



Flint Campus  
College of Human Medicine  
**MICHIGAN STATE UNIVERSITY**

# Flint Community Research Forum

Poster Abstract Submissions

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In partnership with:



## **Aspiration Thrombectomy of Bilateral DVT in Management of IVC Atresia: A Case Report**

*Kimberly Corbitt, DO, Jennifer Baker, MD*

Inferior vena cava (IVC) atresia is a rare congenital anomaly which can cause unprovoked lower extremity deep vein thrombosis (DVT) in young patients. We report a case of a 24 year old female with a history of known IVC atresia and congenital absence of her left kidney presenting with bilateral iliac and lower extremity DVT. We discuss our management option for occluded bilateral DVT with known IVC atresia amendable to endovascular surgery.

## **Assessment of Social Determinants of Health on Chronic Disease Outcome in Patients at Downtown Flint Health Center.**

*Sophie Pokhrel, MD, Internal Medicine PGY3*

Social determinants of health is something that needs to be considered in everyday practice. The goal of this study was to determine which social determinant of health significantly likely impact chronic disease outcomes in patient at downtown Flint health center. A survey was given out during a patient's visit. They were given the consent form and survey in a folder. If they agreed to be in the study then they would fill the surveys out during their clinic visit. The results showed that the top three major social determinants of health in the Downtown Flint Health Center that were the most prevalent were currently unemployed, actively searching for a job, not feeling safe to drink water from their tap. The mean number of needs was 2.5 (SD: 1.7), the range was 0-12. There were 28.7% (n=109) of respondents had either 0 or 1 need. There were 71.3% (n=271) respondents who had 2 or more needs.

## **Association Between Environmental Factors and Gestational Diabetes in Flint Michigan**

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Background: Gestational diabetes mellitus (GDM) is a serious maternal complication in which women without diabetes develop hyperglycemia during the second half of the pregnancy. GDM affects both maternal and fetal outcomes; mothers are at higher risk for future type 2 diabetes and cardiovascular diseases development (reference), meanwhile infants are at increased risk of developing obesity and Type 2 diabetes in childhood (Plows et al 2018). There are many known predisposing factors such as obesity, history of diabetes, family history of gestational diabetes, and advanced maternal age (Plows et al 2018). Environmental factors such as food security seem to

be related to gestational diabetes, but results are mixed. Poor access to food and groceries has been associated with higher rates of GDM (Hojaji et al 2021, Yong et al 2021, Fong et al 2020, Kahr et al 2016, Young et al 2016), however there is also evidence that living in a food insecure area is associated with less GDM (Banner et al 2020, Kazemi et al 2020). Gestational diabetes is prevalent in the Flint, MI community, making it important to understand associations between built environmental variables and developing gestational diabetes. Flint is considered a food desert, with much of the city positioned more than one mile from the nearest grocery store.

**Methods:** This retrospective cohort study will consist of a chart review of all patients who delivered at Hurley Medical Center in Flint, Michigan who were diagnosed with GDM. Geographic information systems (GIS) maps can be used to show the prevalence and distribution of built environmental factors. We will be examining the following built environment variables: chronic health conditions, healthfulness, socioeconomic status, access to food, proximity to public transportation, incarceration rate and walkability. Study personnel will aggregate the data of pregnancy outcomes of subjects with GDM and compare them to zip code of residence, to assess for an association between built environmental factors and the occurrence of gestational diabetes in Flint, MI.

**Anticipated Results:** We anticipate results showing a relationship between GDM in any pregnancy and residency in a zip code with poor environmental factors such as low food security.

**Conclusion:** With this research, we hope providers will better understand environmental factors in GDM development amongst pregnant people and be able to better connect patients to resources in the community that limit their exposure to these factors.

## **Biomechanical Considerations for Computer Simulations of Femoral Neck Fractures Treated with Cannulated Screw Fixation: Mechanical Analysis of Iatrogenic Subtrochanteric Fracture**

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McLaren FLint, Kettering University,

**Background:** Femoral neck fractures are common with a bimodal distribution of younger patients suffering high energy events like MVC's while the elderly typically suffer a low energy event such as ground level fall. Such fractures require urgent assessment and treatment to restore the blood supply to the femoral head. Treatment typically involves the use of internal fixation devices to stabilize the bone until the fracture heals via bony union. One common fixation device is the use of 3 cannulated screws inserted in the neck and crossing the fracture plane. While this treatment has a high success rate, one complication described in the literature is an iatrogenic femoral fracture in the subtrochanteric region. While rare, this complication is devastating and requires additional assessment and treatment. It is hypothesized that the inferior starting point

creates a stress riser that initiates the subtrochanteric fracture. The objective of the current study is to conduct a systematic review of the literature to develop guidelines for computer simulations which can elucidate the state of the stress in the subtrochanteric region.

**Methods:** An extensive survey of the available clinical, experimental, and simulation literature was conducted to identify the current state of knowledge on the principles for the placement of the screws to treat a femoral neck fracture. The findings were synthesized within the context of developing a computer simulation to address the central research question.

**Results:** The use of cannulated screws began approximately 40 years ago. Shortly thereafter, there were clinical reports of iatrogenic subtrochanteric fractures in the early 1980's. In the coming years, it was confirmed that the three screws should be placed as a triad made up of an equilateral triangle with the apex pointing inferiorly. This position essentially optimizes the placement of the screws into the denser bone in the femoral head. Placing the screws parallel allows the fracture to compact during screw insertion and in the subacute stage of healing. It is also recommended to place the screws perpendicular to the fracture plane, however, shallow angle fracture planes (eg more horizontal), would necessitate a more valgus placement of the screws. Experimental studies show that this position, while optimized for fracture fixation and healing, caused an iatrogenic subtrochanteric fracture in 30% of cases with osteoporotic bone. This fracture did not occur in any experiments simulating healthy bone. This finding is relevant in light of the clinical reports which note that 90% of patients suffering iatrogenic subtrochanteric fractures are in patients older than 65 years of age. There is some controversy on the influence of extra holes that may be made during the surgical procedure and the influence of the height of the inferior most hole. A number of authors recommended the use computer simulations to compute the state of stress in the bone to provide insights not available via clinical or benchtop experimentation.

**Conclusion:** Computer simulations should focus on the analysis of the elderly since the complication is apparently limited largely to patients >65 years. One of the limitations of the experimental studies in the literature is variability in the specimens used in testing, ranging from cadavers to a variety of synthetic bone analogs. The loading is also variable to assess the mechanical stability. Simulations should subject the repaired construct to standing loads and AP loading to evaluate arising from a chair and stair ascension activities. These loading modes are considered realistic loading modes which challenge the integrity of the fixation construct. Screw patterns should all be the triad with the apex distal. A control simulation would represent the ideal position with the fracture plane aligned perpendicular to the screws. By decreasing the fracture plane angle, the screw pattern lateral starting points would move inferiorly, thus evaluating bone stresses for an inferior screw. An additional simulation could add a fourth, distal hole to the control simulation. This additional hole would represent the creation of an inadvertent inferior hole that was abandoned once it was discovered it was too inferior. This low screw hole could then be studied by filling it with a screw or

nothing. Collectively, these simulations would help elucidate the influence of the distal most screw on the iatrogenic subtrochanteric fractures.

## **A Case of Myocarditis Post COVID-19 Vaccination**

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Analyses of CDC vaccine data show an increased risk of myocarditis events after vaccination with mRNA COVID-19 vaccines compared with unvaccinated individuals or individuals vaccinated with non-mRNA COVID-19 vaccines. In this case study, we discuss the case of an adolescent who presented with myocarditis post mRNA vaccination. In published case reports, supportive care, NSAIDs, steroids, and colchicine were the mainstay of therapy. Among various published case reports and case series of myocarditis after COVID-19 vaccination, all individuals were hospitalized and monitored clinically. One hundred percent of the patient's symptoms resolved.

## **Characterization of Bioimpedance Measurements of the Knee in Healthy, Young Subjects**

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**Introduction:** No clear set of criteria determines when an athlete has recovered sufficiently from a knee ligament injury and can return to play. There is, however, a broad consensus that joint effusion should be minimal to none. Therefore, successful patient management relies on a clinician's assessment of post-operative swelling in the lower limb. One tool that can be used to make an objective measure of swelling is a bioimpedance meter. Single frequency bioimpedance (SFBI) measurements provide resistance and reactance measurements by delivering a weak 50 kHz current across the body. The resistance is associated with the amount of extracellular fluid present in the sensing region and the reactance refers to the delay in conduction due to cell membrane or tissue interfaces. Studies have suggested that bioimpedance may be helpful in monitoring healing in athletes, but there is limited data identifying healthy baseline numbers. Therefore, the purpose of this study is to document knee bioimpedance measurements in healthy, young subjects along with a clinical knee function score that can be used in monitoring knee injuries in younger patients.

**Methods:** All eligible subjects were asked to self-report sex, age, height, weight, and limb dominance as well as complete a Knee Injury and Osteoarthritis Score (KOOS Jr.). This survey is commonly used to evaluate knee pain and function in orthopedic patients and consists of 7 questions, with a maximum score of 28 points indicative of excellent knee function. Knee bioimpedance was measured using a RJL Systems Quantum

Legacy Body Composition Analyzer with distal electrodes placed on the dorsum of the foot beneath the second and third digits and on the ankle bisecting the medial malleolus. Proximal electrodes were placed midway between the greater trochanter and proximal pole of the patella and 10 cm distal to this location. Additionally, thigh circumference measurements of both legs were taken.

Results: Similar to previous studies, our data verified that women tend to have significantly greater resistance values compared to men and, therefore, have greater overall bioimpedance values (Table 1, poster). For subjects of all ages, there was a slight decline in the impedance values with increasing age and BMI. Additionally, higher KOOS Jr Scores were indicative of higher impedance values, with this trend more pronounced in the data from women. A predictive model for limb to limb percent difference in bioimpedance, obtained using multiple linear regression, indicated sex and KOOS were significant predictors with p-values of 0.027 and 0.012 respectively with an overall power of 92.7%.

Discussion: The subject KOOS Jr Score and sex were associated with the limb to limb percent difference in bioimpedance, with women showing greater limb to limb differences with lower KOOS Jr scores, indicative of worse knee function. This suggests that using the patient's uninjured contralateral limb as a target for assessing baseline swelling may not be appropriate. This also suggests that chronic swelling may be a factor in subjects with lower KOOS Jr scores. This effect was less obvious in the data from men, which may reflect a difference in physiology or may be due to the relatively small sample size for this study. Further data collection and analysis are planned. These may help define how to best utilize bioimpedance and KOOS Jr scores when determining an athlete's ability to return to play after an ACL injury.

## **COVID-19 Vaccine Hesitancy in Black Pregnant People**

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Background: The COVID-19 pandemic has continually shed light on the disparities that exist among different populations within the United States. COVID-19 has disproportionately caused negative health effects on Black people and pregnant people when compared to their white and non-pregnant counterparts. Current literature also suggests that vaccination rates have been lower for each of these populations despite the increased risk the virus confers. This study aims to better understand COVID-19 vaccine hesitancy at the intersection of these two groups. The objective of this study is to better understand whether COVID-19 vaccine hesitancy is more common among Black pregnant people than non-Black pregnant people and assess barriers to COVID-19 vaccination for Black pregnant people using the Health Belief Model.

**Methods:** The study will use an online anonymous survey distributed via QR code on flyers to individuals on the postpartum unit at Hurley Hospital. This survey was created by the study personnel to assess whether or not pregnant people received any COVID-19 vaccine, the reasons for either accepting or denying vaccination during pregnancy, and where participants received vaccination information. The study will take place for 2-3 months and all participants will voluntarily participate. We hope to have 200 participants. Once data is collected, study personnel will analyze the data for associations between patient characteristics and reasons for vaccination hesitancy.

**Anticipated Results:** Our next steps for this study are to begin the rollout of our survey and collect data at Hurley Medical Center pending IRB approval. Our anticipated results are that Black pregnant people will have more COVID-19 vaccine hesitancy than non-Black pregnant people, and that reasons cited for this hesitancy will differ from those cited by non-Black pregnant people.

**Conclusion:** With this research, we hope providers will better understand reasons for COVID-19 vaccine hesitancy among Black pregnant people so barriers and misinformation can be addressed directly and vaccination promotion can target the specific barriers patients face.

## **Crash Characteristics for Classic/Historic Vehicles and Comparisons for Newer Vehicles**

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**Purpose:** There has been an overall decline in the number of vehicle deaths in the last 20 years in the United States which has been attributed to road design, car design, and laws. Despite these conditions continuing to improve, older-style vehicles with less-than-optimal safety systems continue to share the roadways with newer vehicles. These older vehicles are commonly referred to as “classic,” “vintage,” or “historic” vehicles (CVH). Special events and organizations across the United States (US) allow owners of this CVH to share their common interests and love of these vehicles, however, there are no recommendations on the safe operation of these vehicles to reduce the risk of severe injury or fatality. There is some data to suggest that the risk of fatality is higher for occupants in older vehicles involved in crashes, however, there is no study examining the frequency and typical conditions for crashes involving CVH. This study seeks to evaluate the crash frequency, crash event characteristics, and occupant factors related to fatality risk for crashes involving CVH vehicles.

**Methods:** This study utilized information from crashes occurring in 2012 to 2019 to estimate fatal crash rates for vehicles grouped by model-year deciles. Data from

crashes occurring in 2016 to 2019 were utilized to examine roadway, temporal, crash type factors associated with crashes involving CVH. The CVH group was defined as passenger vehicles from the production year 1970 or earlier. This data was extracted from three data sets maintained by the National Highway Traffic Safety Administration (NHTSA): Fatality Analysis Reporting System (FARS), the National Automotive Sampling System (GES), and crash Report Sampling System (CRSS). All fatal crashes in the US are recorded in the FARS sample and overall crash incidence was estimated using weighting factors in the GES/CRSS data. The incidence of fatality, or risk of a range outcomes, were compared to the risk in newer vehicles using relative risk. A chi-square test (or Fishers Exact test when case counts were below 5 for CVH) was used to identify statistically significant differences in frequencies of events between CVH and newer vehicles.

Results: An estimated 0.2-0.6% of crashes involve CVH. The relative risk for fatality in CVH compared to newer vehicles ranged from 4.73 (95th CI: 3.39-6.60) for impacts with other vehicles, which was the most common crash, to 19.95 (12.33-18.12) for rollovers. When considering road and environmental conditions, most crashes occurred in dry weather, 2 lane roads, roads with speed limits between 30 and 55 mph, and during summer months. Factors that increased the risk of fatality for occupants in CVH included alcohol use, lack of seat belt use, and older age.

Conclusions: Crashes involving a CVH are a rare event but continue to have catastrophic consequences when they do occur. Multiple roads, environmental, and occupant risk factors were found to increase the risk of fatality when involved in a crash while operating a CVH. These findings can help identify, predict, and prepare for these unfortunate events and provide recommendations for the safe operation of these vehicles.

## **The Differential Diagnosis of Retropharyngeal Fluid: Calcific Tendinitis of the Longus Colli Muscles**

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The differential for acute neck pain, fever and photosensitivity is vast. Due to the low incidence of Acute Calcific Longus Colli Tendonitis, this diagnosis takes a back seat to more common pathologies such as meningitis, retropharyngeal abscesses, neoplasia and more.

With such minor differences between these differentials, being able to identify ACTLC in the proper situations expedites patient care, decreases the diagnostic timeline and tailors treatment plans to the conservative approach that this diagnosis constitutes.

## **Does Retensioning of Adjustable Loop Cortical Suspension Devices Improve Performance: A Systematic Review and Meta-Analysis**

*Seth Campbell MD, Matthew Sardelli MD, Theresa Atkinson PhD*

**Background:** To date, there is conflicting evidence when comparing fixed loop cortical suspension devices (FLD) to adjustable loop devices (ALD). There is some evidence that ALD are inferior to FLD in regard to displacement and failure load while other studies show that they are biomechanically similar. Most clinical comparisons include adjustable loops that are retensioned while most biomechanical studies have non retensioned ALD.

**Hypothesis/Purpose:** The purpose of this study is to use a meta-analysis of biomechanical data to compare FLDs to ALDs with and without re-tensioning to determine whether re-tensioning the device can recapture some displacement and make it biomechanically equivalent to the FLD. It is hypothesized that re-tensioning the ALD will allow these devices to be biomechanically equivalent to the FLD in total unloaded displacement and failure load.

**Study Design:** Meta-analysis and Systematic Review

**Methods:** This study sought to identify all biomechanical studies that compared fixed loop to adjustable loop devices. A meta-analysis was performed to find the standardized mean difference with retensioning as a covariate.

**Results:** In the animal bone (ABM) displacement analysis there was a significant difference between the non-retensioned ALD and the FLD ( $p=0.018$ ). There was no significant difference between the retensioned ALD and the FLD ( $p=0.995$ ). When comparing the non-retensioned ALD to the retensioned ALD there was no significant difference ( $p=0.317$ )

**Conclusion:** In conclusion, retensioning adjustable loop devices improves their biomechanical performance and allows ALD to perform similar to FLD in animal model studies

## **Effect of Hydroxyurea (HU) on Cardiac Function in Children with Sickle Cell Disease (SCD): A Review of Studies**

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**Background** HU decreases the severity of anemia in patients with SCD by reducing the degree of hemolysis and the frequency of vaso-occlusive crisis in both children and adults. Chronic anemia and hemolysis have been shown to affect the cardiac function

negatively; the main cause of mortality in SCD patients. The aim of this review is to update our knowledge on available evidence and evaluate whether the early initiation of HU in children with SCD may yield any benefit in the prevention of its cardiac complications.

In this review, we searched Pubmed publications from 2009 using the keywords “Echocardiography”, “sickle cell” and “child”. Of the 101 articles, 48 articles matched our question. We narrowed the search further by adding “Hydroxyurea” as another keyword and ended with 19 articles. Three reviews, a meta analysis, and a case report were excluded. One study published online in 2021 was added that partially answered our question. 11 articles discussed the relation between cardiac parameters and HU use which were included in this review. Of these, six measured the tricuspid regurgitation velocity (TRV) as a pulmonary hypertension marker, but only 2 of them showed significant TRV reduction as the result of HU administration. 1. 2. One study failed to detect the protective effect of HU on cardiac remodeling. 3. The remaining 3 studies either showed no statistical significance of the results or did not directly study the correlation between HU and cardiac dysfunction. 6 studies measured different sets of cardiac parameters such as left ventricular size, mass and function. Only 3 studies measured the direct effect of HU on cardiac parameters and compared to those not on HU. Faro et al demonstrated absence of left ventricular hypertrophy only in patients who took high doses of HU. Montalembert et al reported abnormal myocardial perfusion scans in >50% of SCD patients. However, 2 of 8 patients who took HU for 6 months showed improvement. In Dhara et al’s report, LVEF, LV dilation and LV mass all improved with HU when compared to baseline. The remaining 3 studies showed no HU effect due to the small sample size on HU. 4,5,6

Conclusion: Recent studies that focused on the assessment of the correlation between cardiac remodeling and HU administration have shown beneficial HU effects. Prospective longitudinal studies are needed to assess HU effects on the ventricular mass, function and strain and to determine if it can prevent and/or reverse the cardiac damage resulting from SCD.

## **The Effect of Transition Times from IV to Oral Diuretics at the Time of Discharge on the Readmission Rates Secondary to Congestive Heart Failure for Patients Treated and Admitted at a Medium Sized Community Hospital in Michigan.**

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Introduction:

In 2012 over 5.7 million Americans had a diagnosis of heart failure, that number was projected to increase to more than 8 million by 2030. (6, Ziaeeian) In 2012 the total

medical cost of heart failure was more than 20 billion dollars and by 2030 the cost is predicted to increase to greater than 50 billion dollars. (3) 80% of the costs attributed to heart failure are related to hospitalization. (3) From 2009-2012 the rate of readmission for heart failure was over 20% per Medicare fee for service beneficiaries. (2) These readmission rates lead to a huge monetary burden on hospitals. Research is ongoing regarding what factors or parameters can predict increased risk of heart failure readmission.

Heart failure is caused by a dysfunction in the heart structure and function leading to a depressed cardiac output. (3). The dysfunction can be due to underlying coronary artery disease, hypertension, diabetes mellitus, obesity, cardiomyopathy, pericardial diseases, and valvular diseases to name a few. These conditions can lead to depressed cardiac output and increased filling pressure in the left ventricle which subsequently cause symptoms of fluid overload. Patients with heart failure will present with shortness of breath at rest, shortness of breath with exertion, lower extremity swelling or edema, shortness of breath with lying flat in bed or orthopnea.

In patient's being admitted to the hospital for fluid overload or exacerbation of heart failure, diuretics are the main medication for symptom control and fluid removal. There are no formal guidelines regarding optimal duration of diuretic administration. After IV diuretics have been discontinued, observation in the hospital on PO diuretics for > or = 24 hours is a goal prior to discharge, but this goal is not always achieved. In my research there is not a lot of evidence confirming that the 24-hour observation goal is achieved and how that goal affects readmission rates. As diuretic medications are the main symptom controlling medication giving to patients admitted with heart failure, a closer evaluation of the observation period as well as PO diuretic dosage would be appropriate.

A study published in Journal of Cardiac failure, in 2017 performed at a University of Maryland School of Pharmacy at a large academic hospital looked at a total of 123 patients with a primary outcome of 30-day readmission in patients observed on PO diuretics for <24 hours and on those observed on PO diuretic for >24 hours. My study aims to add to the literature by looking at sample from a medium sized community hospital and looking into 30-day as well as up to 90-day readmission or not at all.

Many other studies have looked into other causes of readmission including medication non-adherence, patients not being discharged on guideline directed therapy, but in my research, I was unable to find any other data regarding optimal IV to PO diuretic transition timing.

Methods:

This is a retrospective chart review of all patients with history of CHF admitted from January 2018 to October 2020 in a medium sized community hospital that are admitted for treatment of acute exacerbation of CHF.

All adult patients of both genders of all ethnic backgrounds will be included. Patients 18 years and older. An equal number of patients will be selected and allocated into two groups, patients with <24-hour observation of PO diuretic group and 250 patients in the > or = 24-hour observation of PO diuretic group and the patients will be analyzed to look into the outcome of readmission within 30 days and within 90 days or no readmission. I will be measuring and looking into the patient's length of stay during initial hospitalization, co-morbid diseases, labs including: Creatinine, BUN, GFR, (pro)BNP: from initial admission day. Length of treatment of oral (PO) diuretic prior to initial hospital discharge. We will also be recording timing of readmission; within 30 days or within 90 days.

Analysis will be performed by comparing rate of remission between the two groups using Chi square analysis and the magnitude of difference calculated with the odds ratio. The goal is a total of 500 (250 per group) will be made to test a 22% relative reduction in readmission rates from a baseline of 30% readmission rates and will achieve a 90% or greater power at  $p=0.05$  significance.

Complete results are pending completed data retrieval and analysis.

Discussion: In this research study, collection of data required extensive assistance of information systems which proved extremely difficult. Patient criteria was not fulfilled via information systems on numerous occasions and information was initially incorrect which resulted in an inability of the investigator to obtain enough patient information to fulfill a total of 500 patient requirement for statistical significance. The information is not generalizable as the patient data was collected from one medium sized community hospital in Michigan. Parameters should have been evaluated to assess for optimization of heart failure symptoms.

Additional research is needed to establish if patients who are symptomatically optimized on IV diuretics and transitioned to orals should be required to be observed in hospital for >24 hours and the association with readmission rates. Larger sample size should be analyzed to achieve a 90% or greater power. Diuretic dosage and optimal symptom control parameters should be analyzed in the future.

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## **Gastrointestinal Involvement with Vasculitis; A Rare and Difficult Distinction Between Intestinal Tuberculosis and Inflammatory Bowel Disease**

*Daniel Ramirez, DO, Mark Minaudo, DO*

Gastrointestinal involvement is common with various types of vasculitis. The diagnosis may be difficult to obtain as presentation can mimic Inflammatory Bowel Disease and infectious enteritis. We describe a 43 year old female with a history of international travel and therapy for Tuberculosis (TB) who presented with signs and symptoms of Inflammatory Bowel Disease (IBD). Lower endoscopy revealed circumferential ileal inflammation with biopsies ruling out Crohn's Disease and microorganisms. Serology and kidney biopsy reveal P-ANCA positive Crescentic Glomerulonephritis and, despite the risk of TB dissemination, this patient was treated with plasmapheresis, steroid taper and mycophenolate.

## **Healthcare Experiences among LGBTQ+ People**

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Background: It is estimated that about 3.5% of adults in the U.S. identify as Gay, Lesbian, or Bisexual (3), and about one million identify as transgender (5). Members of the LGBTQ community are more likely to face barriers to care than other groups, for example, LGBT adults were more likely to be uninsured compared to the general population (1). The history of discrimination and lack of cultural competence among healthcare providers has contributed to the many healthcare disparities experienced by these communities. Physicians' behaviors and biases impact care delivery; a study in 2015 found that heterosexual providers' implicit preferences always favored

heterosexual people over lesbian and gay people (6). In this study, we intend to highlight perceptions and experiences of LGBTQ adults during encounters with their healthcare providers in Michigan. Specifically, we focus on how patients decide to express gender, and on the physicians' attitudes and actions towards their LGBTQ patients.

**Methods:** The data was collected in two waves via a novel survey that yielded 214 responses. Adults age 26 and older, who self-identified as LGBTQ and lived in the greater Lansing, Michigan area were invited to participate. Wave 1 launched on May 6th, 2020, and Wave 2 launched on May 18th, 2020, and closed on July 31st, 2020. Wave 2 was used to diversify the sample based on race/ethnicity. For recruitment, we utilized community partners, including churches, academic settings, local clinics, and organizations that work with the LGBTQ community to help with recruitment.

**Results:** When respondents asked how often they worried about being negatively judged by a health provider, 11.3% reported always, 25.8% said most of the time, 36.6% some of the time and 26.3% said never/hardly ever. 51.5% of respondents reported expressing their gender differently while 48.4% did not. When asked how "How often have health providers refused to treat you?" 46.0% of respondents said never/hardly ever, 26.6% said some of the time, 16.4% said most of the time and 8.9% responded always. When asked "How often did health providers give you attitude or disrespected you?" 27.6% of respondents said never/hardly ever, 44.4% said some of the time, 15.9% said most of the time, and 12.1% said always.

**Conclusion:** Our survey reveals that LGBTQ people continue to experience challenges during health care encounters. When going to healthcare visits, over 73% of participants in our survey worried that their health care provider would negatively judge them. In addition, 51% of respondents felt the need to modify their gender expression in health care settings. Alarming, we found that these feelings are not unfounded, given that 72% of respondents reported experiencing disrespectful attitudes from their health provider. Furthermore, our data showed that 54% of participants have encountered a health provider that refused to treat them. Given the multiple health disparities found among the LGBTQ community, these findings are concerning. Having to conform to societal norms and deal with health providers biases may lead many LGBTQ people to feel unsafe and not seek care when needed. More research is needed to explore the factors that influence LGBTQ people's experiences. Additionally, it is imperative that future research explores the intersectionality of the LGBTQ community

## **Hyperglycemia in Diabetics With COPD Exacerbations Treated With Corticosteroids**

*Colby Brooks, Nathan Kopek*

An integral part in the treatment of COPD exacerbation is steroids. Exact dosing, route, and type of steroid used has been variable. A single center retrospective review was performed comparing IV solumedrol at a dose of 40 mg IV every 8 hours to daily oral

prednisone 40 mg. These were compared for their effect on blood glucose and insulin required in diabetic patients being treated for COPD exacerbation over the first three days of hospitalization. 63 patients were identified that fit the criteria of being admitted for COPD exacerbation with history of diabetes and treated with steroids. P value for prednisone vs solumedrol group comparing blood glucose was 0.45. P value for insulin use between the two groups was 0.96. No significant difference between the groups was identified. This was largely due to the large standard deviations within the two groups. A larger population would be required to possibly obtain significant data, however could not be obtained in this study secondary to time restraints and information technology department limitations.

## **Hypertriglyceridemia and Hypercholesterolemia In a Newly Diagnosed Type 1 Diabetes Mellitus and Response to Initial Insulin Treatment: A Case Report**

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Hurley Medical Center and Michigan State University

Hypertriglyceridemia and hypercholesterolemia are commonly seen in patients with new onset type 1 diabetes. This is attributed to insulin deficiency which leads to decreased activity of lipoprotein lipase. Insulin treatment usually corrects the triglyceride level in 2-3 days. However, the response of the cholesterol level is not clear. In this case report, we present the response of both triglyceride and cholesterol levels to two weeks of insulin treatment in a newly diagnosed pediatric patient.

Case report: A 5 year old female presented to our ER with a 2 months history of polyuria, polydipsia and weight loss. Her mother also reported decreased activity. Her developmental history was normal. On presentation, she was vitally stable, alert and oriented. Initial labs showed hyperglycemia with blood sugar >600 and hyponatremia with no ketoacidosis. Triglycerides was 3199, total cholesterol 616, and low insulin levels of <0.5. Management with fluids and subcutaneous insulin for diabetes was started. This treatment improved the glucose levels. In addition, there was a significant decline in triglycerides levels down to 256, however total cholesterol level remained elevated (see table 1).

However, two weeks later, total cholesterol levels decreased with modest improvement with the LDL cholesterol.

Day of insulin  
Triglycerides  
Total cholesterol  
HDL  
LDL\*  
Insulin levels  
Day 1

3199  
616  
80  
\* Not done  
<0.5  
Day3  
256  
556  
39  
466  
6.2  
Day 14  
279  
307  
51  
200  
N/A

Table1.\*not done, LDL level was too high to measure.

It is not uncommon that triglycerides levels are high in insulin-deficient type 1 diabetes mellitus. Insulin has been proven to lower triglyceride levels. However, total cholesterol response to insulin is not clearly studied. In our case triglycerides level showed marked improvement in the first three days but total cholesterol did not improve. Two weeks later, triglyceride level did not change but total cholesterol showed modest improvement. It has been proven that insulin affects the lipase enzyme and improves the triglycerides level. Lowering of the cholesterol in this case could be secondary to better control of sugar and decrease of free fatty acids and corresponding decrease in cholesterol.

Conclusion: Insulin is the most powerful mediator in improving triglyceride levels with a partial improvement in cholesterol level in two weeks. In conditions where there is delayed response of the cholesterol to insulin, further investigation is warranted.

## **The Impact of Alcohol Level on Elderly Patients Presenting to the Emergency Department with Blunt Trauma**

*Hutton White, MD<sup>1</sup>, Tarik Wasfie, MD, FACS<sup>1</sup> Taylor Casey, OMS-III<sup>2</sup>, Jennifer Hella<sup>3</sup>, MPH, BS, Kimberly Barber<sup>3</sup> PhD, Brian Shapiro, MD, FACS<sup>1</sup>*

Introduction: Alcohol is a chemical substance that alters cognitive ability and judgment, which may influence outcomes in elderly trauma patients. We elected to look at our elderly trauma patients that arrived to the Emergency Department (ED) following trauma and evaluate the confounding factors that may influence outcome.

Methods: Following IRB approval, a retrospective analysis of trauma patients seen in the ED with positive alcohol levels was performed. Age, gender, comorbid conditions, medications, mortality, hospital and intensive care unit (ICU) length of stay, Glasgow coma score (GCS) and injury severity score (ISS) were collected. Statistical and regression analysis were performed to identify the confounding factors for outcomes.

Results: Records were collected on 451 patients with a mean age of 43 years. There were 316 males (70%) and 135 females. The average length of stay was 3 days, average GCS was 14, and average ISS was 7.0. Mean alcohol level was  $176 \text{ g/dL} \pm 91.6$ . There were 43 patients aged 65 years and older with significantly higher hospital and ICU stay (4.1 and 2.4 days, respectively,  $p = 0.048$ ) compared to the 64 and younger group (2.8 and 1.1 days, respectively,  $p = 0.063$ ). There was no difference in alcohol level when divided into the two groups of  $\leq 99$  and  $\geq 100$ . However, mortality and comorbid conditions were higher in the elderly.

Conclusions: Elderly alcohol trauma patients had a higher mortality and length of stay than the younger group due to a higher number of comorbidities, while alcohol seems to play an insignificant role.

## **Increase in Violent Crime & Trauma following Relaxation of Stay-At-Home Mandate and Mental Health Crisis during the COVID-19 Pandemic**

*Arjun Chadha, Andrea Montalbano, Dr. Philip Jenkins, Dr. Leo Mercer and Dr. Gul Sachwani-Dasani*

Michigan State University and Hurley Medical Center

The COVID-19 pandemic has influenced daily life with far reaching, expansive, and devastating implications on individuals and society. Stay-at-home orders were issued across states to prevent the spread of the virus, resulting in major disruptions of daily activities for the majority of individuals. The burden of this disruption, along with social, psychological, and economic fallout associated with efforts to lessen the spread of COVID-19, led to intensified violence-related harms. Multiple mechanisms have been theorized through which the pandemic may be associated with changes in violence and exposure to violence, such as social isolation, hopelessness, and loss.

The primary aim of this study is to evaluate the social, economic and mental health factors that may account for the increased violence and trauma case load experienced at HMC following the state of emergency and Stay-at-home mandate issued by the Governor of Michigan in response to the COVID-19 pandemic. We conducted a retrospective chart review on all trauma patients admitted to Hurley Medical Center from 3/2020-7/2021 secondary to intentional interpersonal and self-inflicted injuries ( $n=527$ ). Charts were reviewed for key demographic, mechanism of injury and disposition information. Our findings include that the majority of patients had drug use history, and a large portion had mental health diagnoses. The most prevalent mechanism of injury

was gunshot wounds. Our future steps are to compare our trauma admissions during the same time period to other urban centers across the country.

## **Is it Mycoplasma Pneumonia Induced Mucositis or Multi inflammatory Syndrome Associated with COVID 19 in Children?**

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Mycoplasma pneumonia, a common cause of atypical pneumonia, has a wide range of cutaneous manifestations including urticaria, Mycoplasma pneumonia induced rash and mucositis (MIRM ), erythema multiforme (EM), Stevens-Johnson syndrome (SJS), and toxic epidermal necrolysis (TEN).

MIRM is characterized by involvement of two or more mucosal sites and sparse skin involvement. It has been recently described as a new separate entity from other mucocutaneous eruptions. More recently, Multi inflammatory syndrome associated with COVID 19 in Children (MIS-C) is described. It shares some similarities with MIRM including fever, conjunctivitis, mucosal involvement, and skin rash. We describe a 7-years old female presented with an 8 days' history of fever associated with cough, rash, and mucositis. She showed evidence of both recent mycoplasma infection and COVID 19 infection as evidenced by her positive mycoplasma Immunoglobulin M antibodies (IgM) and COVID 19 antibodies respectively. She was treated with both IVIG and steroids and she recovered well.

The case demonstrates the overlap in symptoms between MIS-C and MIRM. It represents a diagnostic challenge in establishing a definitive diagnosis in the era of high prevalence of COVID 19 antibodies.

## **Lymphocytic Esophagitis: Case Report and Literature Review**

*Jacob Burch, DO, Mark Minaudo, DO*

Lymphocytic esophagitis (LyE) is an uncommon clinical entity first described by Rubio et al. in 2006. Given the limited number of publications regarding this condition, it remains poorly understood and likely under reported. We present the case of a 44-year-old female who was diagnosed with lymphocytic esophagitis while undergoing esophagogastroduodenoscopy for the evaluation of dysphagia. We also discuss the current literature regarding LyE including the diagnostic dilemmas, clinical and endoscopic presentations, and treatment strategies.

# Mindfulness in Medicine: Promoting Health, Well-being, and Resilience

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Hurley Medical Center, McLaren Flint, and Michigan State University

**Background:** Resident burnout is a long-standing issue in medical education with the COVID-19 pandemic causing significant additional burnout burden. Navines et. al. (2021) found current burnout rates of residents as high as 76% (vs 50% prior). Implementation of mindfulness programs have shown to improve physician wellness, decrease burnout, and create environments of resilience (Romceovich [et.al](#) 2018, Ireland, [et.al](#) 2017). Epstein et. al. (2021) implemented a 4-day mindfulness workshop for physicians, with improvements in emotional exhaustion, depersonalization, and patient-centered care. While mindfulness has recently come to the forefront for wellness, few studies describe feasible, longitudinal programs focused on resident wellness. Programs like Search Inside Yourself (SIY) teach mindfulness, emotional intelligence and leadership skills and may assist with mitigating burnout.

**Objective:** To assess a feasible, longitudinal mindfulness program (SIY) for residents to combat burnout and stress; build resilience; and improve self-care.

**Design/Methods:** After completion of SIY training, Dr. Sawni (pediatrician) and Dr. Wolf (psychologist), taught a modified version to Pediatric and Medicine-Pediatric residents at Hurley Hospital, Flint MI. It consisted of 12 hours, split over 3 consecutive sessions. Pre and post surveys were given, assessing demographics, wellness, and program evaluation. Desired responses to 29 wellness questions (combining Strongly Agree/Agree, Very Often/Often, Strongly Disagree/Disagree, or Rarely/Never) were compared pre to post training. The study was approved by Hurley Hospital IRB.

**Results:** Of the 29 wellness questions, 10 items had a positive change by at least 10 percentage points. There were 5 items, related to distractibility, that decreased by at least 10 points (Table 2). After the program, 93% of attendees said they were Satisfied/Very Satisfied with the program and 93% agreed that the material was relevant to current challenges. Majority (86%) reported feeling ready to apply what they learned.

**Conclusion(s):** Mindfulness as an approach to mitigate burnout and stress has been shown to be successful with residents and in limited previous studies. This program is feasible and can be introduced as part of the core residency curriculum. The increase in reported distractibility may be due to the continued pandemic and may be addressed through additional sessions, shown to help burnout and resilience. Limitations include small sample size and limited number of sessions. Future programs will include similar mindfulness interventions to support wellness longitudinally.

## **Neighborhood Factors and Physical Activity During the COVID-19 Pandemic for Black Pregnant Individuals**

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Background: Maternal physical activity is associated with a decreased risk of adverse birth outcomes. Levels of physical activity have been linked to the neighborhood residential environment. This pilot study explored the relationship between neighborhood factors and physical activity during the COVID-19 pandemic for Black pregnant individuals. Methods: Black individuals enrolled in the Biosocial Impact on Black Births (BIBB) study who were still pregnant at the start of the COVID-19 pandemic were surveyed between May and June 2020. Thirty-three participants completed an online survey about their experiences during the early months of the pandemic. Participants were asked about demographics, perceived neighborhood environment (disorder, crime, walkability, racial composition), housing type, and physical activity changes since the pandemic. Results: The participants were 20-39 years old with all but one in the third trimester of pregnancy. The majority were unemployed and identified as having “barely enough” or “not enough” money to get by. Sixty-one percent of participants reported decreased physical activity levels during the COVID-19 pandemic compared with pre-pandemic. Living in an apartment or residing in neighborhoods with lower levels of walkability or higher levels of disorder and crime were associated with lower physical activity levels. Compared with participants who lived in townhomes or houses, individuals who lived in apartments were less likely to exercise in their home (43% vs 20%). Participants who reported higher levels of perceived neighborhood disorder and crime and lower levels of walkability were less likely to report walking in their neighborhood or park. Relationships were suggestive but were not statistically significant at the 0.05 level. Discussion: The results suggest that housing type and neighborhood environment relate to physical activity levels. We are not aware of any published studies on physical activity during the pandemic among pregnant Black individuals. The small sample size limits statistical power to detect statistically significant results. Conclusion: While already a group reporting a low rate of physical activity, levels may have further decreased for Black pregnant individuals during the COVID-19 pandemic, especially those in apartments and in a worse neighborhood environment.

## **Pelvic Fractures and Associated Urogenital Injuries in Children: A Systematic Review**

*Abdulmalik Saleem, Ameen Suhrawardy, Shivam Patel, Sazid Hasan, Alexandria Chrumkab,, Ehab Salehb*

Introduction: It is well-established in the orthopaedic literature that adult pelvic trauma can result in urologic injury. Because of the anatomical differences between the adult

and pediatric pelvis, it may be valuable for traumatologists to understand the immediate and long-term urogenital sequelae of pediatric pelvic fractures.

**Methods:** A literature review was conducted following the PRISMA systematic review guidelines. Pubmed, MEDLINE, SCOPUS, and Cochrane databases were searched using the terms (child OR adolescent OR pediatric OR paediatric) AND (pelvic trauma OR acetab\* injury OR pelvic injury) AND (urogenital trauma OR urethra\* OR urinary tract trauma OR urologic trauma OR urologic complications) on December 21st, 2021, yielding 525 papers. The papers were reviewed using Rayyan QCRI and studies included for data analysis were confirmed by at least two reviewers. The final review included 41 studies, encompassing a total of 1091 pediatric patients with pelvic fracture and concomitant urogenital injury.

**Results:** The most common mechanism of injury was motor vehicle collision (508 patients), followed by motor vehicle vs. pedestrian accident (237), and fall (91). A total of 738 patients were reported to have some level of urethral injury. The most common specific urogenital injuries immediately following pelvic fracture included urethral disruption/rupture (343), penile/vaginal laceration (113), bladder rupture (62), and bladder neck injury (47). A majority of patients were stable and continent at a mean of 53.1 months follow up. Urgency incontinence, stricture recurrence, and erectile dysfunction were significant adverse outcomes associated with pelvic fractures.

**Conclusions:** Children involved in high impact blunt trauma should be assessed for pelvic fractures. Blunt pelvic trauma can cause urethral disruptions that may immediately result in extravasation. It is also fairly common for these urethral injuries to subsequently develop into strictures that must be surgically corrected. Surgical intervention for urethral injuries can be effective for reducing long-term urologic morbidity. However, aggregate data on life-long outcomes is needed to best understand the results of these injuries and interventions.

## **Psoriasiform Eruption in Pediatric Patient Taking TNF-Alpha Inhibitor**

*Antara Afrin BS, Victoria G. Farley MD*

Tumor necrosis factor (TNF)-alpha inhibitors are used to treat a variety of conditions, such as rheumatoid arthritis, psoriatic arthritis and inflammatory bowel disease. TNF-alpha inhibitors can present with a wide range of cutaneous side effects, including "paradoxical psoriasis," which is the new onset or exacerbation of psoriasis after beginning TNF-alpha treatment. We present a case of a 12-year-old male with a two-month history of an active rash located throughout his scalp and body. The patient was previously treated with hydrocortisone 2.5% cream, fluocinonide 0.05% solution, and triamcinolone 0.1% cream with no improvement. The patient has a past medical history of contact dermatitis and Crohn's disease. He was on adalimumab for six months before being switched to vedolizumab after a one-month presentation of the rash. Physical exam revealed psoriasiform papules coalescing into plaques distributed on the scalp and throughout the body. Biopsy of the right central frontal scalp and right anterior

proximal upper arm revealed features which were both pustular follicular-based and psoriasiform. The patient's clinical presentation in correlation with his past medical history and pathology findings indicate a diagnosis of psoriasiform dermatitis secondary due to TNF-alpha inhibitor treatment for Crohn's disease. The patient's Crohn's disease has remained stable due to his vedolizumab; therefore, the patient and his parents do not wish to change his treatment plan. We began treatment of his cutaneous manifestations with 308 nm excimer (XTRAC) laser sessions and emollients. His treatment plan includes hydrocortisone 2.5% cream, fluocinolone acetonide 0.01% topical scalp oil, fluocinonide 0.05% cream, triamcinolone acetonide 0.1% cream, and augmented betamethasone 0.05% topical ointment, only to be used as needed. Patient has no psoriatic arthritis features on imaging and will be monitored accordingly.

## **A Quality Study on COVID-19 Vaccination Implementation, Safety and Effects Among Emergency Department Staff**

*Leah Vreibel, DO, Jennifer Hella, MPH, Virginia Labdond, MD, MS, FACEP, Kimberly Barber, PhD*

**Background:** COVID-19 vaccines entered development in January 2020 and first became available in December 2020. Healthcare workers were the first to receive access to the vaccinations. Thirteen months elapsed between the time of pandemic expansion and the release of the vaccines. Many healthcare workers had already been infected by the COVID-19 virus at that time, which led to questions about how the vaccine may affect an individual that already had a natural immune response. Additionally, hospitals and emergency departments grappled with staffing shortages and illness among its staff. COVID vaccines became available to Hospital employees on December 23, 2020. The study examined the association between symptoms from a previous illness and a COVID vaccination.

**Methods:** A cross sectional survey questionnaire was created using REDCap and distributed electronically to Hospital Emergency Department doctors, nurses, administrators, pharmacists, technicians and secretaries. Participation was voluntary. The survey consisted of 33 multiple choice close-ended questions and requested the age and comorbid conditions of the participants, COVID infection status, and vaccination response symptoms (type, duration and severity). Distribution occurred in June and July of 2021. Differences between reported symptom rates was tested with Chi square analysis, between symptom durations with ANOVA, and with adjustment by regression analysis at a 0.05 significance value.

**Results:** A total of 136 responses were obtained. Of which, 70.9% reported no COVID-19 infection, 17.2% reported COVID-19 infection, 5.2% reported clinical symptoms but negative test, and 6.7% reported clinical symptoms and no testing. Among the subset of patients who had a past COVID-19 infection (n=34), there was no difference in rate of reported symptoms between those vaccinated and not vaccinated (88.9% vs 83.3%; relative difference = 6.3%, p=0.24) and no difference in the rate of long-term symptoms

between those vaccinated and not vaccinated (16.7% vs 10.0%; relative difference= 40.1%, p= 0.67).

Conclusion: We observed no difference in the rates of reported infection-related symptoms between those vaccinated and those who had not been vaccinated at the time of the survey. The similarity in rates was consistent for type, severity and duration of symptoms suggesting that immunized subjects did make it more likely for infected people to have worse side effects from the vaccine. However, the sample size was small and larger studies are needed to confirm this finding.

## **Resident Education to Improve Rate of Tobacco Use Assessment and Cessation in a Resident Clinic**

*Bitia Semsarieh, M.D.*

Ascension Genesys Hospital

This is a quality improvement project at Downtown Flint Health clinic. The purpose of this project is to improve adherence to a quality measure set in our clinic. Assessment of tobacco use by clinicians has shown to be effective in smoking abstinence, and the goal of this project is to provide resident education regarding tobacco use assessment and smoking cessation at Downtown Flint Health Clinic to improve this quality measure.

## **Rib Plating Outcomes in Trauma Patients with Multiple Rib Fractures: A Retrospective Study**

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With the elderly population expanding, traumatic injuries in this population have become far more prevalent. Fractured ribs are one of the most predominant injuries in this population, only second to compression vertebral fractures. Among patients in this demographic who are admitted for a blunt trauma workup, rib plating has become a popular procedure due to the earlier mobility it provides, post-operatively. This study focuses on rib fractures in the geriatric population who went for open reduction and fixation during admission and analyzes the impact of this procedure on length of stay and mortality.

## **Role of Abdominal Ultrasound and Magnetic Resonance Imaging in Pregnant Women Presenting with Acute Abdominal Pain**

*Tarik Wasfie, MD FACS, Alexa Marquez, DO, Holland Korbitz, DO, Eric Pearson, OMS-IV, Victor Wong, OMS-IV, Hunter Holsinger, OMS-III*

The incidence of appendicitis in pregnancy ranges between 1/766-1500 patients (0.07-0.13%) in patients with high clinical suspicion according to recent data. Appendicitis in a nonpregnant individual typically presents with generalized symptoms including nausea, vomiting, periumbilical abdominal pain, fever, with or without leukocytosis. However, in pregnancy, nausea and vomiting are most often physiologic due to normal rises in b-hcg levels especially in the first trimester. Some degree of leukocytosis is also common antepartum due to reactive immunologic changes and can be easily overlooked in pregnant patients whose leukocytosis is secondary to an acute infection. Acute surgical abdominal complications (i.e., appendicitis, diverticulitis, cholecystitis, etc.) are thus difficult to diagnose during pregnancy due to overlapping symptoms and physiologic changes that naturally occur during pregnancy. Given these nonspecific findings, differentials for abdominal pain during pregnancy include labor, appendicitis, cholecystitis, diverticulitis, pyelonephritis, and placental abruption. Acute appendicitis specifically is a clinical diagnosis. However, given the non-classical presentation associated with pregnancy, imaging is commonly used to aid in the diagnosis of appendicitis and acute surgical abdomens in pregnancy. Ultrasound is recommended by the American College of Radiology as the first-line imaging modality to diagnose acute appendicitis in the pregnant patient with MRI being second line in patients whose ultrasound is nondiagnostic.

More recent studies show that MRI has sensitivities and specificities as high as 96% for both and is the imaging modality of choice to evaluate abdominal pain suspicious for an acute abdomen in pregnant patients when clinical findings and ultrasound are equivocal. MRI has high diagnostic yield with minimal adverse effects towards the fetus. The American College of Obstetrics and Gynecology states that ultrasonography and MRI are not associated with risk and are the imaging techniques of choice for the pregnant patient, however the use of gadolinium contrast with MRI should be limited and should only be used if it significantly improves diagnostic performance.

However, MRI is expensive and not readily available. Appendicitis increases the likeliness of abortion or preterm labor especially if peritonitis has developed. Therefore, prompt evaluation and diagnosis is imperative to minimize the risks associated with acute appendicitis. The American College of Obstetricians and Gynecologists also recommends that a pregnant woman should never be denied necessary surgery or have surgery delayed regardless of trimester due to potential adverse effects on the patient and her fetus.

This study will retrospectively analyze the efficacy and utility of MRI during management and evaluation of abdominal pain during pregnancy when physical exam and or ultrasound findings are inconclusive or negative. Secondary analysis is to evaluate whether outcomes or time to diagnosis are improved in patients who underwent MRI during their work up. Data will be extracted from GEMs and CPN at Genesys and will be kept in the secure REDcaps system.

## **“Thumbprint” Cast Reduction for Minimally Displaced Pediatric Supracondylar Humerus Fractures**

*Eric Poole, MS; Courtney Schmidt, MD; Philip Nowicki, MD*

**Title:** “Thumbprint” Cast Reduction for Minimally Displaced Pediatric Supracondylar Humerus Fractures **Abstract Introduction:** Supracondylar humerus (SCH) fractures are a common elbow injury in pediatric patients. While treatments for type I and III SCH fractures are well-established, the treatment for type II fractures remains controversial. Literature has demonstrated that minimally displaced type II SCH can be adequately treated with casting alone. This study evaluates the efficacy of a “thumbprint” mold casting technique to treat minimally displaced SCH fractures. **Methods:** A retrospective case series was conducted assessing patient outcomes with type IIa SCH fractures at a single Level I pediatric trauma center. In this study, a “thumbprint” was placed in the arm cast at the level of the fracture to maintain its position (Fig. 1a). Primary radiographic measures used to evaluate maintenance of reduction included Bauman’s angle (BA) (Fig. 1b), shaft condylar angle (SCA) (Fig. 1c), and hourglass angle (HGA) (Fig. 1d) at three timepoints (initial, post-cast, cast removal). Healing time, surgical intervention and development of cast complications were also reviewed. The radiographs were assessed separately by three reviewers at each time point; intra-rater and inter-rater reliability for each angle was determined. **Results:** Thirty-six patients with type IIa SCH fractures were included. Average age at injury was 5 years 6 months. Average time to healing with cast removal was 4.1 weeks. All patients went on to complete union without the need for surgical stabilization. Three patients experienced mild skin irritation from casting and one patient reported a foreign object in the cast. There was no significant difference in pairwise comparisons of angles between all-time points, demonstrating maintenance of reduction at the end of treatment. Intraclass correlation coefficients (ICC) for raters showed fair reliability for BA (ICC 0.43) and HGA (ICC 0.46), and poor reliability for SCA (ICC 0.09). **Conclusion:** This is the first study to evaluate the “thumbprint” cast technique for treatment of minimally displaced type IIa SCH fractures. This method showed minimal complications. We found the “thumbprint” technique is a useful method to maintain reduction in type IIa SCH fractures that does not require excess flexion (>90 degrees) at the elbow joint.

## **Transporting Forward Facing Children Fitted with Hip Spica Casts: Detailed Crash Test Results, Cast Features, and Child Seat Considerations**

*Ayush Mehta BS, Daniel Kielminski MD, James Ostrander MD, Patrick Atkinson PhD, Theresa Atkinson PhD*

McLaren Flint and Kettering University

**Background:** Transporting a child treated with a hip spica cast is reported by parents and caregivers to be very challenging. This is due, in part, to the difficulty in placing the

child into a seat. The fixed position of the cast does not usually match the geometry of the child's original car seat. Challenges around placing a spica-casted child in a car seat are not well described in training materials for resident orthopaedic surgeons and current seat designs fail to accommodate the full range of casting positions utilized in patient care. The purpose of the current project is to begin to address these issues by making fit and safety performance data available to a broad range of end users including pediatricians, allied health professionals, and crash safety engineers. By providing these detailed data and videos the project will encourage further research and education in this area.

**Methods:** A crash dummy representing a 3 year old child was used as a surrogate for this investigation. A full hip spica cast was applied to the dummy to simulate treatment for a femur fracture. The fixed position of the casted dummy made it impossible to fit into most conventional child seats. After surveying a wide range of available child seats, it was discovered that three would accommodate the casted dummy's shape. The dummy was crash tested without a cast as a control after which a full hip spica cast was applied to the dummy. Pilot tests were conducted to identify car seats that would appropriately accommodate the fixed position of the cast. The casted dummy was then subjected to the same crash test as the control. Detailed photographs were taken of the cast as well as details associated with placing the casted dummy into the seat. High-speed, high-resolution video was taken of the crash to document the kinematics of the child and seat for all tests. Data from internal sensors placed throughout the dummy's body were also recorded to elucidate the loading of the body during the crash.

**Results:** Narrative descriptions of the methods and crash tests, including photographs, have been created. Videos of the crash events have been converted into lower resolution formats suitable for posting on-line. Data files documenting force and accelerations during the crash event have been clipped and reformatted into a generic format accessible to most spreadsheet programs. These data are being posted on Mendley's open access website and a Pubmed discoverable data publication is in process. This will make the data accessible for secondary uses for educational and research purposes.

**Conclusion:** Crash testing is typically very expensive, and it can be difficult to access data due either to proprietary reasons or practical issues with access. This project will make these data openly accessible for the first time. It is anticipated that pediatricians could use the movies in their practice to underscore the importance of the proper use of a car seat. Hospitals that apply hip spica casts could use the photos and videos as training for their surgical teams as well as the care coordinators who manage the discharge and subsequent follow-up appointment transports for the family. Finally, it is anticipated that the videos and dummy sensor data will be helpful to engineers and engineering students seeking to understand the physics of a car crash on children.

The hip spica cast is one example of the intersection of child passenger safety and a specialized medical treatment. Hospitals that offer hip spica casting must identify safe

methods to transport patients home from the hospital and during follow-up visits. The current study provides detailed data that addresses some of the design related issues that are likely to be encountered by the family and the care team. This includes the design of the seat, the cast, and the interaction between them. It is hoped that other groups will also share their findings to improve this challenging issue.

## **Understanding Discharge Instructions in Older Adults with Age Related Hearing Loss after Inpatient Administration of Bedside Assistive Hearing Device**

*Wojcik, Elise, DO*

**Introduction:** Older patients are often brought to the hospital on an emergent basis and are not able to bring any assistive hearing devices. A growing body of research has shown that a patient's age related hearing loss can have profound effects on the quality of their care, affecting such things as time to obtaining pain relief medications, or providers perception of patient's mental status. Studies have shown that patient education and close follow-up with outpatient specialists reduces rates of hospital readmissions. We sought to examine the utility of using a generic hearing device (a "pocket talker") in order to improve patient understanding of discharge instructions.

**Method:** This was a pre-post interventional study. Patients 65 years and older with age related hearing loss were approached during their inpatient stays at a local hospital. 19 patients were interviewed. First, participants were read key aspects of the discharge instructions including medications and follow-up care providers. Participants were then asked to repeat back aspects of their discharge instructions, and a comprehension score was established. Then, patients were provided an assistive hearing device, and the discharge instructions were repeated, and comprehension was checked again.

**Results:** Our results demonstrated a relative improvement of 89% in comprehension scores once patients were provided with an assistive hearing device.

**Discussion:** Our study found that providing a temporary assistive hearing device (that could be kept on the nursing unit) significantly improved comprehension of discharge instructions in older adults with age related hearing loss. This pilot study demonstrates that using a temporary assistive hearing device can be used for multiple hospitalized patients. This significant change suggests the potential benefits of assistive hearing devices if patients had access to them during their stay. Limitations and further research will also be discussed.

## **Using Lessons Learned to Establish Best Practices for Virtual Medical Education**

*Matthew Sardelli, MD; Seth Campbell, MD, Housein Tabrizi, MD; Theresa Atkinson, PhD; Allison Seely; Seerut Dhillon; Ranveer Ajmal*

## McLaren FLint and Kettering University

**Introduction:** With the rise of the COVID-19 pandemic and an increasing need to slow disease transmission, many residency programs transitioned didactic learning to a virtual environment to maintain social distancing. Studies have suggested the benefits of virtual learning include increased accessibility, more faculty engagement with residents, and lower costs/higher flexibility for programs to host guest speakers. However, there are also concerns that remote instruction may not be as effective as in-person learning due to technical difficulties, lack of proficiency with technology, information overload, and difficulty focusing. Despite the Covid-19 vaccine becoming more readily available, many authors believe it is unlikely teaching will return to pre-pandemic methods even as the pandemic subsides. Therefore, the purpose of this study is to analyze the strengths and improve upon the weaknesses of the current, COVID-19 adapted, virtual education practices for McLaren residents. This study will assess how effective the remote learning format has been and identify any gaps in quality, technical know-how, and equipment.

**Methods:** A google survey was deployed across the McLaren and Hurley system residency programs to gather input from residents and faculty about their experiences with the virtual learning environment during the COVID-19 pandemic. The survey included basic questions such as title (faculty, resident, etc.), residency year if applicable, program affiliation, sex, and age range as well as recorded which virtual events they attended this year, how many hours a week they spent in virtually meetings, and how they typically joined the meeting (iPhone, laptop, etc.).

The survey was further broken down into a section inquiring about technical issues and utilization. The questions about technical issues included how frequently they experienced a disruption, which technical issues they frequently encountered, whether they have experienced inappropriate behavior in virtual meetings, how confident they are in their ability to present and interact in virtual meetings, and how helpful they believed their residency program was in providing the necessary resources to meet virtually. The utilization portion of the survey included questions about which events they prefer to be virtual, in person, or hybrid, their level of participation in meetings, whether they prefer small or large groups, how effective they believe virtual learning is compared to in-person, and lastly, which policies they believe should be put in place for virtual meetings.

**Results:** A total of 44 McLaren and Hurley residents and faculty responded to the survey from program affiliations including Orthopedics, Internal Medicine, Pediatrics, Family Medicine, and Obstetrics/Gynecology (Fig 1-2). However, the majority of the respondents were male orthopedic residents and/or faculty between the age of 20 to 49 years old. Most events took place virtually aside from required testing, interviews, and clinical work which resulted in individuals spending more than 2-10 hours per week attending virtual events, typically via their laptop/tablet. Overall opinions regarding the current virtual environment included people having the same or lower participation in virtual meetings than in person, a preference for participation in small groups, and that

virtual was just as effective as in person. However, most respondents experienced some sort of technical/personal disruptions such as unmuted participants and conversations between participants, presenters having technical difficulties, poor sound quality and issues with speaking up, or lack of concentration due to access location distractions (Fig 3). In terms of best practices, 97.7% of participants felt microphone use should be a part of policy for virtual events followed by 76.7% wanting screen sharing policies, 72.1% wanting connectivity strength policies, and 67.4% wanting meeting access location policies.

Figure 1: Respondant Type

Figure 1. Pie graph showing the position of the survey respondents i.e., faculty, resident, etc.

Figure 2: Program Affiliation

Figure 2. Pie graph showing the survey respondents program affiliation

Figure 3: How Frequently Respondents Experienced Disruptions Virtually

Figure 3. Pie graph showing how frequently respondents experienced disruption in their connection during a virtual event.

Discussion: Majority of respondents felt that microphone use policies should be implemented followed by screen sharing, connectivity strength, and meeting access location policies in order to improve their experiences with virtual education. Moving forward, the plan is to update the Flint Orthopedics residency virtual meeting practices using these results and trial the new practices for 3 months. After the 3 months, another survey will be administered to just the Flint Orthopedic residents and faculty to assess whether the changes improved their experience and supported resident education.

## **Why Do Patients Choose Extended Care Facilities after Total Hip and Knee Arthroplasty?**

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Introduction: With the high costs of a total joint arthroplasty (TJA), there has been an increasing push for cost containment. Studies have suggested that a significant portion of the cost is incurred from discharges to skilled nursing facilities (SNF). Under the current bundled payment plan, hospitals and surgeons may encourage patients to utilize a home health aide rather than be discharged to a SNF as a means of cost reduction. Current research shows that patients discharged to an SNF tend to have overall poorer outcomes including higher 90 day readmission rates and complication rates compared

to those who recover at home. However, patients rarely choose to recover in a SNF for medical reasons alone and may be influenced by other factors such as age, gender, race, past medical history, and Medicare status. While many studies have looked at these non-modifiable reasons for discharge destination, there are no studies that consider the modifiable reasons such as lack of a home caretaker, home layout barriers, or even patient fears. Thus, the purpose of this study is to look at the modifiable, non-medical factors in order to provide insight into how to better counsel patients to eliminate unnecessary discharges to a SNF and ultimately, reduce overall cost.

**Methods:** At the pre-surgery appointment, patients completed a Risk Assessment and Prediction Tool (RAPT) questionnaire, which is widely used to predict the discharge destination of patients undergoing elective TJA, along with a joint function questionnaire (HOOS/KOOS) and healthy quality of life questionnaire (PROMIS). Patients also documented their post-operative discharge plan, and answered questions aimed at differentiating between medical versus non-medical discharges to a SNF. Questions included how far patients can walk, the number of stairs in their home, and whether they will live with someone or if someone will be available to help them when needed. At the two week follow up, the patient then completed a follow-up survey including basic demographics (age, gender, race, height, weight, past medical history), whether they recovered at a SNF, and the reasons they chose to recover at a SNF if applicable. This survey allowed patients to indicate why they recovered at a SNF which included: pre-operative plan to recover at SNF, medical reasons (ex.- pain, pre-existing medical issues, hospital complications), social reasons (ex.- no one available to help at home or with transportation), fears (ex.- concern for safety due to living alone or fall risks), and accessibility (ex.- getting to the bathroom, bed, kitchen or up stairs).

**Results:** Of the 320 patients included in the study, 303 discharged home and 17 patients discharged to an SNF post operative: 9 for social reasons, 5 for medical reasons, 3 for accessibility reasons, 1 due to fears surrounding home discharge, and 1 planned to recover at SNF prior to surgery. Some patients listed more than one reason for discharge to SNF. Demographic trends demonstrate that of the patients discharged to a SNF 94% were female and 6% male compared to patients that did not go to a SNF 68% were female and 32% male. When comparing home accessibility in terms of stairs in the home, of patients discharged to SNF, 41.18% had no stairs in their home and 58.82% had 2-5 stairs within their home. Of those discharged to home, 17.5% had no stairs in their home, 60.07% had 2-5 stairs within their home, and 10.23% had 5-10 steps in their home. Of the patients discharged to SNF, 41% had a caretaker that lived with them versus 59% that did not. In comparison, 82.5% of patients discharged to home had a caretaker that lived with them versus 17.5% that did not. Lastly, a RAPT score of 7 or lower was indicative of a patient going to a nursing home (Figure 1).

**Discussion:** Only 5.3% of the study population was discharged to a SNF post operatively. The majority of these discharges occurred for non-medical reasons. Only 30% of patients reported medical concerns as the reason for discharge to SNF. Patients were more likely to be discharged to a SNF if they were female and did not have a

caregiver to live with them post operatively. The presence and amount of stairs in the house was not a deterrent for the majority of patients in discharging home. Secondary to hospital COVID-19 policies, there was an approximately 3-month period in which all TJA were performed on a required outpatient basis with same day discharge to home. Thus, there is a selection bias during this time frame for patients who did not need a SNF discharge. Overall, this observational study demonstrates the role of non-medical, modifiable factors such as presence of live in caregiver in the decision to discharge to SNF versus home.

## **A Wristband QI Project to Reduce ED Utilization Post Total Joint Arthroplasty**

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**Introduction:** Patients who have undergone elective hip or knee arthroplasty occasionally return to the emergency department (ED) for care following discharge, resulting in high healthcare costs. A previous study showed that this can be avoided with appropriate avenues for patient communication, such as by telephone, to help reduce medically unnecessary visits to the ED. Additionally, wristbands have been utilized in many different settings to remind surgical teams and patients of important factors like allergies or exercise. Therefore, the overall purpose of this quality improvement (QI) study is to examine whether providing hip and knee arthroplasty patients with a wristband to remind patients to call their physician if they have questions or concerns post-surgery can reduce ED visits during the 90 days after their surgery. Within this QI broader study, a sub-study examined how responding to patient phone calls impacted resident workload, documented common patient concerns, and collected information on perceived challenges and benefits associated with this wristband project.

**Methods:** Beginning in January of 2020, post-surgery, patients were given a wristband with a phone number that connected them to the on-call orthopedic resident, to remind patients to call prior to considering going to the ED. Residents were expected to be able to address patient concerns and give advice for appropriate follow-up care. Program Year 3 through 5 orthopaedic surgery residents fielded phone calls. These residents were surveyed twice, once at 3 months and again after 6 months, to assess the calls they were receiving. This survey asked residents to indicate whether they received more calls from total hip arthroplasty (THA) or total knee arthroplasty (TKA) patients, at what point in their recovery did they call, specific issues addressed on the call (pain, wound/dressing questions, medication/patient instructions, GI issues, etc.), how many calls they received, percent of calls that required action (referrals to OrthoMichigan or ED), and how long calls lasted. The survey also inquired about the burden the calls placed on the residents and whether or not they believed the wristband initiative improved patient care. Impacts on rates of ED use were monitored using data

from the Michigan Arthroplasty Registry Collaborative Quality Improvement (MARQI) system which provided a count of ED visits for McLaren Flint primary, unilateral hip and knee patients.

Results: Results from the two surveys revealed that the on-call resident received on average about 2 to 3 calls per week and spent about 10 to 15 minutes on each call, typically within the first week of the patient's surgery. They received an equal number of calls from THA and TKA patients with the most common issue being pain. Despite a majority of the residents feeling that the wristband project placed some burden on them, all of them felt that the wristband initiative helped to improve patient care. Furthermore, an analysis of the MARQI data for McLaren Flint from November 2018 to May 2021 revealed that the rate of readmission post THA or TKA decreased, a possible indication that the wristband helped in reducing the amount of ED visits during the 90-day period after surgery (Figure 1, poster).

Discussion: The wristband initiative helped to improve patient care by providing an accessible, direct contact to a physician for an immediate response to questions and concerns. This appears to be helping patients to avoid unnecessary ED visits and readmission to the hospital, however the current data is limited as information through the end of 2021 is not yet available. Additionally, Covid-19 resulted in changes to surgical practice during the project and potentially impacted patient attitudes toward ED visits, which likely impacted the results. Anecdotally, patients made positive comments about the program to attending surgeons supporting the value of this initiative. Overall, the orthopedic residents and attending physicians involved in the study support continuation of this QI initiative.