Session: Poster

Comparison of Titanium and Cobalt Chromium Tibial Trays in Total Knee Arthroplasty: A Retrospective Review

Authors: Junwei Li (Rush), Jeffery Budweg (Rush), Jefferson Li (Rush), Brett Levine (Rush)

Introduction: Total knee arthroplasty (TKA) is an effective treatment for joint diseases in patients who do not respond well to non-surgical approaches. As the number of yearly TKAs increases, there remain questions as to how current implant designs result in a better patient outcome. Currently, few publications directly compare the radiographic and clinical outcomes of the tibial tray, commonly composed of either titanium (Ti) or cobalt chromium (CoCr).

Objective: The goal of the research is to understand the differences in radiographic and clinical outcomes between TKAs with Ti and CoCr trays. Our hypothesis is that 1) CoCr trays will exhibit greater stress shielding while Ti trays will have a higher incidence of radiolucent lines, and 2) there will be no significant difference in the clinical outcomes between the two tibial trays.

Methods: A retrospective study was conducted on 3940 patients who had undergone a TKA with either a Ti or CoCr tibial implant. Radiographic outcomes were evaluated by measuring tibial bone loss and depth of radiolucent lines. Clinical outcomes analyzed include range of motion, KSS (objective and functional), KOOS, SFv12, EQ6D, UCLA, patient satisfaction scores, and complication rates. In this pilot study, 200 patients were assessed, measuring only clinical outcomes aside from patient satisfaction. Statistical analyses were performed using a two sample t-test for clinical outcome scores and Fisher's exact test for complications. In the larger study of 3940 patients, all parameters will be assessed.

Results: Preliminary data show that there is no significant difference in ROM, KSS and EQ6D scores between the two trays. However, there is a significantly higher number of complications with Ti implants compared to CoCr implants. Complications include stiffness, infection, aseptic loosening, avascular necrosis, pulmonary embolism and periprosthetic fracture.

Conclusion/Significance: The pilot study showed an overall lack of statistical differences between CoCr and Ti tibial tray implants, except an increased complication rate associated with Ti trays. One possible explanation for this difference is that most CoCr tibial tray TKAs occurred more recently, leaving less time for complications to arise. Overall, this study can improve the decision making of surgeons in choosing the type of implant to use for specific patient populations.

Abstract #: 149

Session: Poster

Infrared Imaging of Wear and Corrosion Products within Joint Capsule Tissue from THR Patients

Authors: Songyun Liu(RUMC), Deborah J. Hall(RUMC), Stephanie M. McCarthy(RUMC), Joshua J. Jacobs(RUMC), Robert M. Urban(RUMC), Robin Pourzal(RUMC)

Introduction: Implant debris generated by wear and corrosion are a prominent cause of joint replacement failure. There is still little knowledge on the threshold of critical particle burden in terms of amount and type.

Objective: This study utilized Fourier Transform Infrared Spectroscopy Imaging (FTIRI) to gain a better understanding of the chemical structure of implant debris and its impact on the surrounding biological environment. Therefore, retrieved joint capsule tissue from five total hip replacement patients was analyzed.

Methods: All five cases presented different implant designs and histopathological patterns. All tissue samples were formalin-fixed and paraffin-embedded. Unstained, 5 μ m thick sections were made. The unstained sections were placed on BaF₂ windows and deparaffinized with xylene prior to analysis. FTIRI data were collected at a spectral resolution of 4 cm⁻¹ using an Agilent Cary 670 spectrometer coupled with Cary 620 FTIR microscope.

Results: The results of study demonstrated that FTIRI is a powerful tool that can be used complimentary to the existing histopathological evaluation tissue. FTIRI was able to distinguish areas with different cell types (macrophages, lymphocytes). Small but distinct differences could be detected depending on the state of cells (viable, necrotic) and depending on what type of debris was present (polyethylene (PE), metal oxides). Although, metal oxides were mainly below the measurable range of the FTIRI, the infrared spectra exhibited distinct difference in their presence. Micrometer sized polyethylene particles could be easily imaged, but also accumulations of sub-micron particles could be detected within macrophages. FTIRI was also able to distinguish between PE debris, and other birefringent materials such as suture. Chromium-phosphate particles originating from corrosion processes could be identified and easily distinguished from other phosphorous materials such as bone and hydroxyapatite (HAp). The latter exhibited varying states, indicating a potential chemical alteration in vivo.

Conclusion/Significance: In conclusion, this study successfully demonstrated that FTIRI is a useful tool that can determine and image the chemical structure of retrieved tissue samples over several cubic millimeters. The resulting chemical maps provide deep understanding of the chemical nature of implant debris and its impact on chemical changes of the tissue within it is embedded.

Abstract #: 150

Session: Poster

Sensitivity of Total Knee Replacement Wear to Gait Pattern- A Parametric Finite Element Study

Authors: Steven P Mell, Markus A Wimmer, Hannah J Lundberg

Introduction: The gold standard for preclinical wear testing of total knee replacements (TKRs) is mechanical knee simulators with standardized walking inputs. The variation of gait within patients however, is considerable. The influence on wear due to changes in gait pattern is not well understood. A computational framework utilizing finite element analysis (FEA) for modelling wear of TKRs was employed to investigate the influence of gait pattern on TKR polyethylene wear.

Objective: We hypothesized that force would be the primary driver of wear rates in TKR wear simulations.

Methods: A computational model of TKR wear was used to test 66 unique knee simulator input waveforms. Nine characteristic peaks within the load and motion profiles were identified and varied 80%-120% from baseline (ISO-14243-3:2014). The varied parameters were randomly combined using a Latin Hypercube design of experiments (DOE). The Isight Execution Engine and Abaqus v2017/Standard (Dassault Systèmes) were used to run the DOE and wear simulations. CAD models of a left-sided NexGen Cruciate Retaining TKR (Zimmer) were used to create the FEA model. Wear was calculated for 1-million cycles (MC) using a previously developed wear model. Pearson correlation coefficient was used to assess the linear relationship between volumetric wear and gait pattern.

Results: The first flexion/extension (FE) peak had a high-positive correlation and the highest predicted effect on wear ($r=0.71$, $2.18E-2\text{mm}^3/\%\text{change}/\text{MC}$). The second FE peak, which occurs during swing phase, had a low-positive correlation ($r=0.47$, $1.44E-2\text{mm}^3/\%\text{change}/\text{MC}$). An increase in the first anterior/posterior (AP) translation peak had a low-negative correlation ($r=-0.40$, $-1.23E-2\text{mm}^3/\%\text{change}/\text{MC}$). Force peaks were negligibly correlated with increases in wear, with the third force peak having the most effect ($r=0.27$, $0.83E-2\text{mm}^3/\%\text{change}/\text{MC}$).

Conclusion/Significance: Contrary to our hypothesis, our results suggest variation in flexion/extension pattern, not force, is the primary driver of wear in TKR wear simulation. The increase in sliding distance may account for this finding. Interestingly, an increase in AP translation caused a wear reduction, possibly due to a reduced cross-shear angle. This study is clinically relevant because patients walk with a variety of gait patterns which result in a complex state of polyethylene stress. This study demonstrates that no one kinematic factor dominates TKR volumetric wear.

Abstract #: 151

Session: Poster

Comparison of Passive Infrared Motion Capture vs. Moiré Phase Tracking Technology

Authors: Jeremy Mormol BS (RUMC) and Alejandro Espinoza PhD (RUMC)

Introduction: Joint kinematics are typically studied in vivo utilizing motion capture. The gold standard of studying joint biomechanics is passive infrared motion capture. In some cases where this technology is too cumbersome to use due to expensive cost of a multi-camera system, camera occlusion, or the inability to capture motion outside the laboratory, new and simpler technologies are needed to achieve these measurements accurately and in a repeatable manner. Recently, data collection methods using retrograde reflectors (RGR) have emerged as a more user-friendly and efficient method of collecting biomechanical data. One of such methods is the Moiré Phase markers developed by Metria Innovation, Inc. (Wauwatosa, WI), which uses a single camera to detect pitch, yaw and roll in markers with unique Moiré patterns.

Objective: To validate the measurements of known kinematics using Moiré Phase Tracking using a high-accuracy coordinate measuring machine (Microscribe MX, Revware Systems, San Jose, CA).

Methods: The accuracy of the Metria software was confirmed by using a hinge that rotated a total of 60 degrees about its axis with a radius of 9.45 cm. The path traveled as the hinge moved from left to right was collected by the Metria software in ten different trials and compared to the arc length calculated using data points obtained by a 3D digitizer in ten different trials.

Results: The measured path of the reflector markers differed by 0.09 cm on the left reflector marker (10.12 ± 0.30 cm digitizer, 10.03 ± 0.09 cm Metria) and 0.28 cm on the right reflector (10.25 ± 0.24 cm digitizer, 10.53 ± 0.80 cm Metria).

Conclusion/Significance: The Metria software utilizing RGR motion tracking shows reasonable accuracy when comparing the observed motion of the hinge with the predicted motion using a 3D digitizer. Based on this, we anticipate the Metria data will be comparable to the lumbar spine data collecting using passive infrared motion capture. Further work is being conducted to apply this method in a cadaver setting to compare known lumbar kinematics to the retrograde reflector method against traditional infrared motion capture.

Abstract #: 152

Session: Poster

Lumbar Facet Joint Width Comparison Between CT And μ CT

Authors: Moyer EP (RMC), Segami K (RUMC), He J (RUMC), Espinoza Orias AA (RUMC), An HS (RUMC), Inoue N (RUMC)

Introduction: The human lumbar vertebrae bear a significant portion of body weight and thus, have the greatest risk of injury and degeneration. Facet joint osteoarthritis (FJOA) is often implicated as a cause of low-back pain in the elderly and is characterized by a narrowing of the facet joint width (FJW). It is often diagnosed through the use of clinical CT imaging, but the spatial resolution of this technique is sub-optimal.

Objective: This study aims to compare the FJW data collected using clinical CT imaging with the data collected using μ CT imaging, which is considered the gold standard due to its higher spatial resolution.

Methods: The L3/4, L4/5, and L5/S1 facet joints were isolated bilaterally from ten lumbar spines and scanned separately using a micro-computed tomography scanner. A custom-written Visual C++ routine was used to determine the FJW by finding the least distance between articular surfaces of each facet joint and a student's t-test was employed to compare the data by level.

Results: The mean \pm SD FJW values (in mm) calculated from the CT images for the left L3/4, L4/5, and L5/S1 facet joints are 0.96 ± 0.10 , 1.04 ± 0.26 , and 0.92 ± 0.15 , respectively. The FJW CT values for the right L3/4, L4/5, and L5/S1 facet joints are 1.00 ± 0.17 , 1.03 ± 0.20 , and 0.89 ± 0.17 , respectively. The FJW μ CT values for the left L3/4, L4/5, and L5/S1 facet joints are 1.10 ± 0.28 , 1.12 ± 0.19 , and 0.87 ± 0.22 , respectively. The FJW μ CT values for the right L3/4, L4/5, and L5/S1 facet joints are 1.08 ± 0.20 , 1.05 ± 0.29 , and 0.98 ± 0.15 , respectively. The mean width values calculated using the μ CT images were larger than the corresponding values calculated using the CT images at all spinal levels bilaterally except for the left side L5/S1. In general, both μ CT and CT values followed a similar pattern: the largest width measured at L4/5 and the smallest width measured at L5/S1 (only exception was right-side μ CT data).

Conclusion/Significance: The described pattern of mean FJW could be attributed to the differing FJ orientation or position. The differences in FJW between both imaging modalities was insignificant (t-value >2), therefore validating the use of clinical CT as a tool to diagnose FJOA.

Abstract #: 153

Session: Poster

Return to Sporting Activity after Ulnar Nerve Transposition for Isolated Neuritis in Competitive Overhead Athletes

Authors: Amanda Naylor MA (RUMC) Brian Waterman (WFSM), Michael C O'Brien (RUMC), Catherine J Richardson (RUMC), Rachel M Frank (CU School of Medicine), Brandon Erickson (RUMC), Anthony A Romeo (RUMC), Gregory P Nicholson (RUMC)

Introduction: Medial elbow pain in the throwing athlete is a source of dysfunction and anxiety. Ulnar Collateral Ligament (UCL) injuries are high in the differential diagnosis. However, ulnar neuritis (cubital tunnel syndrome) has not been typically considered as an etiology.

Objective: To evaluate rates of return to play and patient-reported outcomes among overhead athletes undergoing isolated nerve transposition for refractory ulnar neuritis.

Methods: Between 2009 and 2016, all patients with ulnar nerve transposition for isolated cubital tunnel syndrome by two senior surgeons were identified. Inclusion criteria required involvement in competitive overhead/throwing athletics and minimum 12-month follow-up. Exclusion criteria were applied to patients with concomitant UCL injury/surgery or no significant upper extremity sporting demands. The primary outcome of interest was return to sport, and secondary outcome measures included the Kerlan-Jobe Orthopaedic Clinic (KJOC) shoulder and elbow score, Mayo Elbow Performance Score (MEPS), Disabilities of the Arm, Shoulder, and Hand (DASH) score, and Visual Analog Scale (VAS). Perioperative complications and rates of secondary reoperation were recorded.

Results: 21 athletes (17 males, 4 females) with isolated ulnar nerve transposition were isolated. The average age of 18.8 ± 2.4 years, and competitive sport involvement included 17 pitchers (81%), 3 quarterbacks (14%), 2 volleyball hitters (9.5%), and 1 swimmer (4.8%). At average 53.6-months follow-up (SD 27.6; range 15-96), 18 patients returned to sporting activity (85%), including 13 at the previous level of play (72%), whereas 2 patients were unable to return to sport and 2 others elected not to continue competitive athletics. Three patients (14%) experienced adverse outcomes, including two patients with persistent activity-related dysesthesias or pain (4.8%) and one patient with transient loss of range-of-motion. Average VAS pain significantly improved (preoperatively, 4.5 ± 2.6 ; postoperatively 0.5 ± 1.6 ; $p=0.04$). Mean postoperative KJOC, QuickDASH, and MEPS were 77.8 (SD 17.7), 5.4 (SD 1.6), and 88.8 (SD 11.9).

Conclusion/Significance: At short- to mid-term follow up, 85% of overhead or throwing athletes were able to return to sporting activity after ulnar nerve transposition, with 72% resuming their previous level of performance. Furthermore, there was a low rate of symptomatic recurrence (4.8%) and no secondary reoperation.

Abstract #: 154

Session: Poster

Nociceptor innervation of the mouse knee dramatically declines with age

Authors: Alia Obeidat (Rush University Medical Center), Richard J. Miller (Northwestern University Feinberg School of Medicine), Rachel E. Miller (Rush University Medical Center) and Anne-Marie Malfait (Rush University Medical Center).

Introduction: The knee joint is highly innervated by sensory and sympathetic nerve fibers and free nerve endings are abundant in the capsule, ligaments, menisci, periosteum and subchondral bone. However there is a lack of detailed information on sensory innervation of the different articular structures in the knee, in addition to sensory innervation changes that take place with ageing.

Objective: The aim of the study was to document the nociceptive innervation in the healthy murine knee joint, and to document age-related changes in the innervation pattern.

Methods: We used male Nav1.8-TdTomato reporter mice on a C57BL/6 background. These mice express a bright red fluorescent tomato reporter in all neurons that express Nav1.8 (75% of dorsal root ganglion sensory neurons, including >90% of C-nociceptors, C-low-threshold mechanoreceptors, and a lower percentage of A δ -nociceptors and A β afferents). At age 10 weeks and 26 weeks (n=5/group), mice were perfused transcardially, and the right knees were collected and processed. Twenty- μ m thick frozen sections were collected at mid-joint level. Consecutive sections were stained with hematoxylin & eosin. C57BL/6-Pirt-GCaMP3 mice (n=3/group) were used to confirm innervation patterns (GCaMP3 in ~90% of sensory DRG neurons).

Results: Examination of the knees of 10-week old Nav1.8-TdTomato mice revealed areas of dense Nav1.8- sensory innervation in the bone marrow, the lateral synovium, and the epiligament and attachment of the cruciate ligaments. Other structures, such as the medial synovium and the collagenous substance of the cruciate ligaments, were less densely innervated. Nav1.8 nociceptors were also present in the outer third of the lateral meniscus. The articular cartilage, the inner two thirds of the lateral meniscus, and the medial meniscus show no innervation. 26-week old Nav1.8 knees mice revealed marked changes in innervation density. 26-week old knees showed a dramatic decline in Nav1.8-expressing nociceptors in the lateral synovium, as well as in the epiligament and attachment areas of the cruciate ligaments. Similar changes were confirmed using Pirt-GCaMP3 mice.

Conclusion/Significance: This study reproducibly shows that the nociceptive innervation of specific murine knee tissues dramatically declines early on in the life of the mouse. Ongoing studies are aimed at monitoring innervation with more advanced age.

Abstract #: 155

Session: Poster

Evaluation of obesity measures in relation to clinical outcomes in total joint arthroplasty, a prospective study

Authors: Caleb Pflederer (Rush); Jefferson Li (Rush); Tori Edmiston, MD (Rush); Denis Nam, MD (Rush); Brett Levine, MD (Rush)

Introduction: Both the prevalence of obesity and the number of total hip and knee arthroplasties (THA and TKA) being performed are increasing. Body mass index (BMI) is currently used as the primary obesity indicator and is used to predict potential arthroplasty complications with varying levels of success. This study aimed to use central and subcutaneous adiposity measures to better predict patients at high risk for complications following primary THA and TKA.

Objective: To prospectively evaluate the effect of BMI, waist circumference, waist-hip ratio, waist-height ratio, operative skin fold thickness, and incision thickness on post-operative outcomes in patients undergoing primary THA and TKA.

Methods: Seventy-Seven patients were prospectively enrolled between May 2017 to January 2018. The study was approved by our institutional review board (IRB) and required informed consent. Patient BMI, waist-circumference, hip-circumference, and operative skin fold thickness measurements were recorded at pre-operative clinic visits. Incision thickness was measured intraoperatively. Operating room (OR) time, hospital stay time, and perioperative complications were recorded. Univariate analysis with Pearson correlations were used to determine trends between these measures of weight and OR time, hospital stay length, and complication rates. Multivariate regression analysis was used to identify independent predictors of OR time, complications, and hospital stay length. Statistical significance was set at $P < .05$.

Results: Mean BMI was 34.07 (SD 8.38), waist-hip ratio 0.92, waist-height ratio 0.66, skin fold thickness 27.93 mm, incision thickness 23.17 mm. Significant correlations were found between BMI and OR time ($R = .459$; $p < .001$), waist-height ratio and OR time ($R = .450$; $p < .001$), and waist-height ratio and complications ($R = .225$; $p = .046$). Multivariate regression analysis failed to find independent associations between either BMI or waist-height ratio and OR time. However, independent associations were found between waist-height ratio and complications (Beta = 0.666; $p = .01$).

Conclusion/Significance: An increased waist-height ratio is a significant independent predictor of post-operative THA and TKA complications. BMI and waist-height ratio were not associated with OR time. Operative skin fold thickness and incision thickness were not shown as significant predictors of THA and TKA outcomes. Future research is warranted to better understand the significance of central and subcutaneous adiposity measures as predictors of THA and TKA outcomes.

Abstract #: 156

Session: Poster

Establishing Maximal Medical Improvement After Anatomic Total Shoulder Arthroplasty

Authors: Richard Puzzitiello (RUMC), Avinesh Agarwalla (RUMC), Joseph Liu (RUMC), Gregory L. Cvetanovich (RUMC), Anthony A. Romeo (RUMC), Brian Forsythe (RUMC), Nikhil Verma (RUMC)

Introduction: As a heightened emphasis continues to be placed on value based healthcare, quality outcomes following orthopaedic procedures must be properly defined. With knowledge of the time to maximal medical improvement following total shoulder arthroplasty (TSA) physician resources can be justly allocated to optimize value in ambulatory orthopaedic care.

Objective: To determine the time point at which maximal medical improvement occurs following anatomic total shoulder arthroplasty.

Methods: A systematic review was conducted to identify studies reporting sequential follow-up at several time points, up to a minimum of two years after total shoulder arthroplasty. Assessment for clinically significant improvements between time intervals was made by utilizing the minimal clinically important difference specific to each patient reported outcome measure.

Results: Thirteen studies were identified that fit criteria to be included in this review, amounting to 984 patients who underwent TSA. There were clinically significant improvements in patient-reported outcome scores appreciated up to 1 year following total shoulder arthroplasty, but no further clinical significance was seen from 1 year to 2 years. Objective physical exam measurements followed a similar trend with clinically significant improvements in abduction occurring up to 1 year postoperatively. For both the subjective and objective outcomes, the majority of improvements occurred in the first three months after the procedure.

Conclusion/Significance: Following TSA, clinically significant improvements in patient reported outcomes and objective clinical measurements are seen up to 1 year postoperatively, but not beyond this time. This result is important for counseling patients and their expectations prior to surgery as well as for establishing a time frame for maximized outcome evaluation to define the value received from total shoulder arthroplasty.

Abstract #: 157

Session: Poster

Electrochemical behavior of a CoCrMo orthopedic alloy in cell culture

Authors: Radice S., PhD; Liu S., MD; Laurent M., PhD; PhD; Pourzal R., PhD; Wimmer A. M. (RUMC)

Introduction: Just as a battery generates electrical current through potential difference between positive and negative pole, a metallic implant surface becomes part of an electric circuit in the human body when accumulation or lack of negative charges (electrons) locally occurs. The electrochemical potential is a quantity which relates to the tendency of the metal to generate electrical current by either losing (anodic behavior) or gaining (cathodic behavior) negative charge in the form of electrons. Variations of the electrochemical potential at different sites of orthopedic metallic implants play major roles in local degradation and film formation (wear, corrosion, lubrication) processes. Besides, these variations may alter the metabolism of cells in the surrounding tissue.

Objective: This work aims to investigate the effect of bovine serum albumin (BSA) and hyaluronic acid (HA) on cathodic and anodic variations of electrochemical potentials of CoCrMo alloys tested in cell culture medium.

Methods: To simulate the periprosthetic environment, the tests were performed inside a CO₂ incubator using a three-electrode setup with CoCrMo-alloy discs as working electrode. Open Circuit Potential (OCP), cathodic and anodic cyclic potentiodynamic measurements were carried out on a Gamry G-750 Potentiostat. BSA and HA were added to RPMI-1640 in concentrations of 30g/L and 3g/L respectively. The final CoCrMo-surface was analyzed optically, by scanning electron microscopy and infrared spectroscopy.

Results: The electrochemical behavior of CoCrMo-alloys varied with test fluid composition. Differences were attributed to chemical interactions between BSA, HA and the metal surface. The OCP measurements revealed a competitive behavior of BSA and HA in binding with the metallic substrate. The influences of BSA and HA were mainly seen during anodic cyclic polarization by a shift of the corrosion potential to more noble values. This was more accentuated with BSA+HA ($\Delta E_{corr}(BSA) \approx 50\text{mV}$, $\Delta E_{corr}(BSA+HA) \approx 150\text{mV}$). In this condition a relatively thick organic layer deposited on the passive oxide film, while in RPMI and RPMI+BSA oxide film growth occurred with no coating formation. Characterization of the films and coatings will be presented.

Conclusion/Significance: These preliminary results point to the importance of adding HA to protein-containing simulating synovial fluids in studies about wear and corrosion of metallic orthopedic implants.

Abstract #: 158

Session: Poster

Topographic matching of a single oval osteochondral allograft for treating a larger cartilage defect of the medial femoral condyle.

Authors: Michael L Redondo, MA, BS1; Atsushi Urita, MD, PhD1; David R Christian, BS1; Brett T. Madden, BS1; Nozomu Inoue, MD, PhD2; Brian J. Cole, MD, MBA1; Adam B. Yanke, MD1 1Sports Medicine, Dept Orthopedic Surgery, RUMC ; 2Orthopaedic Biomechanics Lab (RUMC)

Introduction: Osteochondral allograft transplantation (OCA) is being performed with increasing frequency. Methods to increase expand the availability of OCAs for MFC lesions are required.

Objective: The purpose of this study is to analyze the articular surface and resulting subchondral surface matching of single oval MFC and LFC grafts with larger MFC lesions.

Methods: 12 MFC and 12 LFC were CT scanned for segmentation of the cartilage and subchondral bone. Oval osteochondral graft and recipient models were created in both the MFC and LFC using two different sizes. The surface mismatch between the graft and recipient model was determined by calculating the 'least distance' between the models in 3D space where a perfect congruent match would measure a least distance of 0.00 mm. The periphery of the graft and defect models were divided into 4 areas (anterior, posterior, medial, and lateral), and mean step-off between the graft and recipient models was calculated in each area.

Results: Regarding surface mismatching, ANOVA testing determined a statistically significant difference between mean least distance mismatch for both articular cartilage (<0.001 and <0.001) and subchondral bone (<0.001 and <0.001) between MFC, ipsilateral LFC (Ipsi-LFC), and contralateral LFC (Cont-LFC) donors for both model sizes. Tukey-HSD revealed significant surface mismatching differences between MFC donors and both Ipsi-LFC and Cont-LFC donors also in both model sizes. MFC donor grafts step-off was determined to be < 1.00 mm in all areas. Ipsi-LFC and Cont-LFC donor step-offs were found to be significantly different when compared to MFC donors in the medial and lateral areas.

Conclusion/Significance: MFC donors provided an acceptable mismatch of osteochondral surfaces for treating larger MFC lesions with oval osteochondral allografts. MFC donor grafts provided acceptable step-off in all four areas. Additionally, varying condylar width made no significant difference in mismatch or step-off in MFC donors, suggesting both similar and different MFC donor widths can be utilized as the oval graft for MFC lesions. The mismatch for Ipsi-LFC/Cont-LFC donors provided significantly greater osteochondral mismatch, signifying further evaluation of the clinical relevance of medial and lateral step-off is needed prior to recommending the use of oval LFC donor grafts for treatment of large MFC lesions.

Abstract #: 159

Session: Poster

Oxidized vs. Non-oxidized UHMWPE Particles Do Not Induce More Inflammatory Osteolysis In Vivo Using A Murine Calvaria Model.

Authors: Lauryn Samelko, Kyron McAllister, Robin Pourzal, Joshua Jacobs, and Nadim J Hallab Rush University Medical Center, Chicago, IL 60612

Introduction: Polyethylene (PE) wear-debris induced inflammatory osteolysis is the major cause of total joint replacement revisions¹⁻³. However, the degree to which the oxidative state of the PE particles directly affects osteolysis remains less understood. A previous study reported that 'Antioxidant impregnated ultra-high molecular weight polyethylene (UHMWPE) wear debris particles display increased bone remodeling and a superior osteogenic:osteolytic profile vs. conventional UHMWPE particles in a murine calvaria model'^{4,5}. Consequently, the increased bone remodeling may be primarily due to antioxidant effects, and less dependent on the oxidation state of UHMWPE in peri-implant milieu.

Objective: We hypothesized that oxidized UHMWPE particles will translate into increased osteolysis.

Methods: Male C57BL/6 12 week old either received a direct subcutaneous injection on the calvaria of (n=4/group): (A) PBS-1X, (2) 3mg/100 μ l or 6x10⁸ particles/per calvaria of endotoxin-free UHMWPE particles or (3) of highly oxidized-UHMWPE particles with IACUC approval. Measurement of the oxidized state of particles was performed using Fourier Transform Infrared Spectroscopy (FTIR) Analysis. Osteolysis was determined at 7 days post-op and analyzed by 3D-CT. Statistical analysis was determined by Kruskal-Wallis followed by Mann-Whitney for nonparametric data with $p \leq 0.05$.

Results: The oxidative index of the conventional UHMWPE particles was 0.38 vs. 0.74 of the oxidized UHMWPE. The largest and most significant increase in the amount of calvaria osteolysis ($p < 0.03$) was in the group that received conventional UHMWPE. Whereas, oxidized UHMWPE did not significantly induce increased osteolysis

Conclusion/Significance: Our results did NOT support our hypothesis that highly oxidized UHMWPE would result in more inflammatory osteolysis as compared to conventional UHMWPE at the same dose/shape/size. This may indicate that the increased chemical stability associated with oxidized particles (lower free energy/entropy) translates to less bioreactivity. Additionally, our results indicate that the decreased osteolysis due to specific types of UHMWPE doped with antioxidants may be due directly to the antioxidant. Further testing is required to determine if oxidized UHMWPE have decreased osteolytic potential as compared to conventional UHMWPE. Our in vivo findings suggest that highly oxidized UHMWPE particles not do induce increased osteolysis. This shifts the biologic import of doping UHMWPE with antioxidants to the study of how antioxidants decrease UHMWPE induced inflammatory osteolysis.

Abstract #: 160

Session: Poster

Bone Turnover Biomarkers for Early Detection of Peri-Implant Osteolysis in a Rat Model

Authors: Brittany M. Wilson (RU); Meghan M. Moran (RU); Ryan D. Ross (RU); Maleeha Mashiatulla (UIC); Matthew J. Meagher (RU); Amarjit S. Viridi (RU); and D. Rick Sumner (RU)

Introduction: Using a rat model of particle-induced osteolysis, our group has previously shown that changes in circulating bone turnover biomarkers may precede changes in peri-implant bone volume.

Objective: The purpose of the current study was to assess serum biomarkers and peri-implant bone volume at 6 weeks in the rat model to determine if biomarkers are altered before significant loss of peri-implant bone.

Methods: In this IACUC-approved study, 24 male Sprague-Dawley rats (400 ± 12 g) were randomly allocated to three groups ($n=8$ /group). Sixteen animals received bilateral distal femoral titanium intramedullary implants and weekly intra-articular injections. Eight rats were injected with lipopolysaccharide-doped polyethylene particles (particle group). Eight were injected with vehicle carrier alone (vehicle group). The remaining 8 rats did not undergo surgical procedures or injections (intact group). Whole blood and femora were collected 6 weeks after implant surgery. Blood was processed for serum and analyzed by ELISAs for markers of bone turnover (CTX-1, osteocalcin, and PINP). Distal femoral diaphyses were analyzed by micro-computed tomography to assess peri-implant trabecular bone volume fraction (BV/TV). All data were assessed for homogeneity of variance before one-way analyses of variance (ANOVAs) with Bonferroni post hoc testing. Due to inhomogeneity of variance, PINP data were analyzed by Kruskal-Wallis test.

Results: Serum CTX-1 and osteocalcin were significantly increased in the particle group compared to both the vehicle and intact groups ($p<0.003$ and $p<0.003$, respectively). Serum PINP was not different among the groups ($p=0.526$). Compared to the intact group, bone volume fraction (BV/TV) was not significantly different in the vehicle group ($p=0.619$), but was significantly reduced in the particle group ($p=0.016$). The difference between the particle and vehicle groups was not significant ($p=0.256$).

Conclusion/Significance: We found that 2 of the 3 bone turnover biomarkers differed between the particle and vehicle groups, but the peri-implant bone volume was not different between these two groups. This finding suggests that bone turnover biomarkers, specifically CTX-1 and osteocalcin, are increased before significant peri-implant osteolysis has occurred in the rat model. Bone turnover biomarkers may offer a method to identify the development of peri-implant osteolysis early in the disease process.

Abstract #: 161

Session: Poster

Effect of different compressive stress patterns during articulation on cartilage stiffness: a microindentation study

Authors: Catherine Yuh (RUMC), Tony Chen (HSS), Mehdi Khoshgoftar (HSS), Suzanne Maher (HSS), Susanna Chubinskaya (RUMC), Markus A. Wimmer (RUMC)

Introduction: The current understanding of the response of articular cartilage in the knee to complex stress patterns from altered gait kinematics is unclear. In this study, we input stress patterns from a cadaveric knee simulator at Hospital of Special Surgery into a tribological bioreactor to investigate how different stress patterns affect cartilage stiffness.

Objective: We hypothesize that cartilage explants undergoing tribological stress will experience stiffening and that single-peak and double-peak loading will have different stiffening effects.

Methods: Live cartilage explants procured from 24-week-old bovine trochlear grooves were pre-cultured in media at 37°C for 4-5 days with daily media changes. Tekscan stress measurements from cadaveric knee simulations on various tibial plateau locations were translated into force inputs using finite element analysis. This study had three experimental loading groups: single-peak, double-peak, and free swelling control. Microindentation was performed using a 20- μ m spherical indenter before/after loading in the articulated/non-articulated regions with a 3 \times 1 array of 8- μ m deep indents submerged in 1 \times PBS. For bioreactor testing between microindentation, explants were confined and placed in 3 mL of media. 40-N loading was applied for 30 minutes using an articulating ceramic hip-ball. The mean stiffness of each array was calculated and data were compared using ANOVA blocked by day of testing (day 4/day 5).

Results: Both the single and double-peak groups had significantly increased stiffness values post-loading compared to pre-loading in the wear region ($p < 0.001$), but not in the non-wear region ($p = 0.359$ and 0.289 , respectively). There was no difference in stiffening between the single and the double-peak groups ($p = 0.270$).

Conclusion/Significance: In this study, we investigated early stiffness responses to alterations in local cartilage stress patterns on a micron-scale. Our data indicates that dynamic loading/articulation on cartilage leads to increased stiffness. Contrary to our hypothesis, these results suggest that no significant difference in stiffness exists following single-peak and double-peak loading. These findings suggest that healthy cartilage stiffness is not highly sensitive to different compressive stress patterns if identical peak loads are applied. This study contributes to the understanding of how kinematics is related to cartilage health and can be extended to assess mechanical mechanisms of cartilage degeneration in pathological tissue.

Abstract #: 162

Session: Abstract

Measuring shoulder movement mechanics before and after reverse total shoulder arthroplasty

Authors: Antonia Zaferiou (Rush University Medical Center), Matt Perek, Avinesh Agarwalla, Richard Puzitiello, Anthony Romeo (Rush University Medical Center)

Introduction: Shoulder implant revisions usually occur due to shoulder instability/dislocation or implant loosening, suggesting that such implants could not withstand loading in vivo or that the implant was misaligned. Presently, shoulder mechanics are not fully understood during activities of daily living (ADL) (1) at a patient-specific level before and after arthroplasty or (2) between the humerus and glenoid ('glenohumeral' vs. humero-thoracic). The implant design process may not yet use contextually-relevant inputs of glenohumeral movement (rotation and translation) and loading. Furthermore, patient-specific fixation locations (that determine shoulder joint center) are currently based on stationary imaging geometry rather than functional calculations of the shoulder's center of rotation. Misalignment due to inaccurate shoulder centering could expose the implant to unprecedented loading conditions that lead to implant loosening.

Objective: Therefore, this study aims to understand patient-specific shoulder control (muscle activation), dynamics (movement), and loading (joint kinetics) during ADL before and after reverse total shoulder arthroplasty (RTSA).

Methods: Volunteer participants provide informed consent in accordance with the RUMC IRB. Patients perform ADLs before and after RTSA while motion is monitored using an optical motion capture system (Optitrack, OR, 150fps) and muscle activation is captured using electromyography (Noraxon, AZ, 3000Hz). Before performing ADLs, calibration poses and movements enable modelling the human body as a rigid body system using custom MATLAB software (Mathworks, MI) to calculate kinematics, kinetics, and muscle activation. Shoulder muscle activation is normalized to maximum voluntary contraction while a hand-held dynamometer measured force between tester and the patient's elbow. The scapula's positioning is measured using multiple mathematical relationships defined as distinct calibration poses while using an acromion marker cluster technique used previously.

Results: To date, two patients have enrolled and two patients have different compensatory movement strategies and muscle activation patterns used during ADLs before surgery.

Conclusion/Significance: When complete, this study will advance our understanding of functionally-relevant glenohumeral motion before and after RTSA. We will identify relevant glenohumeral mechanics (to provide more meaningful inputs to the implant design process) and improve shoulder measurement technology - which can also be used to understand the development of other shoulder pathologies, like rotator cuff tears, and how these pathologies could progress into osteoarthritis.

Abstract #: 163

Session: Poster

Turning in People with Cerebellar Ataxia

Authors: Caitlin Bailey (Rush) Joanne O'Keefe (Rush) Antonia Zaferiou (Rush) Deborah A. Hall (Rush) Lauro Ojeda (University of Michigan)

Introduction: Cerebellar Ataxia (CA) is a neurodegenerative movement disorder of the cerebellum. People with CA have difficulty maintaining balance, gait and turning abnormalities, and poor motor coordination. This population is at a high risk of falls during normal daily activities.

Objective: The deficits in turning while walking have not been well studied in this patient population. The aims of the study will be to show the differences in turning motion between people with CA and healthy controls as well as between anticipated and unanticipated turns.

Methods: This study has been approved by the Institutional Review Board at Rush University. After giving informed consent, 10-15 people with CA and age-matched healthy controls will complete a walking course with 90° and 180° anticipated and unanticipated turns while wearing inertial measurement units (IMUs) to measure movement. The spatiotemporal outcomes from this walking course will be correlated with scores on various balance scales and self-reported fall history using Spearman's correlation. The outcomes from people with CA and healthy controls will be compared using t-tests. The outcomes from anticipated and unanticipated turns will also be compared using t-tests.

Results: An algorithm is being developed using Matlab to calculate turn velocity, steps to complete a turn, turn radius, step length/width and timing of segmental rotation from the IMU data. A significant difference is expected between people with CA and healthy controls as well as between anticipated and unanticipated turns. Compared to controls, the CA group is expected to turn slower with a larger turn radius and step width, use more steps to complete the turn and a shorter step length. The anticipated turns are expected to be completed slower, with a larger turn radius and more steps than the unanticipated turns. The subjects' fall risk is expected to correlate with the parameters listed above.

Conclusion/Significance: The results of this study will give insight into how people with CA turn differently than healthy controls. Unanticipated turns were included to more closely mimic normal daily activities. This information may be useful in future development of therapeutic interventions to improve turning ability and minimize fall risk in people with Cerebellar Ataxia.

Abstract #: 164

Session: Poster

High Bone Mass Phenotype in 8-Week Old Outbred CFW Mice

Authors: Kelsey A. Carpenter (Rush), Meghan M. Moran (Rush), D.R. Sumner (Rush)

Introduction: Carworth Farm White (CFW) mice are an outbred mouse strain commonly used in bone genetic studies. Parker et al. (Nat. Genet. 2016) discovered that some CFW mice have abnormally high areal bone mineral density (aBMD) at ~13-weeks of age.

Objective: The aim of this study was to determine if the bone mass phenotype was present during the growth phase of CFW mice.

Methods: The humerus, femur, tibia, and vertebral columns of 24 8-week old CFW mice were contact radiographed in an IACUC-approved study and scored by three observers independently as having normal or elevated radiographic opacity. All femurs were scanned using micro-computed tomography (μ CT) to quantify the trabecular bone in the distal metaphysis and cortical bone geometry at the mid-diaphysis. Statistical analyses included chi-square, frequency distributions and analyses of variance (ANOVA).

Results: Elevated radiographic opacity was found most commonly in the distal femoral metaphysis (29.2%), followed by the proximal tibial metaphysis (20.8%), and proximal humeral metaphysis (12.5%). There was no evidence of elevated radio-opacity in the vertebrae. Sex did not affect the prevalence of radio-opacity (chi-square: femur $p = 0.653$, tibia $p = 0.615$, humerus $p = 0.537$). The medullary area and bone volume/total volume (BV/TV) had bimodal frequency distributions, whereas cortical area, cortical thickness, trabecular number, trabecular thickness, and trabecular spacing were unimodal. The radiographic presence of the phenotype was associated with elevated distal femoral metaphyseal trabecular BV/TV (ANOVA: $p < 0.001$), but not with sex ($p = 0.924$). Elevated cortical area was associated with sex ($p < 0.001$), but not with the presence of the phenotype ($p = 0.234$). Body weight and femoral length were associated with sex ($p < 0.001$, $p = 0.001$ respectively), but not with the presence of the phenotype (body weight: $p = 0.374$ and femoral length $p = 0.330$). There were no significant interactions for these analyses.

Conclusion/Significance: The elevated bone mass phenotype was present in both sexes of CFW mice at 8 weeks and affects trabecular bone of the appendicular skeleton, but not the cortical bone or the vertebrae. The elevated bone mass phenotype in CFW mice is present before growth ceases at ~12 weeks.

Abstract #: 165

Session: Poster

Modulation of Autoimmune Arthritis by Protein Tyrosine Phosphatase SHP-1

Authors: Adrienn Markovics (RUMC), Andrew B Nesterovitch (RUMC), Katalin Mikecz (RUMC), Tibor Rauch (RUMC), Daniel M Toth (RUMC) and Tibor T Glant (RUMC)

Introduction: The protein tyrosine phosphatase SHP-1 is known to exert negative regulatory effects on immune cell signaling. Mice with mutations in the Shp1 gene display inflammatory skin disease and autoimmune features, but no arthritis. The role of SHP-1 in arthritis is currently unknown.

Objective: To explore the role of SHP-1 in arthritis using cartilage proteoglycan (PG)-induced arthritis (PGIA), an autoimmune model of rheumatoid arthritis (RA). We generated Shp1 transgenic (Shp1-Tg) mice overexpressing this phosphatase to study the impact of SHP-1 overexpression on arthritis susceptibility and adaptive immune responses.

Methods: Wild-type (WT) and Shp1-Tg mice were immunized with cartilage PG in adjuvant, and arthritis symptoms were monitored. Tyrosine phosphatase activity, T-cell and B-cell proliferation and activation in response to polyclonal stimulation as well as global protein tyrosine phosphorylation (pTyr) levels were measured in spleen cells from WT and Shp1-Tg mice using cell proliferation and enzyme activity assays, flow cytometry, and Western blot. Statistical analysis was carried out employing GraphPad Prism 7. Protocols involving animals were approved by the IACUC of RUMC.

Results: Interestingly, while all of the WT mice developed arthritis after PG immunization, none of the Shp1-Tg mice developed disease (n=13-16 mice per genotype). Shp1-Tg spleen cells showed 7-fold higher tyrosine phosphatase activity than WT cells. T and B cells from Shp1-Tg mice proliferated less well and expressed significantly lower levels of activation markers than those from WT mice. Global pTyr levels were also lower in T and B cells from Shp1-Tg than in cells from WT mice.

Conclusion/Significance: Resistance to autoimmune arthritis in Shp1-Tg mice is likely due to impaired T- and B-cell responses to PG immunization. Reduced T- and B-cell activation and resistance to arthritis in the presence of SHP-1 overexpression seem to result from the impairment of tyrosine phosphorylation (deactivation) of key T-cell and B-cell signaling proteins, due to the overwhelming tyrosine phosphatase activity of the enzyme in Shp1-Tg mice. Our study is the first to investigate the role of SHP-1 in autoimmune arthritis. Further experiments with the animal model may identify a therapeutic target for the treatment of human autoimmune arthritis such as RA.

Abstract #: 166

Session: Podium Presentation - Student Award

Proteasome-targeted nanobodies alleviate pathology in a synuclein-based Parkinson's disease model

Authors: Diptaman Chatterjee (Rush University), Mansi Bhatt (Rush), David Butler (Neural Stem Cell Institute), Erwin De Genst (University of Cambridge), Christopher Dobson (University of Cambridge), Anne Messer (Neural Stem Cell Institute), Jeffrey H. Kordower (Ru

Introduction: Parkinson's disease (PD) is a synucleinopathy with a significant loss of dopaminergic neurons in the substantia nigra (SN) and abrogation of dopaminergic tone along the nigrostriatal pathway. Therapeutics designed to target α -synuclein (α -syn) aggregation may be critical in halting the progression of pathology in PD patients. Nanobodies are single-domain antibody fragments that can be expressed intracellularly and specifically bind to target regions critical for protein accumulation. Nanobody fusion with a proteasome-targeting PEST motif can modulate monomeric concentrations of aggregate proteins while maintaining aptamer stability. Current efforts to disrupt α -syn-mediated pathology are restricted to extracellular clearance of proteinaceous aggregates which fails to quell intracellular proteopathic seeding and cellular disruption. Thus, intracellular interference of disordered misfolding and protein nucleation is necessary to curb pathogenic cascades.

Objective: Here, we aimed to validate and compare the in vivo therapeutic potential of gene therapy delivery of two proteasome-directed nanobodies selectively targeting α -syn in a synuclein-overexpression based PD model: VH14*PEST (non-amyloid component region) and NbSyn87*PEST (C-terminal region).

Methods: Stereotaxic injections of AAV5- α -syn into the SN were performed on 48 Sprague-Dawley rats that were sorted into three cohorts. Behavioral testing (cylinder test and stepping test) was conducted over the course of experimentation to evaluate gross motor phenotype. Rats were treated with unilateral SN injections of vectors for VH14*PEST, NbSyn87*PEST, or injected with saline 3-weeks post-lesion. Animals were sacrificed 16-weeks post-lesion for histological and biochemical evaluation.

Results: Post-mortem assessments of the SN showed nanobodies markedly reduced the level of phosphorylated-Serine129 α -syn labeling relative to saline-treated animals. VH14*PEST showed considerable maintenance of striatal dopaminergic tone in comparison to saline- and NbSyn87*PEST-treated animals as measured by tyrosine hydroxylase immunoreactivity, dopamine transporter immunoreactivity, and dopamine concentration. Inflammatory response, assessed by stereological density of Iba-1-labeled cells, was modestly increased in NbSyn87*PEST-injected rats but not in VH14*PEST- or saline-treated animals. Both nanobody constructs significantly improved stepping test performance. NbSyn87*PEST-treated animals also displayed improvement in cylinder test compared to the saline-treated group, although there was pronounced variability amongst individual animals.

Conclusion/Significance: These data show novel in vivo therapeutic efficacy of vector-delivered intracellular nanobodies targeting α -syn misfolding and aggregation in synucleinopathies such as PD.

Abstract #: 167

Session: Poster

Intracellular Uptake of Nanotubes Augments Neural Conductivity and the Extent of Activation During Direct Brain Stimulation Therapy

Authors: Jack Creagmile (RUMC), Paula Wagner-Egea (RUMC), L Cendejas-Zaragoza (RUMC, IIT), TJ Harris (RUMC), MA Rossi (RUMC, IIT)

Introduction: Direct Brain Stimulation (DBS) therapy only activates neurons within a 4mm radius of its surface. One method to increase the extent of cortical activation is to modify tissue conductivity (σ) adjacent to the electrode contact. Our study demonstrates the influence of fluorescein-thiosemicarbazide (FTSC) functionalized metallic carbon nanotubes (fCNTs) on tissue impedance, intracellular uptake, and in vitro biocompatibility.

Objective: 1) Evaluate fCNT-induced changes on σ ; 2) Evaluate cellular uptake of fCNT; 3) Predict fCNT-induced conductivity changes on DBS.

Methods: Three experiments were carried out: 1) electrical impedance spectroscopy to evaluate fCNT-induced changes on σ inside a 0.6% agarose gel; 2) in vivo immunofluorescence assay after fCNT injection to evaluate their cellular uptake; 3) computational Hodgkin and Huxley (HH) cable modeling to predict the effect of fCNT-induced conductivity changes extending the reach of DBS.

Results: CNTs were successfully characterized via ATR-FTIR Spectroscopy, given the obtained peaks correspond to those referenced in the literature. Preliminary data show that FTSC's optical density can be correlated with fCNT's concentration. Confocal microscopy analysis of immunofluorescence staining revealed fCNT clusters in the hippocampal formation, demonstrating fCNT uptake by glial cells and neurons near the injection point.

During impedance spectroscopy, changes in the parameters of R_{int} , R_{medium} , C , and n were analyzed after fCNT injection. A nonlinear regression analysis yielded statistically significant differences in R_{medium} ($p=8.8111E-4$), C ($p= 6.6565E-6$), and n ($p= 0.0084$) after CNT injection, suggesting a change in electrical properties resultant from fCNT injection.

The HH model revealed that intracellular σ changes enhance axon excitability and propagation speed of an action potential. Modulated Circuit Tractography (MCT) showed the volume of cortical activation with Metallic Single-Walled-Nanotubes (M-SWNT) is more extensive than without M-SWNT.

Conclusion/Significance: Previous work demonstrated fCNT biocompatibility in the brain. fCNT cellular uptake potentially modifies the biophysical properties of neural cells, alters σ , and enhances the extent of cortical activation by a DBS depth lead. Contrary to what was expected, we observed an increase on the impedance magnitude after injecting fCNTs in agarose gel. MCT showed that the volume of cortical activation with M-SWNT is substantially larger and can potentially enhance the extent of activation during DBS.

Abstract #: 168

Session: Poster

Elevated usage of negative emotion regulation strategies in schizophrenia

Authors: Briana N Galindo (Rush) Kristen M Haut (Rush) Laura M. Tully (UC Davis) Christine I Hooker (Rush)

Introduction: Cognitive emotion regulation strategies are the mechanisms individuals use to process emotional experiences. These are important predictors of how people handle stressful, negative or emotionally arousing events, especially in the context of dysfunctional attitudes about themselves and the world. While this has been studied extensively in mental illnesses like depression, it is less clear how they impact emotional and social functioning in more chronic psychiatric disorders.

Objective: This study examines the relationship between emotional regulation and dysfunctional attitudes in people with schizophrenia.

Methods: 27 healthy controls without history of significant psychopathology and 25 individuals with schizophrenia completed the Cognitive Emotion Regulation Questionnaire (CERQ) and the Dysfunctional Attitude Scale (DAS). The CERQ measures nine cognitive components of emotion regulation, such as acceptance or self-blame, that refer to what someone thinks after experiencing a threatening or stressful event. The DAS is a self-report scale designated to measure the presence and intensity of dysfunctional attitudes, such as the importance of success to their own self-worth. MANOVA was used to analyze differences on the CERQ and the DAS between healthy controls and individuals with schizophrenia. T-tests were used to explore any significant effects.

Results: MANOVA shows a significant group difference ($F= 4.2165$, $p< .001$) on emotion regulation and dysfunctional attitudes. T-tests show that this significant group effect was due to individuals with schizophrenia reporting more dysfunctional attitudes than healthy controls ($t=-4.1538$, $p<.001$). In addition, patients with schizophrenia rated themselves higher than the control's self-ratings on the self-blame ($t=-2.7964$, $p<.001$), catastrophizing ($t=-4.0312$, $p<.001$) and blaming others scales ($t = -4.7423$, $p<.001$) of the CERQ.

Conclusion/Significance: Individuals with schizophrenia report higher scores on self-blame, catastrophizing and blaming others subscales of the CERQ as well as higher scores on the Dysfunctional Attitude Scale when compared to healthy controls. This suggests that those with schizophrenia utilize more maladaptive emotion regulation strategies and have more dysfunctional attitudes about themselves and the world. These differences indicate a need for a better understanding of the relationship between emotion regulation and schizophrenia and how these are linked to mood, role functioning and social functioning.

Abstract #: 169

Session: Poster

Correlates of facial weakness in patients with facial nerve schwannomas

Authors: Jeffrey Heiferman, BA (Rush); Matthew Bartindale, MD (Loyola); Cara Joyce, PhD (Loyola); Neelam Balasubramanian, BA (Loyola); and John Leonetti, MD (Loyola)

Introduction: Facial nerve schwannomas are frequently associated with facial weakness. Due to their slowly progressive nature, facial nerve schwannomas do not always require immediate surgical intervention. Because of the risks associated with surgery, a conservative approach is often recommended. Therefore, identifying correlates of facial weakness can assist in determining whether surgical intervention is warranted, and if so the timing of such intervention.

Objective: The purpose of this study is to evaluate demographic and anatomical findings to identify associations with facial weakness in patients with facial schwannoma, to assist in determining the most appropriate treatment options.

Methods: We performed a systematic review of the English literature regarding facial schwannoma studies. Included studies reported patient-level data, such as House-Brackmann facial function scores, which grade the degree of facial weakness. Odds ratios were estimated using generalized linear mixed models with case series as a random effect.

Results: Thirty-two studies with 505 patients were included in our analysis. Of these patients, 200 presented with facial weakness of varying degrees. Patient age, sex, and tumor size were not associated with facial weakness. Higher grades of facial weakness were associated with left-sided tumors (OR=3.05, $p=.01$), intratemporal involvement (OR=5.52, $p<.001$), and a greater number of facial nerve segments involved (OR=1.31, $p<.001$). Intradural (OR=0.60, $p=.01$) and extracranial (OR=0.53, $p<.001$) extension were associated with a lower probability of facial weakness.

Conclusion/Significance: Facial schwannomas that were left-sided, intratemporal, and had a greater number of facial nerve segments involved were associated with a higher probability of developing facial weakness. With additional understanding of the natural history of these complicated and rare lesions, more accurate risk assessment of specific lesions can lead to improved therapeutic decision making.

Abstract #: 170

Session: Poster

Microelectrode Recording Does not Significantly Affect Lead Location in DBS Surgery

Authors: Kristen Kraimer BS (RMC) Ryan B. Kochanski MD (Rush), Kavantissa M. Keppetipola BS (Rush), Sander Bus MD (Rush), Todd L. Beck MS (Rush), Gian Pal MD, MS (Rush), Leo Verhagen Metman MD, Ph (Rush), Sepehr Sani MD (Rush)

Introduction: With advances in neuroimaging, debate exists regarding the utility of microelectrode recording (MER) during deep brain stimulation (DBS) surgery. Prior studies have shown discordance between optimal subthalamic nucleus (STN) target utilizing imaging versus MER-based targeting. However, it is unclear whether optimization of the target with MER translates to a significant deviation of the final DBS lead.

Objective: We aimed to: 1) determine the incidence of discordance between image-based and MER-optimized targeting, and 2) determine whether MER resulted in a significant radial deviation of the final DBS lead location when compared to the initial anatomic target (AT) and the MER-optimized target (MER-O).

Methods: Patients with Parkinson's disease who underwent STN DBS lead placement between 2014 and 2016 were retrospectively analyzed. The radial error between the microelectrode location of the first recorded tract and the intended MRI-defined STN target (AT) was calculated in the axial plane, and was deemed an acceptable electrophysiological representation of AT if less than 1 mm. The number of hemispheres by which the neurophysiological data was suboptimal, thus requiring multiple MER tracks, were further analyzed. The radial distances between 1) AT and MER-O; 2) MER-O and DBS lead; and 3) AT and DBS lead were calculated and compared using two-tailed, paired T-test. The Clark-Evans test was performed to assess for directional bias.

Results: A total of 150 hemispheres in 82 consecutive patients were reviewed. In 38 (25%) hemispheres, MER was suboptimal despite radial error of less than 1 mm between the microelectrode and initial AT, as determined by intraoperative CT imaging. The mean radial distance between the initial AT and MER-O was 1.51 ± 0.11 mm, between MER-O and final DBS lead was 1.24 ± 0.16 mm, and between AT and DBS was 1.45 ± 0.13 mm. No significant differences were found in the comparison of mean radial errors. Additionally, there was no directional bias in the error distribution between any of these groups.

Conclusion/Significance: In nearly one out of four hemispheres, there is discordance between optimal neurophysiological and radiographic STN. While this finding favors the utility of MER for target optimization, such optimization does not translate to a significant change in the final DBS lead location.

Abstract #: 171

Session: Podium Presentation - IMSD

Latino CORE Study: Association of Education and Cognitive Function Level in Community-Dwelling Older Latinos

Authors: Ashley Madera, BA (Rush), Raj C. Shah, MD (Rush), David X. Marquez, PhD (UIC), Ana Capuano, MPS, MS, PhD (Rush)

Introduction: The older Latino population is one of the fastest growing groups in the US and is at increased risk for cognitive dysfunction. Limited data has shown no difference in level of cognitive function between Latinos and non-Latino whites in older age. In other groups, education has been associated with level of cognitive performance on neuropsychiatric evaluations. However, little research exists regarding cognitive function and education within the older Latino population.

Objective: This cross-sectional study tested the hypothesis that lower education in older Latino adults at initial evaluation is associated with a lower level of global and specific cognitive function.

Methods: Participants were older adults who self-identify as Latino/Hispanic adults within the Latino CORE study. The study from which the participants were drawn has been approved by the institutional review board of Rush University Medical Center. A total of 154 people without dementia at baseline, recorded educational level and cognitive resources, and at least one global cognitive assessment were eligible for this analysis. Linear regression models were constructed with global and specific cognitive function, measured by a battery of 21 cognitive performance tests, as outcomes of interest. Education and preferred language were independent variables. All models were adjusted for age and gender.

Results: Participants had mean age of 69 +/- 5 years, mean education of 10 +/- 4 years, and mean MMSE score of 26 +/- 3. Among participants, 80% were female, 87% were born outside the US, and 70% only spoke Spanish or preferred Spanish. In a fully adjusted linear regression model, each unit increase in education above the mean was associated with 0.05 units increase in level of global cognition (0.05 +/- 0.01, $p < 0.001$). The impact of one year of education was essentially equivalent to being two years younger of age. Education was also significantly associated with cognitive function in all domains.

Conclusion/Significance: Results suggest that in this community dwelling cohort of older Latinos, education is significantly associated with global and specific cognitive function. Given the limited longitudinal data available within older Latino populations, future studies should focus on the rate of cognitive change as it relates to baseline education level.

Abstract #: 172

Session: Poster

Viral Vector-Mediated Rat Models of Parkinsonian and Cerebellar Variants of Multiple System Atrophy

Authors: David J Marmion (Rush); Ronald J. Mandel (University of Florida), Deniz Kirik (Lund University), Yaping Chu (Rush), Thomas J. McCown (University of North Carolina), Steven J. Gray (University of Texas Southwestern), Jeffrey H. Kordower (Rush)

Introduction: Multiple System Atrophy (MSA) is a rare and progressive neurodegenerative disorder with an uncertain pathophysiology and etiology. MSA can be stratified into a Parkinsonian variant (MSA-P) characterized by striatonigral degeneration and Parkinsonian-like motor features, and a cerebellar variant (MSA-C) characterized by olivopontocerebellar atrophy with associated ataxia. MSA is a unique synucleinopathy, in which α -synuclein preferentially accumulates in the cytoplasm of oligodendrocytes, forming glial cytoplasmic inclusions (GCIs), the pathological hallmark of MSA. α -synuclein aggregation is thought to elicit dysfunction in oligodendrocytes, causing disruption in myelin and reduced neurotrophic support, leading to neurodegeneration.

Objective: Traditional animal modeling of MSA relies on transgenic murine models, in which human α -synuclein is overexpressed using different oligodendrocyte-specific promoters. The success of experimental therapeutics tested in these animals has not translated to successful treatment in the clinical setting, which may suggest improper disease modeling. In this study, we sought to develop novel viral vector-mediated overexpression models of both MSA-P and MSA-C to establish more clinically relevant models for future use as platforms for drug discovery.

Methods: α -synuclein or GFP was overexpressed in oligodendrocytes using a recently developed novel oligotrophic adeno-associated virus vector, Olig001. Sprague-Dawley rats were injected in the striatum to model MSA-P, and in the pontine nucleus and middle cerebellar peduncle to model MSA-C. Animals were sacrificed and evaluated histologically for MSA-like pathology.

Results: Histological analysis showed 94-97% of the GFP-positive cells co-localizing with oligodendroglial marker Olig2. There was little co-expression in neurons (2.9-4.7%) or astrocytes (0.18-0.49%), indicating the highly oligo-specific tropism of this vector in vivo. Widespread α -synuclein accumulation was seen throughout the injection areas, which were resistant to Proteinase K digestion, indicating the formation of insoluble inclusions. Loss of myelin was observed in white matter regions containing α -synuclein expression. Unbiased stereological counts indicate an ~20% loss of neurons in the striatum of MSA-P rats.

Conclusion/Significance: Taken together, our data indicates the establishment of novel animal models of the Parkinsonian and cerebellar variants of MSA, recapitulating key aspects of the disease. Long-term studies are underway to evaluate the progression of pathology and development of motor symptoms.

Abstract #: 173

Session: Poster

Sodium benzoate, a food additive and a metabolite of cinnamon, increases tyrosine hydroxylase in dopaminergic neurons: Implications for Parkinson's disease

Authors: Aparna Nutakki, Sridevi Dasarathi and Kalipada Pahan Department of Neurological Sciences, Rush University Medical Center

Introduction: Parkinson's disease (PD) is caused by the loss of dopamine (DA) in the striatum. Tyrosine hydroxylase (TH) is the rate-limiting enzyme in the DA biosynthesis pathway and dopaminergic neurons in the nigra synthesize DA from tyrosine with the help of TH. Drugs/molecules capable of upregulating TH and increasing the production of DA may have implications for the treatment of PD patients. Sodium benzoate (NaB), a metabolite of cinnamon, is a commonly used food additive and a FDA-approved drug for urea cycle disorders. Earlier studies have shown that NaB as well as cinnamon are capable of protecting dopaminergic neurons in a mouse model of PD.

Objective: This study highlights the importance of NaB in upregulating the expression of TH and increasing the level of DA in dopaminergic neurons.

Methods: NaB dose-dependently increased the expression of TH and the production of DA in mouse MN9D dopaminergic neuronal cells with maximum upregulation seen at 200 μ M concentration. Time-dependent analysis revealed maximum increase in TH and DA at 4 h of NaB stimulation.

Results: Rapid activation of CREB by NaB alone and the inhibition of NaB-mediated expression of TH by siRNA knockdown of CREB suggest that NaB stimulates the expression of TH in dopaminergic neurons via CREB.

Conclusion/Significance: These studies delineate a new property of NaB in stimulating TH that may be beneficial for PD patients. This study was supported by grants (AT6681 and NS83054) from the National Institutes of Health to KP and Dean's Office Summer Research Fellowship to AN.

Abstract #: 174

Session: Poster

Upregulation of tyrosine hydroxylase in dopaminergic neurons by aspirin: Implications for Parkinson's disease

Authors: Priyanka Pahan (Rush); Sridevi Dasarathi (Rush); Kalipada Pahan (Rush)

Introduction: Parkinson's disease (PD) is the most common neurodegenerative movement disorder in humans. It is believed that motor signs first appear in PD patients when about 30-50% of substantia nigra (SN) dopamine neurons are lost. Therefore, increasing the function of residual dopaminergic neurons in the nigra of PD patients is an important area of research as it may eventually compensate the loss.

Objective: Although tyrosine hydroxylase (TH) is the rate-limiting enzyme in the dopamine (DA) biosynthesis pathway, there are no effective drugs/molecules to upregulate TH and increase the production of DA in nigral dopaminergic neurons. Acetylsalicylic acid, commonly known as aspirin, is one of the most frequently used pharmaceuticals in medical practice and is available over the counter. This study was undertaken to examine the effect of aspirin on the expression of TH and the production of DA in dopaminergic neurons.

Methods: MN9D dopaminergic neuronal cells were treated with different doses of aspirin under serum-free condition followed by monitoring the expression of TH by RT-PCR, real-time PCR, Western blot, and immunofluorescence. The level of DA was measured in supernatants by HPLC.

Results: Aspirin dose-dependently increased the expression of TH and the production of DA in neuronal cells with maximum upregulation seen at 5 μ M concentration. Time-dependent studies also showed maximum increase in TH and DA at 2 h of aspirin stimulation. While investigating mechanisms, we found the presence of cAMP response element (CRE) in the promoter of TH gene and the rapid induction of cAMP response element binding (CREB) activation by aspirin in dopaminergic neuronal cells. Aspirin-induced expression of TH was abrogated by siRNA knockdown of CREB suggesting the involvement of CREB in this process.

Conclusion/Significance: These results highlight a new property of aspirin in stimulating the TH-DA pathway in dopaminergic neurons via activation of CREB, which may be beneficial in PD patients. This study was supported by grants (AT6681, NS83054 and AG50431) from the National Institutes of Health.

Abstract #: 175

Session: Poster

The Effects of Dual-Task Cognitive Interference on Balance in Huntington's disease

Authors: Nicollette L. Purcell¹ (Rush), Jennifer G. Goldman (Rush) , Bryan Bernard (Rush), Joan A. O'Keefe (Rush)

Introduction: Huntington's disease (HD) is a progressive, autosomal dominant neurodegenerative disease caused by an expanded CAG repeat (>40) in the gene for the huntingtin protein (HTT). As HD progresses, individuals experience loss of automaticity of motor behaviors. Motor symptoms range from mild coordination deficits, to choreiform movements and akinesia. Additionally, cognitive deficits occur and individuals can experience difficulty holding, shifting, and dividing attention. Motor dysfunction contributes to progressive balance deficits and falls. However, the extent to which cognitive deficits exacerbate balance dysfunction in HD is unknown.

Objective: Dual-task (DT) cognitive-motor paradigms have the capacity to reveal impairments not present under single-task (ST) and exacerbate existing impairments by creating competition for limited neural resources. Information collected from DT assessments and balance performance provide important information about fall risk in HD patients. The goals of this study were to determine the impact of DT interference on postural control in HD.

Methods: 17 Subjects with HD (55 + 9.7 years), and 17 age-matched controls (56.5 + 9.3 years) underwent IRB-approved quantitative balance testing with the APDM inertial sensor system. Informed consent was obtained for all participants. Balance testing included instrumented postural sway (i-SWAY) tests where stance (feet apart/together), vision (eyes open/closed), surface (firm/foam), and cognitive demand (ST/DT) were manipulated. DT conditions consisted of performing a concurrent verbal fluency task. A complete battery of neuropsychological assessments was also administered to measure attention, response inhibition, working memory, verbal fluency, delayed recall, and visuospatial ability.

Results: HD subjects exhibited significantly greater total sway, total jerk, and sway variability under all conditions, including ST and DT, compared to controls. Additionally, they exhibited significantly greater DT costs (DTC) during eyes closed conditions for total sway area ($p = 0.01$) and variability ($p = 0.02$). Spearman's correlations revealed low visuospatial performance correlated with greater total sway area ($p = 0.0097$) and total jerk ($p = 0.0087$) under eyes closed conditions.

Conclusion/Significance: HD subjects have difficulty maintaining postural control under DT, especially when proprioception and vision is limited. This information may be useful in designing motor and cognitive strategies to improve balance and prevent falls in HD.

Abstract #: 176

Session: Poster

Pilot Validation of the Sensory Assessment for Neurodevelopmental Disorders (SAND) in Fragile X Syndrome

Authors: Michael Seidman (Rush), Elizabeth Berry-Kravis (Rush)

Introduction: Fragile X syndrome (FXS) is a neurodevelopmental disorder affecting 1:4000-5000 individuals and represents the leading genetic cause of autism and intellectual disability worldwide. Sensory abnormalities are a clinical feature of FXS and contribute to the quality-of-life burden borne by caregivers. Because there are no known biomarkers for FXS disease state, behavioral assessments are often used to evaluate outcomes in clinical trials. The Sensory Profile is currently the gold-standard such assessment of sensory symptoms in FXS, but is subject to inconsistency as it relies exclusively on caregiver reporting.

Objective: The Sensory Assessment for Neurodevelopmental Disorders (SAND) is a novel assessment of sensory symptoms combining a clinician-administered observation and structured caregiver-interview. The present study piloted the SAND in a FXS population as part of an ongoing IRB-approved initiative to develop new FXS outcome measures.

Methods: Individuals with FXS were recruited from the Rush Fragile X Clinic (n=8) along with a sample of typically developing (TD) peers (n=3). With informed consent, the SAND was administered to each participant. Additionally, the Sensory Profile Short Form (SSP) was completed for FXS subjects. SAND scores for FXS and TD groups were compared using the Student's t-test. Correlation analysis was performed for the SAND and corresponding SSP scores in the FXS group.

Results: A significant difference in SAND performance was found between FXS and TD groups for total SAND scores ($p=0.003$), and for observed ($p=0.001$), reported ($p=0.007$), hyporeactivity ($p=0.015$), seeking ($p=0.005$), visual ($p=0.050$), tactile ($p=0.050$), and auditory ($p=0.024$) subscores. No significant difference was observed for hyper-reactivity sub-scores. A negative correlation was found between total SAND and SSP scores in the FXS group ($r=-0.78$, $p=0.022$). A positive correlation between observed and reported SAND subscores was observed in the FXS group ($r=0.832$, $p=0.010$).

Conclusion/Significance: These pilot results show promise for the SAND as an instrument for sensory assessment in the FXS population. Since higher scores reflect greater abnormality in the SAND and less abnormality in the SSP, the observed negative correlation between SAND and SSP scores supports clinical validity. Correlation between SAND observed and reported subscores suggests internal consistency. This study indicates that additional, more extensive validation in a larger population is warranted.

Abstract #: 177

Session: Poster

Impaired empathic accuracy in individuals with schizophrenia but no individuals at high clinical risk of psychosis

Authors: Parnika Telagi (UIC) Kristen M. Haut (Rush) Erin Guty, (Pennsylvania State University) David Dodell-Feder, (Rochester University) Abhishek Saxena (Rush) Sarah Pridgen (Rush) Briana Galindo (Rush) Christine I Hooker (Rush)

Introduction: Empathy, the ability to understand and share the subjective emotional states of others, is crucial for social functioning and relationships between individuals. Current research suggests that empathy is impaired in individuals with schizophrenia and that they show impairments in social functioning and interpersonal relationships more broadly. However, the direct impact of impaired empathic ability on their social functioning is unclear, as is whether this impairment occurs prior to the onset of the disorder.

Objective: This study aims to compare the empathic accuracy of individuals at clinical high risk for psychosis and individuals with schizophrenia to controls.

Methods: This study included 45 healthy individuals, 37 individuals determined to be at a clinical high-risk for psychosis, and 44 individuals with a diagnosis of a schizophrenia-spectrum disorder. Subjects completed an empathic accuracy task where they were asked to make inferences about the naturalistically occurring emotions of individuals as they recalled autobiographical events. Subjects continuously rated what they thought the emotions of the individuals recalling the events were and were then scored for accuracy using the person's self-reported feelings. An ANOVA was conducted to assess for group differences in empathic accuracy performance.

Results: ANOVA shows a significant group difference ($F=19.323$, $p<.001$) in overall empathic accuracy performance. Using the Tukey HSD, this significant effect was shown to be driven by differences between the schizophrenia and the clinical high-risk groups and between the schizophrenia and control groups. The average correlation for the schizophrenia group was .493 whereas the clinical high-risk and control groups showed correlations of .698 and .689 respectively (higher correlation indicating greater concordance between subject and target). There was no significant difference between the control and the clinical high-risk groups.

Conclusion/Significance: Individuals with schizophrenia had significant impairment on empathic accuracy. On the other hand, individuals with clinical high-risk for psychosis did not show any impairment compared to a healthy control sample, which suggests that impairments on empathic accuracy may become apparent after the onset of the disorder. Further research will assess the relationship between empathic accuracy and real-world social functioning in individuals with and at-risk for psychosis.

Abstract #: 178

Session: Poster

Health Literacy and Length of Stay in Stroke

Authors: Wendy Tian (Rush Medical College) Lakshmi Warrior (John H. Stroger Jr. Hospital of Cook County)

Introduction: Health literacy is defined as the capacity to obtain, process, and understand health information. It is a necessary component of successful care of patients with chronic conditions. Little is known about the extent to which health literacy affects patient outcomes.

Objective: We sought to investigate the impact of health literacy on length of stay and NIHSS score for stroke patients admitted to a large urban public hospital.

Methods: We performed health literacy testing to patients admitted for stroke from June 1, through August 1, 2017. We administered the short form of the Test of Functional Health Literacy in Adults (s-TOFHLA) to determine health literacy for English-speaking patients identified as potential stroke who consented to testing. We reviewed the patients' chart to obtain demographic data, as well as initial NIHSS and length of stay.

Results: A total of 20 male patients (67%) and 10 female patients (33%) participated in health literacy testing. The average age was 56 years (SD 13.3) and 27 patients (90%) identified as Non-Hispanic Black. Six patients (20%) were uninsured and 22 patients (73%) were covered by Medicaid/Medicare. Ten patients (33%) were classified as having inadequate health literacy and 20 patients (67%) were classified as having adequate health literacy. The average length of stay for patients with inadequate health literacy was 5 days compared to 1.33 days for those with adequate health literacy ($P = .0153$). The average NIHSS for patients with inadequate health literacy was 5.6 compared to 3.5 for those with adequate health literacy ($P = .0275$).

Conclusion/Significance: Health literacy could contribute to how patients interpret symptoms, navigate care, and participate in treatment evaluation and decision-making. Lower levels of health literacy may lead to worse clinical health outcomes, longer stays and higher NIHSS scores, for patients admitted with stroke and requires further study.

Abstract #: 179

Session: Poster

Use of dual-task paradigm to detect gait disturbances in Fragile X-Associated Tremor/Ataxia Syndrome (FXTAS) premutation carriers vs. controls

Authors: Timothy Yung (Rush Medical College, RUMC), Nicolette Purcell (Dept of Cell and Molecular Medicine, RUMC), Deborah A. Hall (Dept. of Biochemistry, RUMC), Joan A. O'Keefe (Dept. of Cell and Molecular Medicine, RUMC)

Introduction: Premutation carriers between 55-200 CGG trinucleotide repeats in the FMR1 gene are at risk for developing FXTAS, a neurodegenerative disorder characterized by cerebellar gait ataxia, balance deficits, and impaired cognitive function. We explore previously determined measures of gait indicative of FXTAS under renewed power using dual-task paradigm to elicit greater sensitivity in cognitively taxing conditions.

Objective: To examine the effects of the dual-task (DT) testing paradigm in premutation carriers of the fragile X mental retardation (FMR1) gene.

Methods: 51 subjects, 24 premutation carriers with FXTAS and 27 healthy matched controls, underwent instrumented gait tasks using mobile inertial sensors (APDMTM; Oregon). Gait tasks included a 2-minute walk exercise under self-selected (SS) and fast as possible (FAP) speeds as well as under the dual-task (DT) testing paradigm. Mann Whitney U and unpaired t tests were used to determine statistically significant associations.

Results: FXTAS subjects had marked deficits in stride length, velocity, and turning time ($0.002 > p < 0.014$). These deficits were associated with all three testing conditions (SS, FAP, and DT) with pronouncement under DT conditions. Turn time in the FXTAS subjects was also significant for increase over controls ($p < 0.011$) in DT conditions. Gait analysis revealed significant increase in double support time and stance time ($p < 0.03$) under FAP conditions with corresponding decrease in swing time ($p < 0.03$).

Conclusion/Significance: Use of dual-task testing paradigm to cognitively engage test subjects can exacerbate gait function in FXTAS individuals. This testing paradigm utilizes known cognitive function deficits in FXTAS subjects to confirm markers of fall risk, their significance, and add new markers that can be used in the assessment of FXTAS.

Abstract #: 180

Session: Poster

Exotic Properties of a Voltage Gated Proton Channel in the Snail *Helisoma trivolvis*

Authors: Deri Morgan (Rush), Vladimir V. Cherny (Rush), Sarah Thomas (Kennesaw), Susan M.E. Smith (Kennesaw), and Thomas E. DeCoursey (Rush)

Introduction: Voltage gated proton currents, HV1, were first reported in snail neurons (*Helix aspersa* and *Lymnaea stagnalis*). These H⁺ channels open very rapidly, 2-3 orders of magnitude faster than mammalian HV1.

Objective: We wanted to discover a proton channel gene in a snail and determine its properties.

Methods: We identified an HV1 gene in the snail *Helisoma trivolvis* and expressed it in mammalian cells.

Results: The resulting HtHV1 currents in most respects resembled those described in other snails, including rapid activation. In contrast with most HV1, activation of HtHV1 was exponential, suggesting first-order kinetics. Also consistent with first order kinetics, Tact and Ttail overlapped at intermediate voltages and the voltage at which the gating time constants were slowest occurred at the midpoint of the gH-V relationship. However, the large gating charge of ~5.5 e0 and the existence of extensive predicted coiled-coil regions in the C terminus both suggest that HtHV1 functions as a dimer, but evidently with more highly cooperative gating than exists in other species. In stark contrast with mammalian HV1, HtHV1 opening is extremely sensitive to pHo whereas closing is nearly independent of pHo. All known HV1 exhibit Delta-pH dependent gating that results in a 40 mV shift of the gH-V relationship for a 1 unit change in either pHo or pHi. This property, called Delta-pH dependent gating, is crucial to all of the functions of HV1 in many species and in numerous human cells. The HtHV1 channel exhibits normal or supernormal pHo dependence, but anomalously weak pHi dependence. The average slope of the pHi dependence is 15 mV/unit between pHi 5 and 9, with pHo 7.

Conclusion/Significance: Evidently, HtHV1 has distinct internal and external pH sensors. The anomalous Delta-pH dependent gating of HtHV1 channels provides clues to the structural basis for this important property.

Abstract #: 181

Session: Poster

Analysis of Recruitment Methods for a Patient-Centric Trial

Authors: Kirsten Hendrickson (Rush), Raj C Shah, MD (Rush)

Introduction: Recruitment is a hurdle for clinical trials. Aspirin Dosing: A Patient-Centric Trial Assessing Benefits and Long-term Effectiveness (ADAPTABLE) used a combination of USPS mailings, e-mails, and phone calls for recruitment at Rush. Enrollment required participants to log-in to a website for informed consent and study questionnaires. There is also a non-internet option. Enrollment was designed to be self-directed, only requiring a contact from the recruiting institution to introduce the study.

Objective: Analyze the recruitment methods used in the ADAPTABLE study to see if there are any patterns that may inform the recruitment strategy of future trials.

Methods: The ADAPTABLE study was approved by the Chicago-Area Institutional Review Board (CHAIRb). A computable phenotype (CP) was used to find all eligible participants in Rush's electronic medical record. The list was reviewed to confirm eligibility and providers were contacted to allow an opportunity for them to review eligibility. Remaining participants were assigned a study ID and sent a letter with instructions for self-enrollment by USPS or email, followed by phone calls. After three unreturned calls, participants were listed as 'Calls Completed' and no further attempts were made. All contact attempts were tracked.

Results: The CP returned 7430 potentials, 4723 were eligible and were sent to be reviewed by a provider. 4430 participants remained after provider review. 2719 potentials have been contacted. Of those, 2.3% have enrolled, 43.6% have refused, 30.3% are 'Calls Completed,' 7.5% are unable to be contacted, 3.8% are deceased, and 0.5% are ineligible. 12.0% are pending. 2053 emails, 1437 USPS letters and 7761 phone calls have been completed for a combined total of 11251 touches. On average, participants who refused received 3.8 touches, enrolled participants received 5.6 touches, and 'Calls Completed' participants received 5.2 touches. To reach any endpoint required 4.2 touches on average. The enrollment rate is 2.2%. The average age of all contacted was 69, of all enrolled was 65, of one-touch enrollment 59, of refused was 70.

Conclusion/Significance: Enrollment required more touches than designed to reach a point where participants felt comfortable completing online enrollment. Target population and preferences need to be considered when designing a study and recruitment strategy.

Abstract #: 182

Session: Poster

Long-Acting Reversible Contraception Knowledge, Attitudes, and Practice Patterns Among Healthcare Providers in Chicago

Authors: Camille Johnson, BS (Rush), Jessica Madrigal, MS (Stroger, Cook County), Juan Aparicio, MD, MBE (Stroger, Cook County), Kelly Stempinski, MPH (Stroger, Cook County), Ashlesha Patel, MD, MPH (Northwestern; Stroger, Cook County)

Introduction: Though long-acting, reversible contraceptive (LARC) methods are reliable, safe, and cost-effective, prior studies have demonstrated knowledge gaps and low LARC utilization among some providers. These gaps span multiple healthcare specialties, creating barriers for patients seeking LARC. Providers from different specialties have never been studied simultaneously, and to our knowledge, an assessment of knowledge of contraceptive implants in addition to the multiple brands of intrauterine devices (IUDs) across different medical disciplines has not been conducted.

Objective: The objective of this study was to assess LARC knowledge, attitudes, and usage patterns among healthcare providers in the Chicago area.

Methods: We conducted a cross-sectional evaluation of healthcare professionals attending a regional LARC training in Chicago, IL during the study period. Age, sex, race, medical specialty, and job title were self-reported. Participants rated their experience, comfort, and skills with all LARC methods using a series of yes, no, not sure questions. Responses to the survey were summarized using frequencies and percentages. Analyses were completed using SAS 9.4. This evaluation was designated as exempt by the Cook County Health and Hospital System Institutional Review Board.

Results: A total of 126 practicing medical providers attended our trainings. The majority of participants were resident physicians (n=86; 68.2%). Other attendees included attending physicians (n=14; 11.1%), midwives (n=5; 4.0%), nurse practitioners (n=15; 11.9%), and physician assistants (n=6; 4.8%). Family medicine was the most represented specialty (n=77; 61.1%), followed by OB/GYN, and pediatrics. Close to one-third of attendees had never attended any prior lectures or trainings on LARC devices or placements. 39% and 51% of attendees reported never inserting an IUD or implant, respectively, during their career. For all of the IUDs and the implant, providers felt more confident in their ability to counsel patients on the method, compared to their ability to place it.

Conclusion/Significance: Overall, a diverse array of medical providers participated in our evaluation. Providers had varied levels of experience using LARC, but it appeared that most attended to gain knowledge on patient counseling and training on how to place and remove the various methods. Additional training opportunities for providers may benefit women by increasing access to LARC methods.

Abstract #: 183

Session: Poster

Community-Level Economic and Racial Segregation and Premature Mortality in Chicago, 2011-2015

Authors: Brittney Lange-Maia (Rush), Fernando De Maio (DePaul), Elizabeth Avery (Rush), Elizabeth Lynch (Rush), Emily LaFlamme (City of Chicago), David Ansell (Rush), and Raj Shah (Rush)

Introduction: Substantial disparities in life expectancy exist between Chicago's 77 defined community areas, ranging from approximately 69 to 85 years. Prior work in New York City has shown that community-level racial and economic segregation as measured by the Index of Concentration at the Extremes (ICE) is strongly related to premature mortality. This novel metric allows for the joint assessment of area-based income and racial polarization.

Objective: The purpose of this work is to assess the relationships between racial and economic segregation with premature mortality in Chicago.

Methods: Annual age-adjusted premature mortality rates for deaths age <65 years from 2011-2015 were calculated using mortality data from the Chicago Department of Public Health. ICE measures for household income (<\$25,000 \geq \$100,000; ICEincome), race (non-Hispanic black vs non-Hispanic white; ICErace), and a combined ICE measure incorporating income and race (ICEincome+race) were calculated from 2015 American Community Survey 5-year estimates. ICE measures can range from -1 to 1, with positive values indicating greater extreme concentration of high income households and/or non-Hispanic white residents. Spearman correlations and negative binomial regression were used to determine the relationship between ICE and premature mortality.

Results: Annual premature mortality rates ranged from 94 (95% CI: 61-133) to 699 (95% CI: 394-1,089) deaths per 100,000 population age <65 years. Median ICE measures were as follows: ICEincome= -0.13 (interquartile range: -0.33 to 0.03); ICErace=0.11 (interquartile range: -0.87 to 0.40); ICEincome+race=0.1 (interquartile range: -0.35 to 0.14). Strong, negative correlations existed between each of the ICE measures and premature mortality (ICEincome $r=-0.76$; ICErace $r=-0.83$; ICEincome+race $r=-0.86$; $p<0.001$ for each). Compared to the highest ICE quintiles, communities in the lowest quintiles had significantly higher rates of premature mortality: ICEincome RR=3.06 (95% CI: 2.51-3.76); ICErace RR=3.07 (95% CI: 2.62-3.58); ICEincome+race RR=3.27 (95% CI: 2.84-3.77).

Conclusion/Significance: Combined economic inequity and white-black racial segregation are strongly associated with premature mortality in Chicago. ICE may be useful for describing and monitoring health inequities and identifying communities for interventions to reduce disparities in Chicago.

Abstract #: 184

Session: Poster

The Relationship between Short Interpregnancy Intervals and Abnormal Placental Cord Insertions

Authors: Whitney Lewandowski (Rush Medical College) Gary Loy MD MPH (Rush University Medical Center)

Introduction: In normal fetal development, the umbilical cord inserts into the central portion of the placenta, leaving space between the cord and the placental edge. When the umbilical cord inserts away from the central portion of the placenta, it is termed an abnormal placental cord insertion (PCI). Abnormal PCIs are classified by distance from the placental edge, and include marginal and velamentous cord insertions. The etiology of abnormal PCI is undetermined. Numerous studies have demonstrated that abnormal PCIs can result in adverse outcomes for both mother and baby. A short interpregnancy interval (the time between the birth of one child and the conception of another) has also been shown to result in poor outcomes.

Objective: This study aimed to determine if there is an association between short interpregnancy intervals and abnormal PCIs.

Methods: In this retrospective case-control study, the interpregnancy interval was calculated for women with known abnormal PCI's - velamentous and marginal cord insertions. The incidence of short interpregnancy intervals was also calculated for a group of controls with no placental pathology, and the results were compared and analyzed using the Fisher's exact test.

Results: There was a statistically significant association between short interpregnancy intervals (6 months or less) and velamentous cord insertions ($P=0.0469$) and no difference between short interpregnancy intervals and marginal cord insertions ($P=0.557$).

Conclusion/Significance: This data supports the importance of patient counseling on the spacing of pregnancies to avoid adverse outcomes potentially resulting from velamentous cord insertion, and provides further rationale for enhancing access to family planning and reproductive health services.

Abstract #: 185

Session: Podium Presentation - IMSD

Study of initiation of hypercholesterolemia in nephrotic syndrome.

Authors: Eduardo Molina-Jijon PhD (RUMC); Camille Macé (RUMC); and Lionel Clement PhD (RUMC)

Introduction: Nephrotic syndrome is a major component of human kidney disease, and patients with this condition develop large amounts of proteinuria and elevated levels of plasma lipids (triglycerides and cholesterol). Percentage of nephrotic syndrome patients that develop high levels of low density lipoproteins (LDL) is much more important than in the general population. We hypothesize that in nephrotic syndrome, the kidney directly plays a major role in the development of hypercholesterolemia. We showed that proprotein convertase subtilisin/kexin type 9 (PCSK9), a protein implicated in the pathogenesis of hypercholesterolemia in liver, is present in the kidney, especially in the cortical collecting duct (CCD). Its protein and mRNA expression are increased in a mouse model of collapsing glomerulopathy presenting nephrotic syndrome (Rrm2b mice). We showed that mouse collecting duct cells in culture express and release the active form of PCSK9 into the medium.

Objective: We want to study a potential role of kidney cortical collecting duct (CCD) secreted PCSK9 in the molecular mechanisms of the pathogenesis of hypercholesterolemia in nephrotic syndrome. Temporality between kidney and hepatic PCSK9 expression and serum cholesterol levels will be studied during the development of nephrotic syndrome in a mouse model of collapsing glomerulopathy presenting nephrotic syndrome. The proof of concept of the phenomenon will come from the use of generated PCSK9-CCD knock-out mice in which nephrotic syndrome will be induced.

Methods: We followed Rrm2b mice (IACUC 16-045) at 5, 8 and 11 weeks of age. We collected urine for 18 hours and measured proteinuria. We assessed plasma levels of cholesterol, and studied PCSK9 protein expression in glomerular cortex, liver and serum.

Results: In the Rrm2b mouse model of nephrotic syndrome, increased kidney CCD PCSK9 expression occurs in temporal correlation with the development of hypercholesterolemia. Furthermore, as disease progresses, PCSK9 expression is increased in glomerular cortex, but decreased in liver and serum.

Conclusion/Significance: A link between renal PCSK9 and hypercholesterolemia would be a novel and logical mechanistic component of nephrotic syndrome. This link could then become a therapeutic target to prevent the development of hypercholesterolemia in nephrotic syndrome.

Abstract #: 186

Session: Poster

Verification of a Novel Treatment Algorithm for Young Men with Erectile Dysfunction

Authors: Adam Wiggins BS (RUMC) Peter Tsambarlis MD (RUMC), Laurence A Levine MD (RUMC)

Introduction: Young men with erectile dysfunction (ED) represent a significant challenge for the practicing urologist, as little data exists regarding treatment options and outcomes. Our algorithm includes utilization of a nightly PDE-5i, sexual therapy, and the option to progress to more invasive treatment options pending a suboptimal response.

Objective: Our goal was to objectively verify the efficacy of our approach to these challenging cases.

Methods: After obtaining institutional review board approval and informed consent, seventy-three men were identified from a single urology practice who were 40 years of age or younger and carried the diagnosis code for ED. Those with Peyronie's disease were excluded. Upon initial presentation, these men completed a detailed questionnaire regarding their erectile health and medical history, which included an International Index of Erectile Function (IIEF) score. After a minimum of 6 months of treatment, patients were asked to complete a follow-up questionnaire which closely mirrored the initial survey, of which 33 men completed. Each parameter was evaluated individually, comparing initial data to post-therapy responses via a two-tailed t-Test.

Results: The mean age of men who completed the follow up questionnaire was 32.7 years (range 22-39). Post-therapy, 14/33 (42%) reported problems obtaining an erection compared to 62/73 (85%) prior to therapy. Overall, 19/33 (58%) of men reported satisfaction with their current erectile function. IIEF scores indicate a significant improvement in Erectile Function ($p < 0.01$), Orgasmic Function ($p = 0.01$), and Overall Satisfaction ($p < 0.01$). Desire and Intercourse satisfaction did not reach statistical significance.

Conclusion/Significance: With ED of psychogenic origin, increased anxiety is thought to inflict excessive adrenergic tone, thus limiting erectile capacity. The current series provides evidence that utilization of a nightly PDE-5i in combination with sexual therapy can overcome sympathetic inhibition. To our knowledge, this is the first treatment algorithm which has demonstrated efficacy via improved IIEF scores. Indeed, an improved erectile response may reduce anxiety levels associated with the prospect of failure, allowing for a more consistent erectile ability and heightened overall sexual satisfaction.